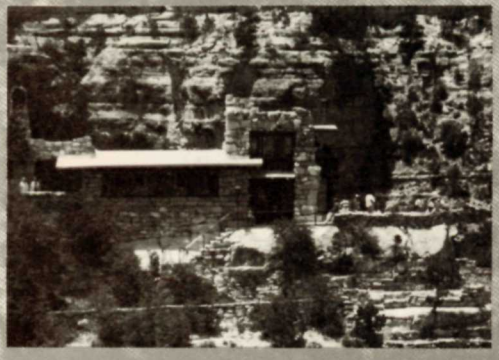
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ACKNOWLEDGEMENTS

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These guidelines are intended to direct and shape the efforts of architects, planners, landscape architects, concessioners, administrators, maintenance personnel and design review staff as they work to create aesthetically and environmentally appropriate structures. If these guidelines are used successfully, the built environment will contribute to, rather than detract from, the unique sense of place within ***Grand Canyon National Park.***

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The Grand Canyon of the Colorado is a special place.

Many modern Native American tribes revere the Canyon as a sacred place, some considering it the place where their ancestors emerged into this world from a previous world. The canyon has powerful meaning in many of the ancient stories which have been passed through generations. When these people visit the Canyon today, they are not tourists but worshippers, walking on holy ground.

Our European culture has also considered Grand Canyon to be a special place. In the last century, while there have been exploiters of the Canyon, the legislative history has been one of increasing protection of the land and its resources. First recognized as an incomparable scenic landscape and as an unparalleled geologic storybook, the Grand Canyon has since been recognized as a treasure of biological, paleontological, archeological and historical resources as well. And, as development pressures continue to consume resources, memories, and ways of life, worldwide, the Grand Canyon's significance as an island of permanence which is accessible to millions, increases.

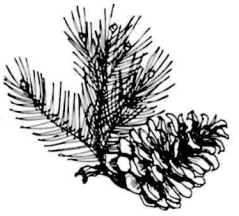
The sense of being in a special place at the Grand Canyon was reinforced by the architecture of some of the earliest white builders. Mary Elizabeth Jane Colter's Hopi House, and later her Hermit's Rest and Lookout Studio buildings, blended native materials and local building practices to facilitate a thoroughly modern activity – tourism. Her buildings respect the dominance of the natural landscape and fit into, rather than compete with, their natural and cultural surroundings. Hers was a style not in vogue in the Victorian time and not in keeping with the new modernism. It was special architecture for special places. In the years since her last Grand Canyon building was constructed in 1935, her work has become a resource worthy of protection in and of itself by being awarded National Landmark status.

After World War II, the architecture at the Grand Canyon lost the feeling of subservience to the natural environment and with it, some of the sense of a special place. The 1950's and 1960's saw a suburbanization in architecture. Today that era's architecture reads as arrogance toward the organic, rustic buildings of earlier builders in favor of the practical, convenient, and automobile-based architecture of the time. The business of tourism dominates the natural environment in that era of Grand Canyon architecture.

Today, while the protection afforded the Grand Canyon has improved, threats to its status as a special place have increased. Drastic increases in visitation in only a few years have made much of the built environment look shabby, worn, and tired. The existing infrastructure no longer functions well, and important changes are being considered in the way people visit the Canyon.

At the same time, America has tightened its economic belt and the up-front costs of building, in both the private and public sectors, are being very closely scrutinized. Our challenge is to return to an architecture that reflects the special sense of place we must preserve without breaking the budget.

At Grand Canyon National Park we propose to do three things. First, to encourage new buildings to contribute to the pre-existing sense of place at the building site. This means structures should be designed to "fit in" with their sites rather than to dominate them. Second, to encourage sustainable building systems, materials, and construction techniques in all buildings. Reducing consumption of materials and energy, reducing waste, and making intelligent choices about how a building is used can benefit the environment both locally and globally.



Third, to continue the rustic style for important public buildings which contributes to visitors' understanding of where they are and why this place is important.

This document outlines our intended direction as we embark upon a new era of protection and interpretation of the Grand Canyon as a special place in the world. It is not intended to be so rigid as to stifle creative expression; yet it must guide. It is hoped that these parameters will channel that expression to appropriately interpret the natural and cultural resources of the area as others have done before us.

Above all, we must regain the level of respect for the Canyon that was evident in the work of earlier designers and builders such as Mary Jane Colter. These guidelines were written with a healthy respect for the Canyon environment, tempered by the economic realities of our time. However, we must always remember that we are building on holy ground.

Brad Traver
Chief of Professional Services
Grand Canyon National Park
May, 1994

CONTEXT



All of the land within Grand Canyon National Park is federally owned and managed by the National Park Service. Any project within the Park which impacts Park resources (natural or cultural) is subject to federal laws and regulations which are intended to protect the resources and promote effective project planning.

These architectural character guidelines are part of a design review process which exists in the Park to encourage a cooperative approach to planning, design, and construction between project sponsors, their designers, and Park managers. The steps outlined on this page are common to all design and construction projects within the Park.

In order to meet final approval, each project must adhere to the following codes and NPS guidelines, although special provisions may also apply. Designers should contact the Park permitting office for further information.

BUILDING CODES

- Uniform Building Code (latest edition)
- National Electrical Code (latest edition)
- Uniform Mechanical Code (latest edition)
- Uniform Plumbing Code (latest edition)
- Uniform Fire Code (latest edition)

NPS GUIDELINES

- NPS-10: Drafting Guideline
- NPS-12: NEPA Compliance Guideline
- NPS-28: Cultural Resources Management Guidelines
- Grand Canyon National Park Architectural Character Guidelines
- NPS-76: Housing Design and Rehabilitation Guideline
- NPS-70: Design Process Guidelines (Draft)
- UFAS: Uniform Federal Accessibility Standards (latest edition)
- Secretary of the Interior's Standards for the Treatment of Historic Properties (rev. 1992)

DESIGN AND REVIEW PROCESS

1. PREDESIGN MEETING

- Discuss project program, scope of work.
- Visit site.
- Identify archeological needs, historic structure documentation.
- Ensure compatibility with existing Park plans.
- Identify course of action, permit, and compliance requirements.

2. DESIGN ALTERNATIVES

- Identify and present several alternatives. NPS will assist in selection of most appropriate alternative.
- Initiate NEPA and section 106 compliance procedures.

3. DESIGN DEVELOPMENT

- Further develop the selected alternative with plans and specifications. Submit to NPS for review at 50% completion stage.
- If project involves historic structures, NPS reviews and forwards the submittal to Coconino County and the State Historic Preservation Officer for review.

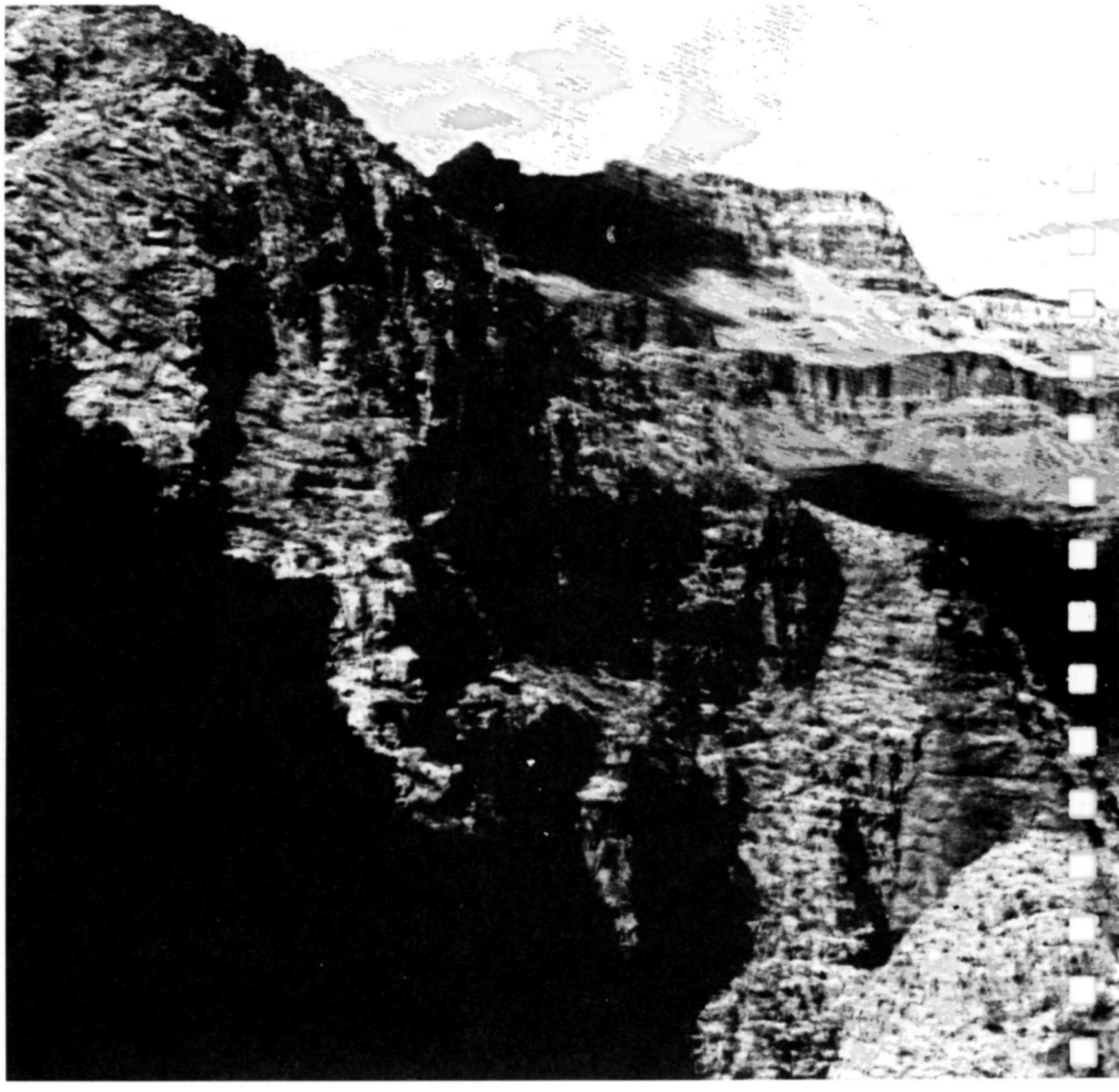
4. FINAL SUBMITTAL

- After receiving 100% final construction document submittal and after approval of compliance procedures, NPS issues a construction permit.
- NPS inspects project at various stages during construction until project closeout.

DESIGN WITHIN CONTEXT

Context refers to the major factors within the environment which taken together establish an area's character or sense of place. These factors include natural features such as topography, soils, vegetation, and climate; as well as cultural features such as the local history, traditions, art, and architecture. In order to design within context a designer must understand these factors and how they combine to create the character of a specific site. A clear understanding of the context is crucial in order to ensure that new development contributes to the character of an area rather than detract from its sense of place. The purpose of this section is to help the designer begin to identify the natural and cultural features of various developed areas within this park which in combination create the context.

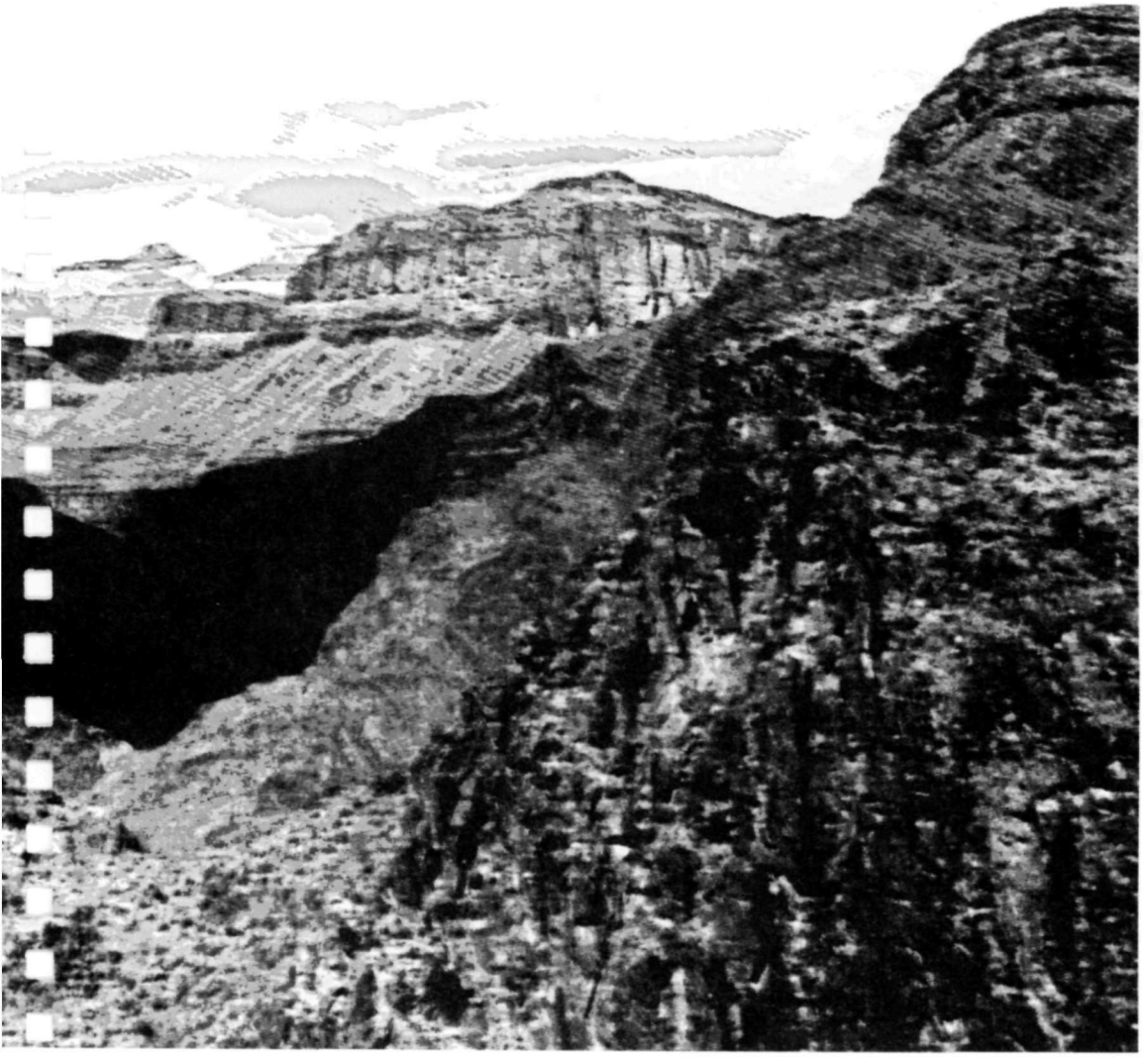
Development within Grand Canyon National Park is and will continue to be concentrated in four distinct subareas. These subareas include the South Rim, North Rim, Desert View, and the Inner Canyon. Each of these subareas is unique both geographically and culturally, as will be described in the pages that follow. A variety of building types exist in each subarea including Public/Visitor Use buildings, Community buildings, Residential buildings, and Utilitarian buildings. Each of these building types requires a different design approach. It is important to remember that within each subarea there are



historic districts and structures which require strict adherence to established NPS policies and guidelines (in addition to what is contained in these guidelines) which address any alteration or new development.

Many of the historic structures within the park are successful examples of design within context. Taken together they contribute to a strong and identifiable sense of place. The history timeline and discussion of architectural styles included in this section will describe the variety and development of existing architectural styles within the park. It is useful to note that the basic principles of many of the historic rustic design styles can be summarized as site specific, contextual design in which structures are subordinate to the natural environment.

Understanding the natural environment as well as the predominant architectural styles is the basis for successful design at Grand Canyon National Park. The designer must keep in mind that design within context does not mean recreation of historic details and methods of construction. Instead, it means understanding and translating the basic design process and principles, using contemporary materials and construction techniques to create structures which will contribute to, rather than detract from, the existing sense of place.



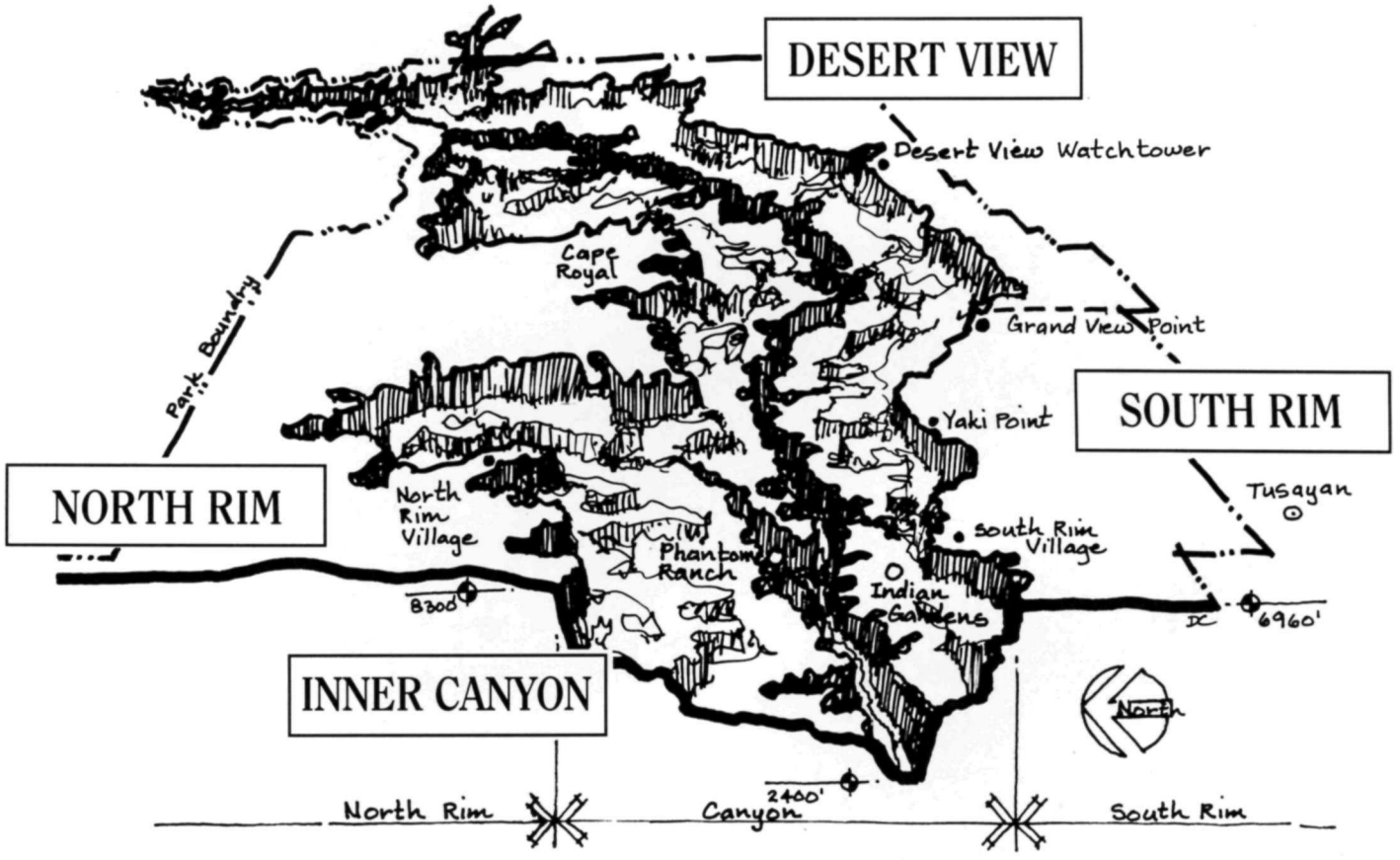
DEVELOPED AREAS OF GRAND CANYON



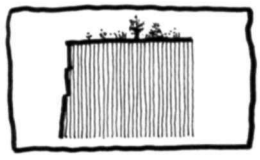


NORTH RIM

- Average elevation of 8300 feet
- 1300 feet higher than South Rim, thus cooler with more precipitation
- 129 inches average annual snowfall
- Average temperature: July Max: 77°F/Min: 46°F January Max : 37°F/Min: 16°F
- Densely forested with ponderosa, fir, spruce and aspen
- Hilly nature of the area results in slopes which are steeper than on the South Rim plateau
- Building styles: NPS Rustic, Mission 66, Rustic Revival







DESERT VIEW

- Average elevation of 7400 feet
- Flat, high plateau
- 65 inches average annual snowfall
- Average temperature: July Max: 84°F/ Min: 54°F January Max: 41°F/Min: 18°F
- Juniper/pinon forest, desert shrubs/cactus
- Limestone bedrock lies within inches of the surface
- Minimum development to date
- Building styles: Ethno-Historic Rustic, NPS Rustic, Mission 66, Rustic Revival

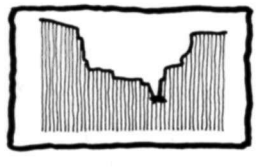




SOUTH RIM

- Average elevation of 6960 feet
- Flat, high plateau (4% slopes)
- 65 inches average annual snowfall
- Average temperature: July Max: 84°F/Min: 54°F January Max: 41°F/Min: 18°F
- Juniper/pinon/ponderosa forest
- Limestone bedrock lies within inches of the surface
- Contains the majority of development within the Park
- Building styles: Vernacular, Ethno-Historic Rustic, Swiss Rustic, NPS Rustic, Mission 66, Rustic Revival





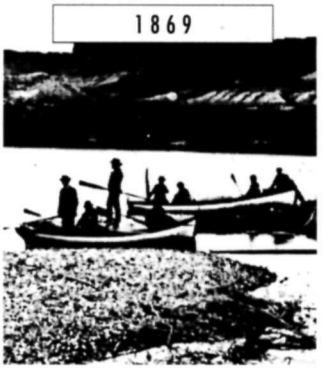
INNER CANYON

- Average elevation of 2400 feet
- Canyon is dominant, rock walls are overwhelming
- Zero inches average annual snowfall
- Average temperature: July Max: 106°F/Min: 78°F January Max: 56°F/Min: 36°F
- Phantom Ranch at bottom of canyon and Indian Gardens on the Tonto Plateau have a desert riparian environment, with the spring-fed creek, a canopy of cottonwoods, and more lush vegetation
- Very limited development potential
- Building styles: NPS Rustic, Rustic Revival

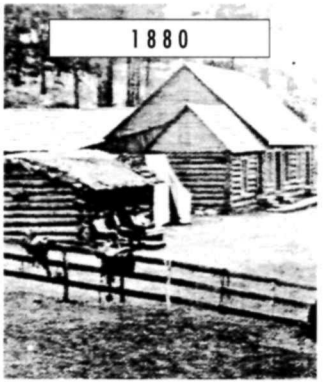
HISTORY TIMELINE



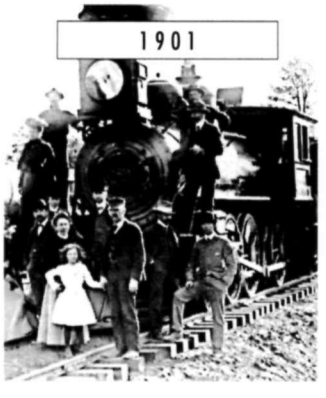
Pueblo ruins near Point Sublime



Powell's expedition



Pioneer John Hance's cabin



1st passenger train

THE PUEBLO PEOPLES- 1050 TO 1150

The Grand Canyon has had an estimated 5000 years of human occupation and contains an extensive archeological record. Perhaps the oldest surviving buildings in the Grand Canyon are cliff dwellings built of stone masonry by the Anasazi Pueblo Peoples under the overhanging cliffs near Point Sublime, occupied from circa 1050-1150. Additionally, there are archeological remains of settlement throughout the National Park from the earlier Basketmaker period of occupation, circa 700.

Today, the reservations of the Havasupai, Hualapai and Navajo tribes border the Grand Canyon while the Hopi, Paiute, and Zuni reservations are located nearby.

EXPLORATION - 1540 TO 1880

The Grand Canyon, which lay in the northerly frontier of New Spain, was reached by Spanish explorers from the Coronado expedition in September 1540.

In 1629 missions were established by missionary priests in the Hopi villages, and exploration of the Canyon continued.

The arrival at the Grand Canyon by an explorer from the United States reportedly occurred in 1826 when a fur trapper named James Ohio Pattie traveled down the Colorado River.

The Grand Canyon officially became United States territory in 1850, and exploration began in earnest. The daring scientific expeditions down the Colorado River led by Major John Wesley Powell in 1869 and 1871 were the most significant in terms of mapping and exploration.

PIONEER SETTLEMENT - 1880 TO 1900

Prospectors also began to explore the Grand Canyon in the second half of the 19th century and established numerous mining claims. Mining was limited until the railroad arrived.

The pioneer settlement of the Grand Canyon area began with the establishment of a ferry across the Colorado River by John Doyle Lee in 1871 at the mouth of the Paria River. Settlement by ranchers and miners did not really progress until the railroads reached the towns bordering the Grand Canyon, such as Flagstaff and Williams, in the early 1880's. Tourism also began on the South Rim in the 1880's with the construction of several primitive hotels. The Hance Hotel of 1886 was built on the rim near Grandview Point and was succeeded by the Grandview Hotel in 1895 and the Bright Angel Hotel in 1896.

RAILROAD DEVELOPMENT - 1901 TO 1920

To increase ridership on its cross-country trains, the nation's major railroad companies began to promote the great natural wonders and National Parks of the American West for tourism. The Santa Fe Railroad extended its line from Williams, Arizona, to the South Rim of the Grand Canyon, and the first passenger train arrived in September 1901. The Santa Fe Railroad teamed up with the Fred Harvey Company to build high quality resort facilities at the terminus of the railroad and within 4 years had completed the El Tovar Hotel and Hopi House. The railroad also remodeled the older Bright Angel Hotel into a lower cost tourist camp as overflow from the El Tovar. The railroad's development of tourist and service facilities continued at a very rapid pace and was practically unregulated in the first two decades of the 20th century.

NATIONAL PARK SERVICE PLANNING- 1919 TO 1933

The establishment of the National Park occurred in 1919, following the creation of the National Park Service in 1916. Prior to this, the park had been designated a Forest Reserve and then a National Monument, and was administered by the U.S. Forest Service. Under the new NPS administration, planning for the development of the Grand Canyon began as a cooperative effort with the NPS Landscape Engineering Department, the Santa Fe Railroad, and the Fred Harvey Company. The Comprehensive Development Plan for the Grand Canyon Village was adopted in 1924, and implementation began the following year.

The Rustic Style of architecture was utilized by the NPS in the planning and development of Park facilities from 1919 to the 1940's.

CIVILIAN CONSERVATION CORPS - 1933 TO 1941

Most of the development in Grand Canyon National Park between 1933 and 1941 was the direct result of the Civilian Conservation Corps (CCC). During the years the CCC program was in place, the Park enjoyed a boom period of development and construction. By 1936 four CCC camps had been established in the Park, and projects focused on road and trail building, erosion control, fire protection, and building construction. The building construction activity was widespread and included all the Park's developed areas with particular attention given to the village on the South Rim. The labor-intensive CCC construction was characterized by fine craftsmanship and the utilization of natural materials in the Rustic Style.

MISSION '66 - 1956 TO 1970

In 1956 Congress authorized a 10 year program of planning and construction known as Mission '66 to provide modern facilities for an increasing number of visitors. The 1966 target date for construction marked the 50-year anniversary of the creation of the National Park Service. Mission '66 at the Grand Canyon created a new visitor focal center on the South Rim, including a visitor center, campground and shopping center. The program enlarged roads, parking areas, and campgrounds and constructed many new motel units.

The design philosophy of Mission '66 was a radical departure from the Rustic heritage of the NPS; the new style was based on modern, progressive, architectural design and functionalism, employing the latest materials and technology.

CURRENT CHALLENGES - 1970 TO PRESENT

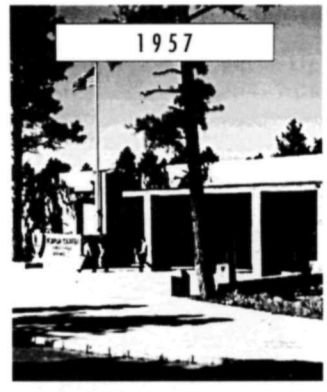
As a World Heritage Site, the Grand Canyon is recognized as a place of universal value containing internationally significant natural and cultural resources. The NPS faces the challenge of ensuring the preservation of the resources of the Grand Canyon as well as providing for the visitor experience of the Park. The expansion of tourism which began after World War II has continued unabated. The 1970's, 80's, and 90's have seen tremendous visitor use and demand placed on Grand Canyon National Park and its concessionaires. Current planning issues include visitor management and transportation within the Park to reduce traffic congestion, and the location of new facilities for both visitors and staff.



Superintendent's Residence



CCC Camp at Bright Angel



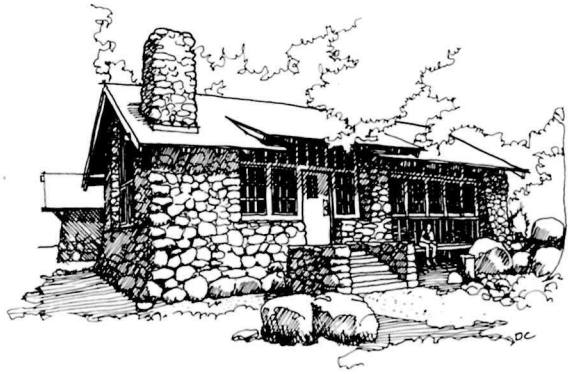
Visitor Center



New shuttle buses

OVERVIEW OF DESIGN PHILOSOPHY

In the development of Grand Canyon National Park, there have been a number of architectural stylistic influences at different periods in time. Briefly, this construction breaks down into the following categories or styles:



Phantom Ranch dining Hall, 1921: This structure exhibits many characteristics of the Rustic Style: a pitched overhanging roof with exposed rafter ends; vertically proportioned, multi-paned wood windows; and battered stone exterior combined with sections of sawn timber siding.

PIONEER/ VERNACULAR STYLE

There are very few remaining examples of the earliest pioneer construction in Grand Canyon National Park. Two original pioneer log cabins on the South Rim were incorporated in the construction of the Bright Angel Lodge in 1935. Likewise, there are few genuine vernacular buildings in the Park because both railroad era development and NPS development involved professional design. Vernacular buildings are simple, unsophisticated structures designed by their owners or builders without an architect and without refined stylistic characteristics. An example of vernacular building is the Kolb Studio of 1914.



An overhanging roof with decorative log corner buttresses and bracketing is characteristic of the rugged hand craftsmanship and attention to detail of the Rustic Style.

RUSTIC STYLE

The railroads were responsible for the first major concession developments in the important natural areas of the West, later to become national parks, capitalizing on the nation's growing interest in tourism to the wild frontier. The earliest hotels had been constructed in the mainstream architectural styles of the period, popular in the East and Midwest, such as the Colonial Revival Style. The Old Faithful Inn designed by Robert Reamer in 1903-1904 began a radical new movement in architecture in the parks of the West called (for want of a better term) Rustic. Influenced clearly by the Adirondack Style and Stick Style of the late 19th Century, the Rustic Style is related to the Arts and Crafts Movement of the turn of the century which was, in a sense, a backlash against the decorative excesses of the Victorian period. This backlash was characterized by a desire to return to a rugged simplicity in design, materials, and fine hand craftsmanship. The primary intent of the Rustic Style was to subordinate or harmonize a structure to its environment. It was believed that nature could not be improved upon and harmony with nature was the goal in Rustic architectural design. Pioneer building techniques were revived or imitated because it was thought that a structure employing native



Building No. 9: The rustic porch detail shows the rough but carefully crafted nature of the stonework. The battering of the corners and base helps the stonework to visually "grow" from the earth.

material in a natural or rough condition would blend best with its environment.

Within the overall category of Rustic Architecture at the Grand Canyon, three different sub-styles are apparent: Swiss Rustic, Ethno-Historic Rustic and NPS Rustic.

SWISS RUSTIC STYLE

Nearly concurrent with the design of the Old Faithful Inn in Yellowstone was the design of the El Tovar on the South Rim of the Grand Canyon in 1904 by staff designer Charles Whittlesey for the Atchison, Topeka and Santa Fe Railway and the Fred Harvey Company. The use of log slab siding and log detailing on the first floor created a rustic frontier atmosphere for the luxury hotel. Stylistically the El Tovar was called a combination of the "Swiss Chalet and Norway Villa." It is the earliest form of the Rustic Style at the Grand Canyon, transitional between the eclecticism of Victorian architecture and a Craftsman-based Rustic architecture which would, years later, become highly developed and widely promulgated by the National Park Service. The overall appearance of this Swiss Rustic Style is refined, not rugged or rough. The Swiss Rustic was used again twenty years later in the houses of Apache Street by Mohr and the deceptively large power house, next to the railroad tracks. The Swiss motif was not used in the design of the Mule Barn and Livery Stable of 1906. These utilitarian structures have a Craftsman Style appearance.

ETHNO-HISTORIC RUSTIC

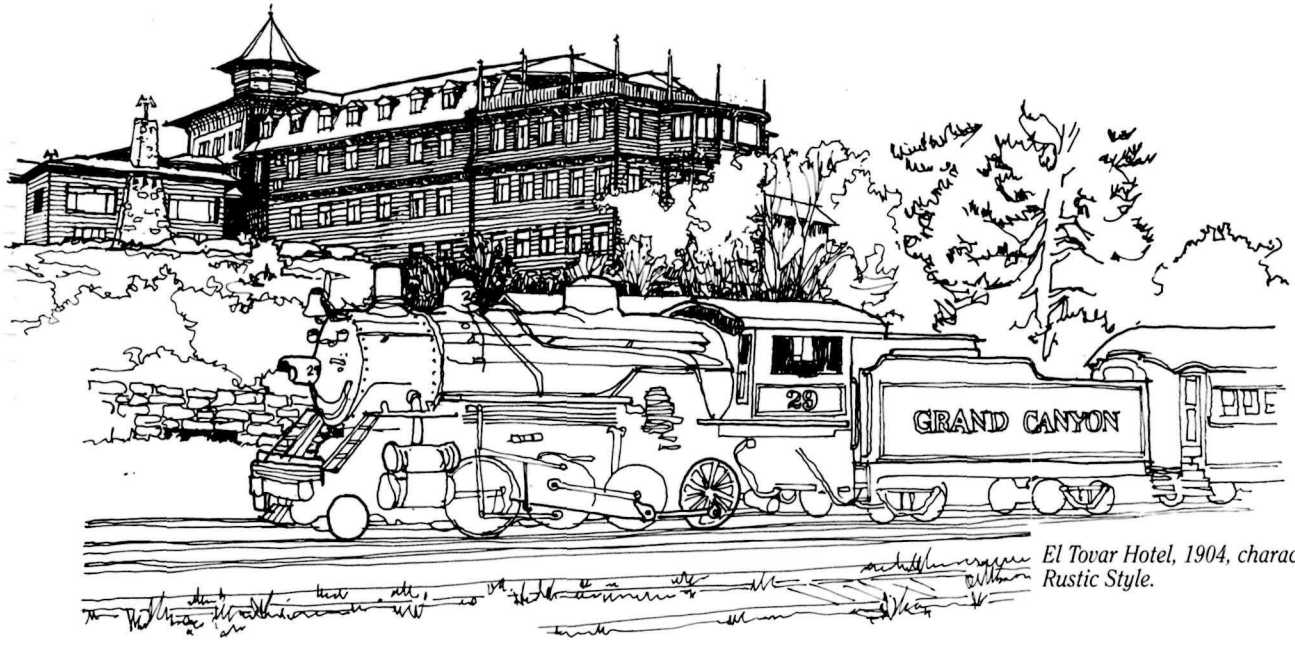
This expression of the Rustic Style draws its inspiration from the historic and prehistoric background of the southwest as well as the physical characteristics of the desert and the canyon.



Power House, 1926, South Rim Village: The elements of this building that are characteristic of the Swiss Rustic Style are the second story balcony with a flat, cut-out balustrade and a low pitched gabled roof with bracketed overhangs.



Lookout Studio, by Mary Colter, 1914. The organic design of this native stone structure reflects the rocky character of the Canyon Rim, typical of the Ethno-Historic Rustic Style.

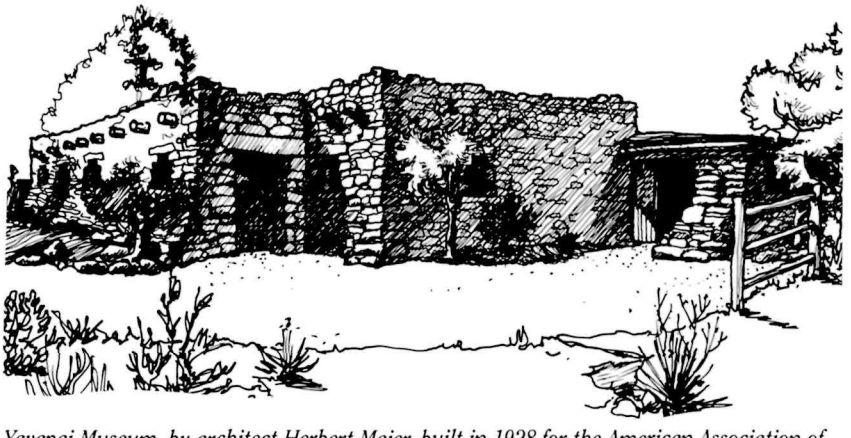


El Tovar Hotel, 1904, characterizes the Swiss Rustic Style.

Mary Elizabeth Jane Colter was hired in 1904 to design the main sales building for the Fred Harvey Indian Arts directly across from the El Tovar. Colter wanted to create a building which was appropriate to the setting at the edge of the canyon and which represented the cultural history of the area and the objects being sold within the building. Colter reproduced the Hopi pueblo at Oraibi, Arizona, and called it Hopi House. The building was designed to house "living history" exhibits as well as sales rooms. This building, in the development of the Rustic Style, establishes the value of relating to the ethnohistory of an area. Mary Colter's 1914 design of the Lookout Studio and Hermit's Rest had an enormous formative impact on the Rustic Style. These flat-roofed, native stone buildings which appear to grow out of the rock formation of the rim of the Grand Canyon are startlingly original and organic. She let the landscape shape the buildings and became a pioneer in the aesthetics of an architecture appropriate to and harmonious with the natural environment. Mary Colter's Desert View tower, built in 1932, is a superb example of the ethno-historic influence in design. Other examples of this style designed for the National Park Service are the museums at Yavapai and Tusayan, both flat-roofed, native stone structures with detailing which relates to building traditions of the Southwest.



Desert View Tower, by Mary Colter, 1932.



Yavapai Museum, by architect Herbert Maier, built in 1928 for the American Association of Museums and the National Park Service. This Ethno-Historic Rustic stone structure reflects the appearance of the canyon rim and the building traditions of the southwest with the flat roof and use of vigas to support the roof. The battered stone base was designed to blend the structure with its rocky environment.



Hermit's Rest, by Mary Colter, 1914. This Ethno-Historic Rustic building utilizes the southwestern flat roof form of vigas and latias. It features battered stonework crafted to look like a natural rock formation.

NPS RUSTIC

The Rustic Style flowered, thrived and matured in the official embrace of the National Park Service from 1916-1941. The design philosophy and policy statement of the newly formed agency was stated in 1918 as follows: "in the construction of roads, trails, buildings and other improvements, particular attention must be devoted always to the harmonizing of these improvements with the landscape." [1]

Daniel P. Hull and his assistant Paul P. Kiessig established the NPS design office of "Landscape

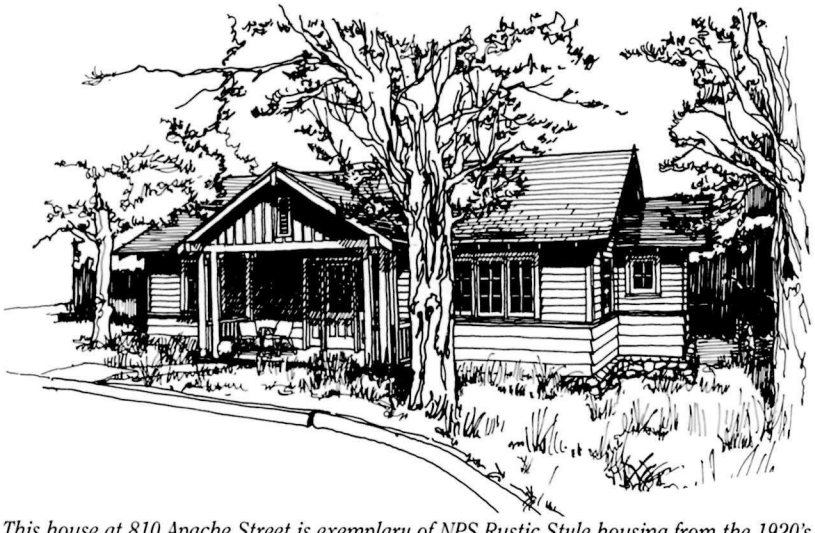
1. N.P.S. – Report of the Director of the National Park Service, Washington D.C. Government Printing Office, 1918, p. 274.

Engineering" which took on the enormous task of implementing the above design statement. Hull drew inspiration from existing Colter buildings to establish a Park Administration Building in 1921 which was intended to be non-intrusive in design. The term "NPS Rustic" is misleading and not strictly accurate, because many structures which fit in this category were designed by concession architects, such as the 1920's buildings at Phantom Ranch and the Bright Angel Lodge of 1935, designed by Mary Colter, and the Grand Canyon Lodge of 1928, designed by Gilbert Stanley Underwood.

Therefore, understand "NPS Rustic" as the predominant expression of the Rustic Style in the park which was developed after the establishment of the National Park Service in 1916, rather than buildings designed by NPS architects. This expression of the style is characterized by the use of timber (both sawn and logs) with rock foundations and steeply pitched, overhanging roofs. There are also buildings in this category which are entirely wood with very little stone, such as the exposed frame buildings comprising the North Rim Inn, the General Store, and cabins. The Rustic structures were responding to a rugged, wooded environment. At the Grand Canyon, these Rustic timber structures continued to be built through the CCC years until about 1941. The Administration Building (#1) and the houses along Tonto and Kaibab Streets represent some of the earliest NPS Rustic design.



Building No. 1: Built in 1921, this structure was initially used as the Park Headquarters and later became the Superintendent's home. Now an administration building, it is a superb example of the NPS Rustic Style, predominant in the South Rim Village, constructed by the NPS in the 1920's and 30's. Note the combination of wood siding and stone as the exterior building materials and the variety in the massing to break up the bulk of the structure.



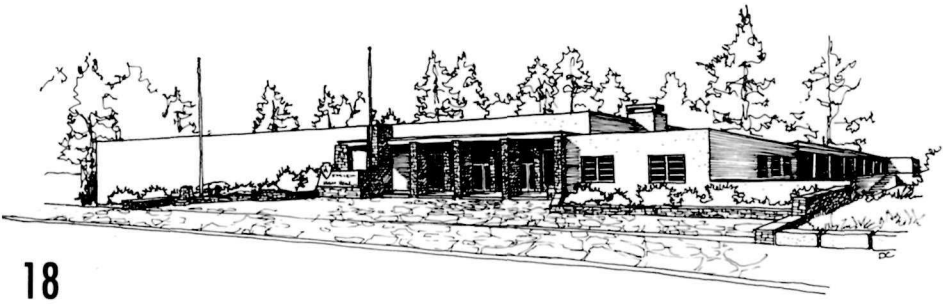
This house at 810 Apache Street is exemplary of NPS Rustic Style housing from the 1920's and 30's in the South Rim Village. It features horizontal wood siding and vertical wood casements grouped in bands.



One of the deluxe cabins at the Grand Canyon Lodge on the North Rim is an example of the NPS Rustic Style although it was designed by a concessioner architect. This form of the Rustic Style is the most common and is characterized by the combination of stone foundations and chimneys and corner buttresses with log and sawn wood siding.

MISSION '66

This was a period of construction beginning in the 1950's and culminating in 1966 stylistically based on the International Style, consciously rejecting the tenets of the more romantic Rustic Style. The International Style is characterized by simple, boxy, functional designs with no ornamentation and little use of natural building materials. The architectural direction of the NPS designers of the 1950's, '60's and '70's was toward simple, refined modern buildings which were progressive in design as well as materials and technology. They rejected the rugged, hand-crafted aspects of the Rustic Style as dishonest and self-conscious. The influence of Mission '66 continued from the 1950's through the 1970's with such buildings as the Yavapai Lodge, Babbitt's General Store, and the Visitor Center.



The Mission '66 Style, exemplified in the Visitor's Center, is often characterized by a flat or low-pitched roof and refined materials such as stucco and metal sash with no decoration and little or no use of natural materials. Windows are horizontal in proportion, often with large areas of glass as "picture windows".

RUSTIC REVIVAL

A number of very recent buildings designed and constructed during the 1980's and 1990's have revived some of the design principles of the earlier NPS Rustic Style. These buildings include the South Entrance Station, Maswik Transportation Center, and structures at Indian Gardens by Randy Fong of the NPS, Denver Service Center. The buildings are characterized by the extensive use of timbers and wood siding with modest stone foundations.



The South Entrance Station revives Rustic Style elements: a steeply pitched, overhanging roof; exposed timber framework; and the use of natural materials – logs, sawn timbers, siding and stone.

DESIGN-PROCESS AND PRINCIPLES



With a thorough understanding of the context of the project, a designer will now be ready to develop design alternatives. The purpose of this section is to outline the process and principles of Rustic Design as they relate to the Grand Canyon National Park. This section is intended to be a primer, introducing the designer to the process, principles and elements of rustic design as they apply to both sites and structures. These elements are crucial to achieving site specific design in Grand Canyon National Park. The goal is to understand and utilize these principles in a contemporary way in order to relate the various building types to their immediate surroundings and the park as a whole. Successful design will provide a sense of continuity with the past and contribute to, rather than detract from, each site's unique sense of place.



Ranger Operations, South Rim.

It is earnestly hoped that a more apt and expressive designation for the style may evolve, but until it appears, "rustic", in spite of its inaccuracy and inadequacy, must be resorted to in this discussion. Successfully handled, it is a style which, through the use of native materials in proper scale, and through the avoidance of severely straight lines and over sophistication, gives the feeling of having been executed by pioneer craftsmen with limited hand tools. It thus achieves sympathy with natural surroundings and with the past.[2]

Nothing is more indicative of a lack of proper sense of values in park technique than the frequently expressed determination to "make a feature" of a shelter or other park structure. The features to be emphasized and stressed for appreciation in parks with which we are here concerned are the natural features, not the man-made.[3]

2. Good, Albert, **Park and Recreation Structures.** *p. 5*
3. Good, Albert, **Park and Recreation Structures.** *p. 6*

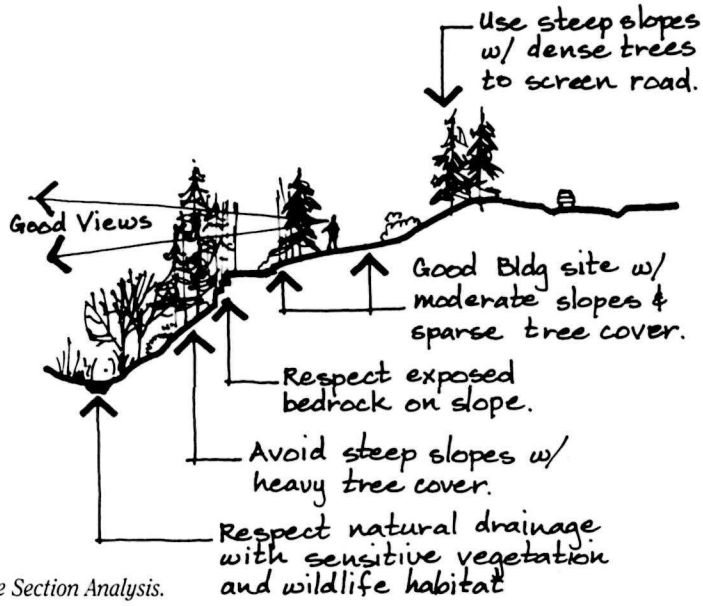
SITE CONSIDERATIONS

The goal of achieving both a sensitive fit between the site and its resources and the accommodation of a desired program is a challenging one. An understanding of the intricate relationship between site and program is evident in the following statement by Kevin Lynch, a noted author on the art of effective planning.

...The existing site and the purpose for which it will be modified, are the two sources from which the design springs. These two sources are curiously interrelated, in a circular way. Purpose cannot be stated until the limitations the site will impose are known, and the site itself cannot be analyzed until the purpose for which it will be used is set forth. Previous experience is needed to break the circle: to set realistic purposes before a particular site has been analyzed, or to judge a site before detailed purposes are known...[4]

SITE ANALYSIS

In order to determine the best location for a proposed building or facility the important characteristics of the site should be understood. The architect should conduct an analysis of the site to learn about and document important site features. The site analysis should attempt to define the best features and qualities of the site, the potential problems or constraints which might affect the proposed construction effort, and the sensitive natural or cultural resources which might be affected by the proposed construction.



Example of Site Section Analysis.

The site analysis should consider the following:

TOPOGRAPHY OF THE SITE:

Slopes affect the difficulty of construction and must be understood in order to minimize site disturbance associated with site grading. Areas of moderate topography can more easily accommodate most types of improvements and facilities than steeper areas.

SOLAR ORIENTATION OR ASPECT:

One must understand the potential effect of the sun's energy on the building or facility. Areas where sunlight can be captured in winter months for solar heating or daylighting purposes are more desirable sites for buildings. Areas where the late afternoon sun is unshaded will tend to heat up during summer months. Areas shaded from the sun or on north-facing slopes will be cold and uncomfortable during fall and winter months, and snow and ice will not melt as quickly.

EXISTING VEGETATION TYPES AND RELATIVE QUALITY:

Vegetation serves as potential for visual screening, shading, and other aesthetic benefits. For example, stands of ponderosa pines are attractive and provide desired shade in the summer months; however, the branching height does not provide the density for screening at ground level that the pinyon and juniper vegetation type provides. In general, all existing vegetation is valuable for wildlife, screening, and climate considerations, and should be protected where possible.

4. Lynch, Kevin, Site Planning. 2nd ed. Cambridge: The M.I.T. Press, 1971.

VIEWS:

Views to and from the proposed site should be analyzed. If they are good views they should be considered a positive feature and should be preserved, enframed, or somehow incorporated into the design. If they are bad views, they should be avoided or screened.

SIGNIFICANT NATURAL OR CULTURAL RESOURCES:

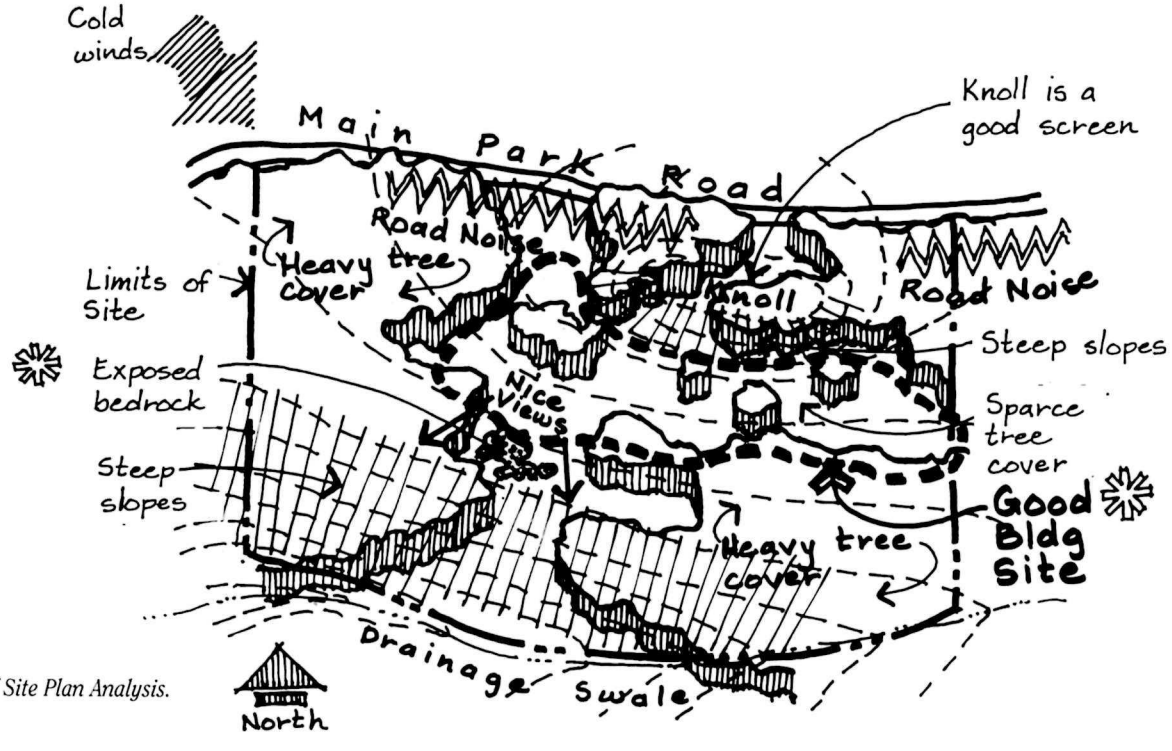
The National Park Service has considerable expertise in Grand Canyon National Park with the responsibility of identifying significant natural and cultural resources and ensuring the protection of these resources. These NPS resource experts should be consulted to determine whether any significant natural or cultural resources exist on the site or in adjacent areas. In cases where conflicts with resources exist, plans will have to be modified or impacts mitigated as directed by the National Park Service. Resource protection should include avoidance of impacts from the initial design stage all the way through construction. Protection of the resources should also extend after occupancy of the site or building.

CLIMATIC CONSIDERATIONS:

Climatic considerations should include determining the direction and intensity of prevailing winds, precipitation patterns and frequency, likely areas of snow and ice accumulation, temperature ranges, and other related influences which can affect the desirability of a site for a proposed use. (Sometimes broad climatic patterns are not applicable due to the existence of micro-climates such as exposed knolls, sheltered glens, or pockets of cold air.)

SOIL AND FOUNDATION CONDITIONS:

One of the most important considerations in evaluating a site is the nature of the site, soil, and geology. Shallow soils are prevalent over bedrock. Lack of substantial vegetation makes these soils erodable; trenching and foundation excavation is often difficult, as is revegetation of disturbed sites. Care should be taken to design to fit these conditions rather than to require extensive grading and excavation. Foundation walls and rock retaining walls are an effective way to minimize site disturbance and take up grade variation in sites with shallow bedrock.



Example of Site Plan Analysis.

DRAINAGE SWALES AND
STREAM CORRIDORS:

Drainage swales and stream corridors should be identified and located to ensure that disturbance to these areas is minimized. Drainage corridors in some cases contain wetlands and other sensitive environments. The stability of soils and the nature of runoff in these corridors directly affect water quality. Drainage corridors often contain diverse vegetation, provide suitable wildlife migration routes and habitats, and provide interesting and beautiful natural landscapes. Drainages also represent potential flood hazards for certain types of uses.

ADJACENT LAND USES:

Adjacent land uses should be evaluated to understand potential impacts of proposed construction and development on existing uses, and conversely, to understand potential impacts of existing uses on proposed uses. Considerations should include undesirable views, noise, odors, and traffic impacts.

PROGRAM/USER ANALYSIS

One needs a clear understanding of the program for the proposed facilities to understand the relationship of the proposed buildings and other facilities to the site. The individual components which make up the facility should be listed along with the desired relationships among these components (i.e., to buffer or screen adjacent uses or to locate in close proximity, to provide school next to day-care center, service station next to park entrance, etc.).

The needs and characteristics of the group of intended users of the facility should also be understood. The program and user analysis should include the following:

PURPOSE:

The architect must also understand the intended role and purpose of the proposed facility (e.g., to provide a place to educate, to stimulate, to house, to store equipment or machinery, to receive hundreds or thousands of visitors, to house one family, to provide office space for workers, and provide space for community events).

SIZE:

An estimate of the size of the facility and related site features should be prepared (e.g., 1,200 or 12,000 square feet, one or two story, parking for ten cars or one hundred cars, small porch area or large plaza area, etc.).

SEQUENCE:

The analysis must define the appropriate sequence of user's needs and experiences; (e.g., a typical visitor experience sequence might include a sign announcing location of or direction to the facility, visual identification of the facility, arrival at the facility, understanding the location of the drop-off or entrance, location of parking, and direction to walk to the building entry).

USER GROUP:

The analysis must include an understanding of the characteristics of the user group (e.g., age, abilities, expectations, cultural values, gender, potential numbers of users, specific needs and desires of users).

SAFETY:

Safety considerations for users and visitors (e.g., handrails at overlooks and loading docks, fences to protect school children from adjacent traffic, and handrails for elderly along steps and walks) are essential.

ACCESSIBILITY:

Accessibility for the disabled is a major design criteria. Compliance with barrier-free guidelines is described in the Uniform Federal Accessibility Standard (UFAS) and the Americans with Disabilities Act (ADA).

GROWTH:

The analysis should include an estimate of potential growth in the numbers of users (e.g., new families planning children, a school with expanding enrollment, increased visitation, and regional population trends).

PARKING/ACCESS:

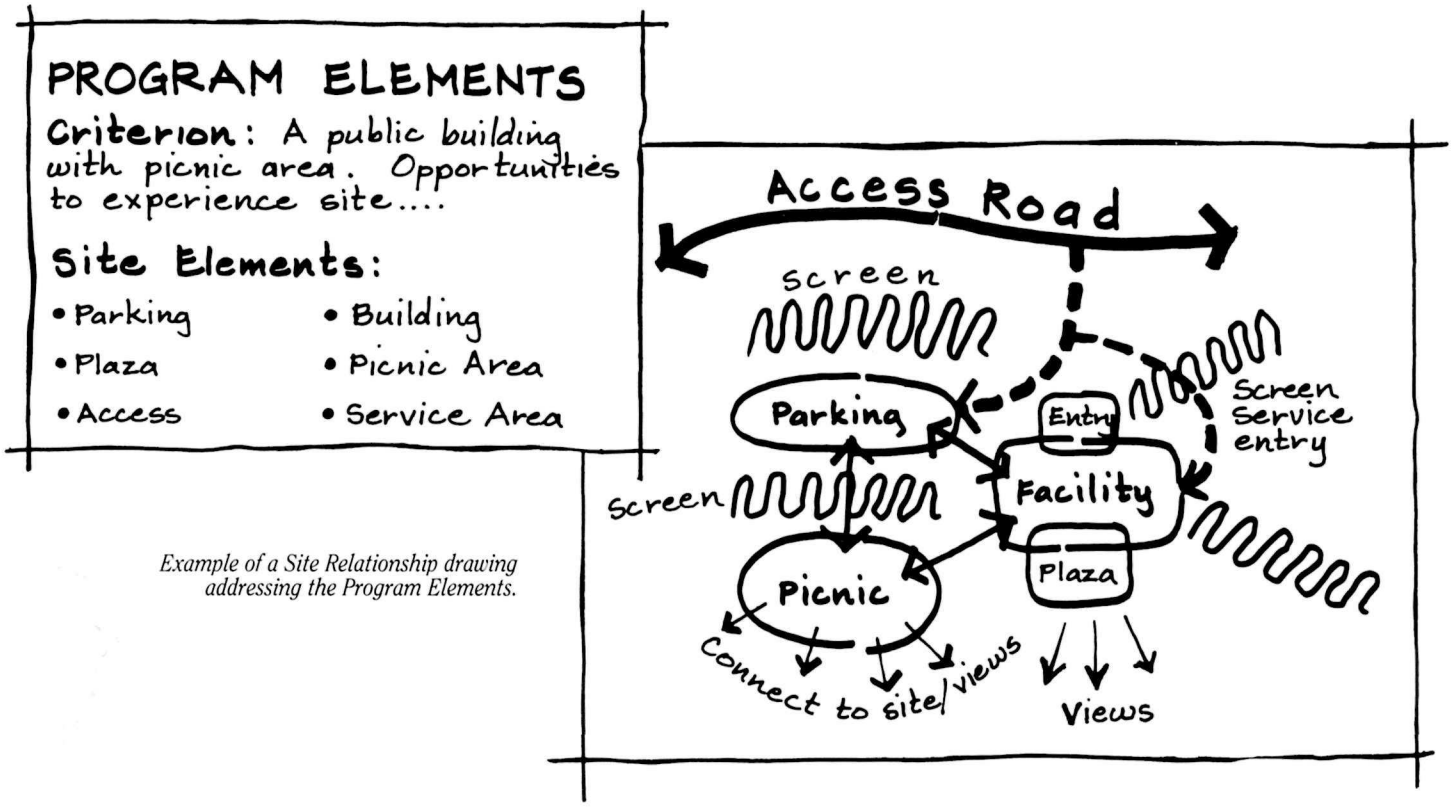
The analysis must consider necessary and desirable access, circulation, and parking characteristics (i.e., degree to which facilities are accessible by automobiles, shuttle and tour buses, maintenance equipment, snow plows, fire trucks, pedestrian trails and walkways, bicycle routes, trains or other modes of transit).

UTILITIES:

The analysis must identify required utilities and infrastructure (i.e., water, sanitary sewer, storm sewer, telephone, electricity, propane or natural gas, solar energy and other alternative energy sources, communications, and other relevant utilities).

ENERGY:

Also, the analysis must include an understanding of the extent to which energy conservation and sustainable design practices can be incorporated into the design and construction of the site and facilities. The National Park Service is a strong proponent of sustainable design. Sustainability is the capability of natural and cultural systems to maintain themselves over time. (NPS, Guiding Principles of Sustainable Design, Sept. 1993).



Example of a Site Relationship drawing addressing the Program Elements.

SITE DEVELOPMENT CONCEPTS

Understanding the facility program and the important characteristics of the site produces a site plan which achieves the program while respecting the characteristics of the site. A fundamental concept to guide the design and construction of buildings and other facilities within a National Park setting is the concept of creating facilities which are subordinate to the natural setting. Keeping this concept in mind makes achieving the goal of a facility which is in harmony with the natural and cultural resources and features of the site more likely.

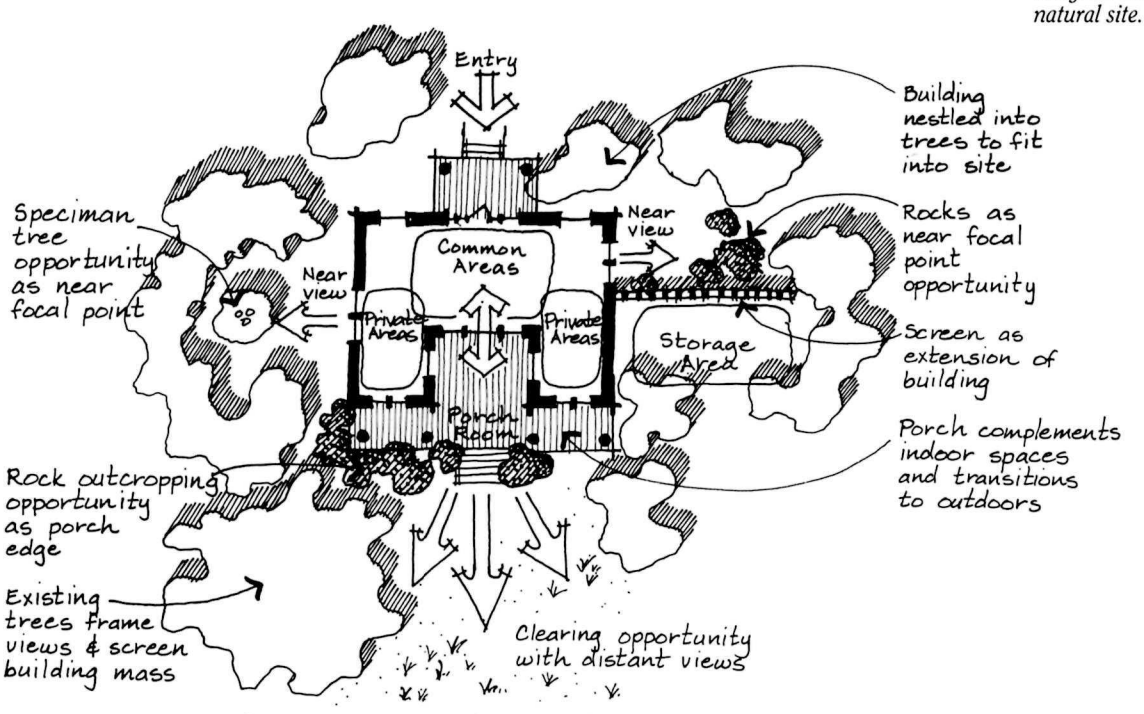
Characteristics of sensitive development include the following:

Disturbance of the site area and site resources is limited by reducing the size of the footprints of buildings, parking, or other facilities to the minimum required by the program and characteris-





Integrate building into natural site.



Integration of indoor with outdoor spaces and natural site features

Example of integrating indoor and outdoor spaces.

tics of the users. Site development plans should locate improvements to avoid conflicts and impacts to site resources (especially existing vegetation) to the maximum extent possible.

The landscape development augments existing vegetation as needed to accomplish site objectives such as creating landscape buffers to screen undesirable views, provide wind protection, create privacy for users, develop shade for outdoor use areas or enhance views. Planting is also used for revegetation, soil stabilization, and wildlife habitat.

Access roads, parking, utilities, and buildings are laid out in an efficient arrangement which minimizes disturbance to the site, limits area of paving, and shortens distances traveled.

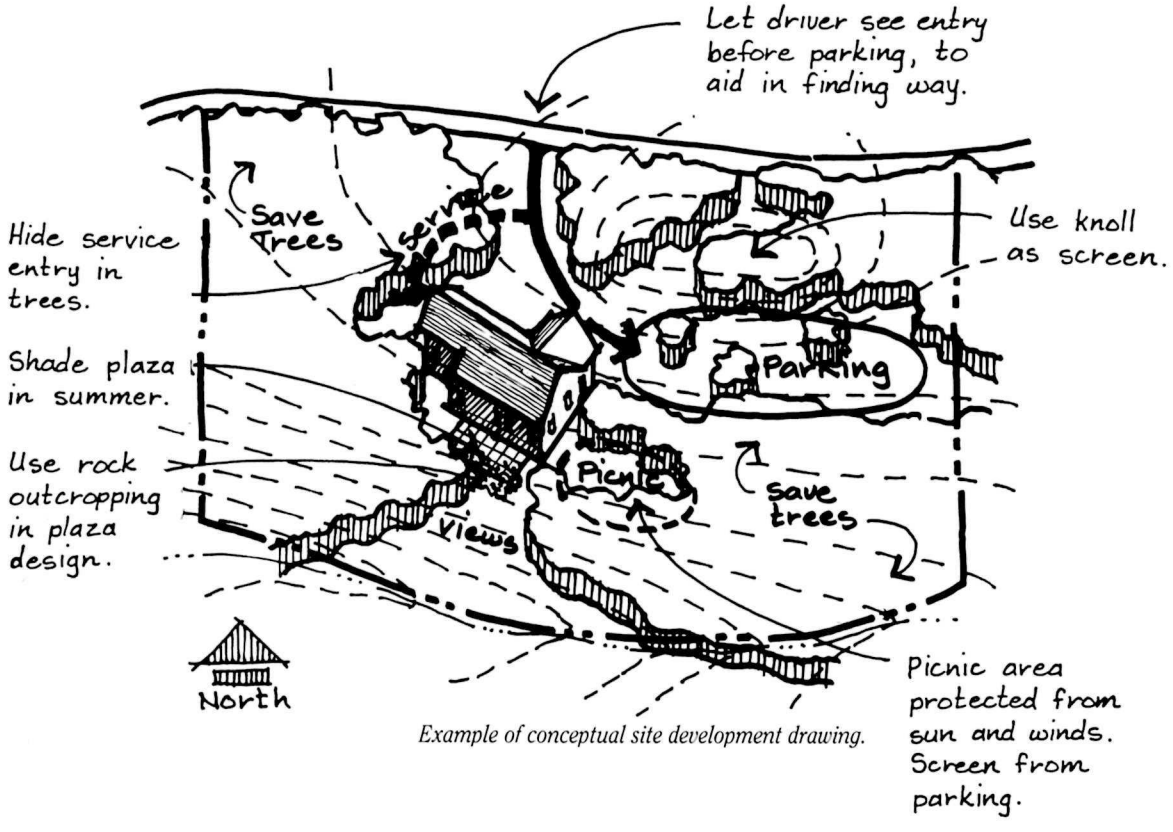
Indoor and outdoor spaces are complementary and are carefully integrated with site features.

The visitor or user should experience the pertinent features and characteristics of the site so that he has the opportunity to learn about and appreciate the natural and cultural resources of the specific site and the Park.

To ensure the development of the most appropriate and sensitive site plan, a series of alternative concept plans should be prepared and analyzed. The preferred site plan should reflect the best possible balance between the program objectives, the user requirements, and the sensitive resources and characteristics of the site.



Use opportunities to integrate and feature rock formations and trees into plaza areas.

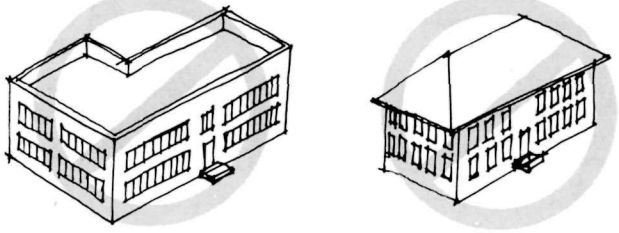


Example of conceptual site development drawing.

FORM

Buildings should not be in competition with the natural environment. Building shape should distract as little as possible from the natural setting.

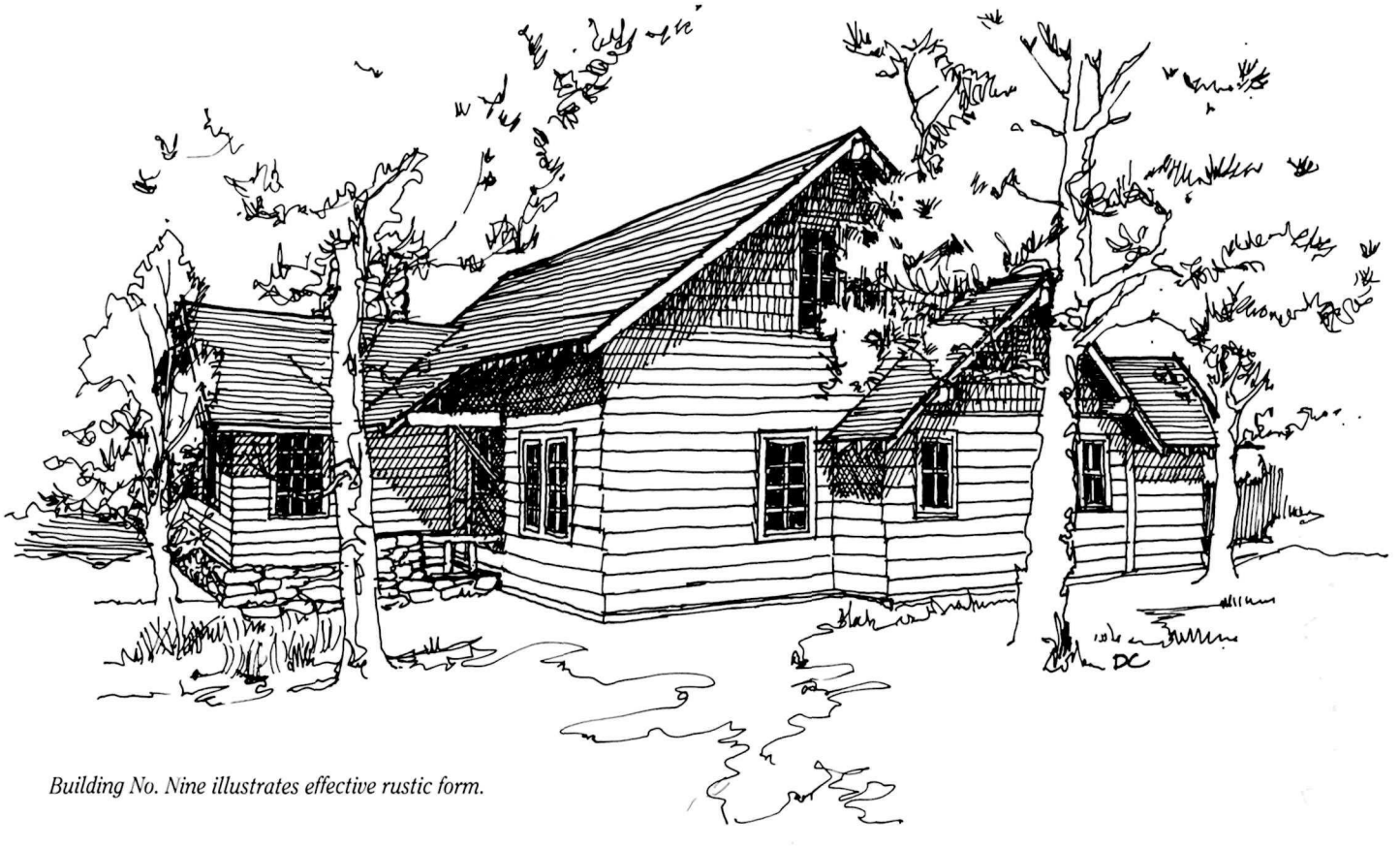




Use rectangular plans which yield simple roof forms. Gable roof shapes are generally most appropriate, though flat roofs may respond best to flat, desert settings.

The horizontal should be strongly emphasized in the rustic style, in both shape and vocabulary of materials. Broad roof overhangs create a strong horizontal shadow. Vertical elements, like chimneys and major wall openings can provide vertical counterpoint.

Buildings that are grouped closely together should remain consistent with each other, none seeking attention over others or over the natural setting.



Building No. Nine illustrates effective rustic form.

SCALE

The scale of the building should be in balance with the scale of the natural surroundings. (Within a setting of massive trees or geological features, the building components should be oversized. In a finer setting, such as an open desert landscape, the building elements should be reduced to reach a harmony with the setting.)

The use of oversized materials, such as large stones, heavy timbers, and oversized doors and windows helps to reduce the perceived size of a large structure.

Special attention to the size of porches and chimneys can bring a building into correct human scale.



Large timbers and stone tend to reduce the scale of a large structure.

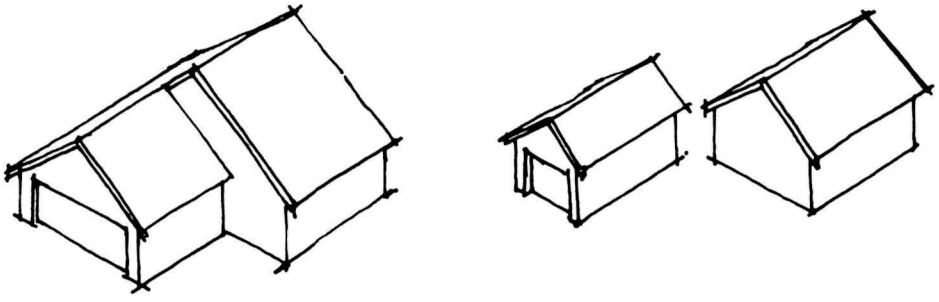
MASSING

The size of the building should not exceed the capacity of the natural setting to accommodate the building. Buildings must not dominate the natural setting.

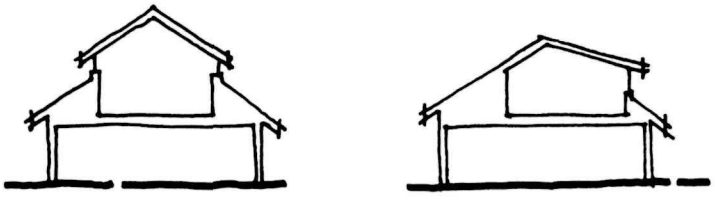
When necessary, a large mass can be reduced by breaking it up into smaller, simpler elements–telescoping the gable ends, flanking wings, stepping back upper stories, or occupying the roof spaces by employing dormers and clerestories–all may achieve this effect. Smaller elements, such as porch roofs, which can project out and wrap around the main structure, can help diminish apparent mass.

Break up a large building into a cluster of smaller buildings.

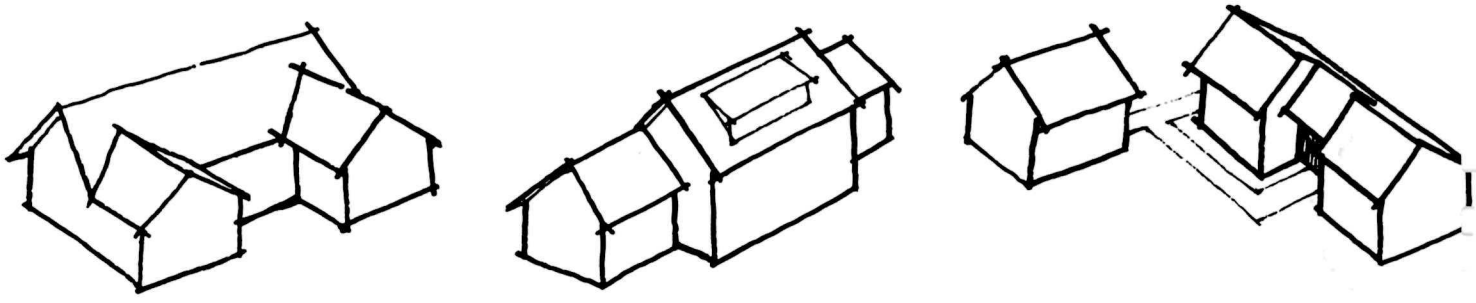
Use tree masses or other site features to break up the profile of a large building.



A smaller, detached garage provides more appropriate massing.



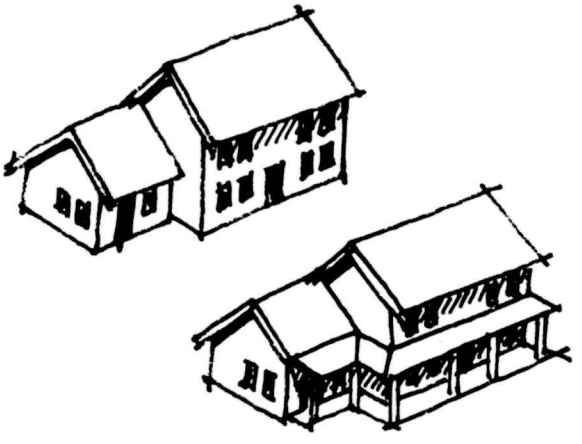
Minimizing mass in upper levels.



Techniques for minimizing mass.



Trees break up large mass.



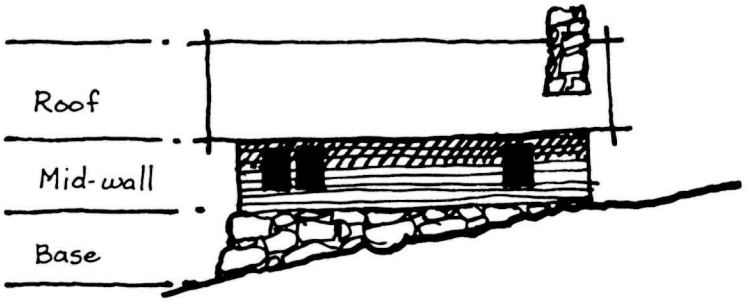
Porch elements diminish mass.



Building No. 1: Administration Building, South Rim. A good example of effective massing.

ELEVATIONS

The elevation of a Park Service Rustic building will commonly be made up of the three major elements of **base, mid-wall, and roof.**

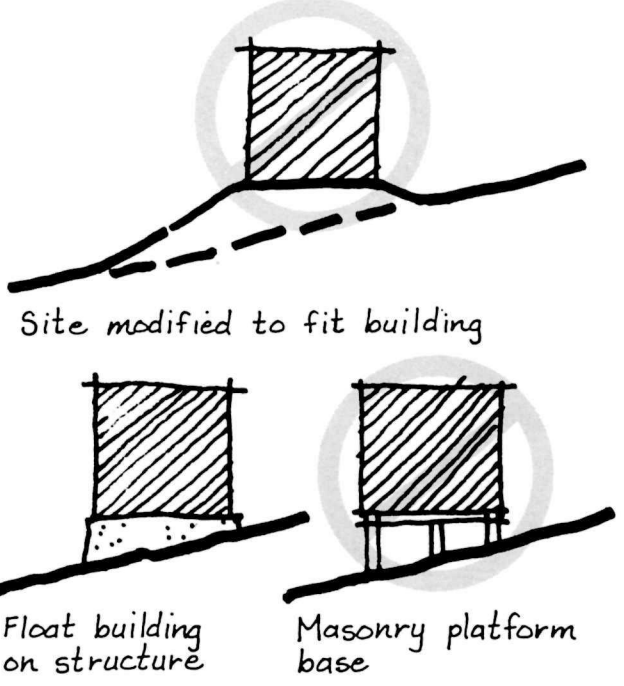


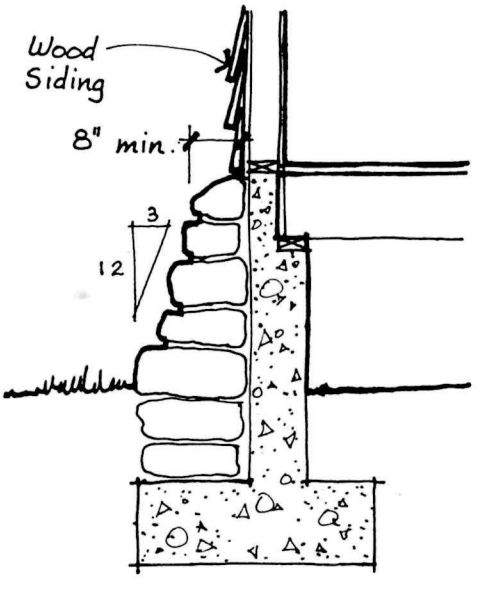
Major Elevation Elements

The major elements of the building elevation should combine to emphasize the horizontal. Vertical counterpoint is achieved with limited use of elements such as major entries and chimneys.

BASE

Traditional rustic buildings start with a stone base which firmly anchors the building to the earth. Do not "float" the building. Stone used as a base should appear to grow naturally from the ground, an effect achieved by using larger stones at the bottom and battering, or flaring out the lower courses. In most regions of the Grand Canyon, bedrock lies within inches of the surface, so structures are seldom dug into the slope. The stone base creates a solid, level platform for the walls. By extending the masonry up to the window sills, a weathering wall is created which further emphasizes the horizontal. In instances where stone is not affordable, alternative materials which will achieve a similar effect should be explored.





Stone as base

WALL

The mid-section wall can be of stone, but is more typically of naturally finished wood in a horizontal pattern: logs or lap siding. Often, broader siding is used below the window sill, giving further weight to the base of the facade. Corner boards are not typical. Broader board siding often improves scale. Vertical board and batten and shingles are common in the cornice of the gable ends and, if used sparingly, are suitable as mid-wall material.

Stone is often used to express the structure of the walls by extending it up at the corners of the building. The remaining inset area is available for door and window openings.

Windows and doors are vertically proportioned and are punched into the facade. Openings make up a small proportion of the overall wall, though there can be more openings on the south wall for solar gain.

Wall materials should become increasingly smaller as they move toward the roof.

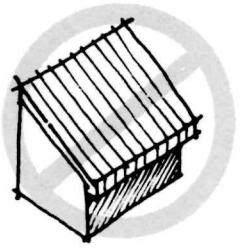


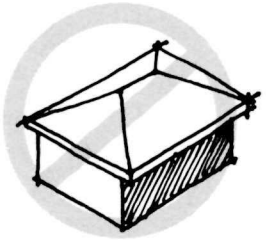
Phantom Ranch Cabin, Inner Canyon. Stone used as corner elements.



810 Apache Street. A good example of wall elements.

ELEVATIONS





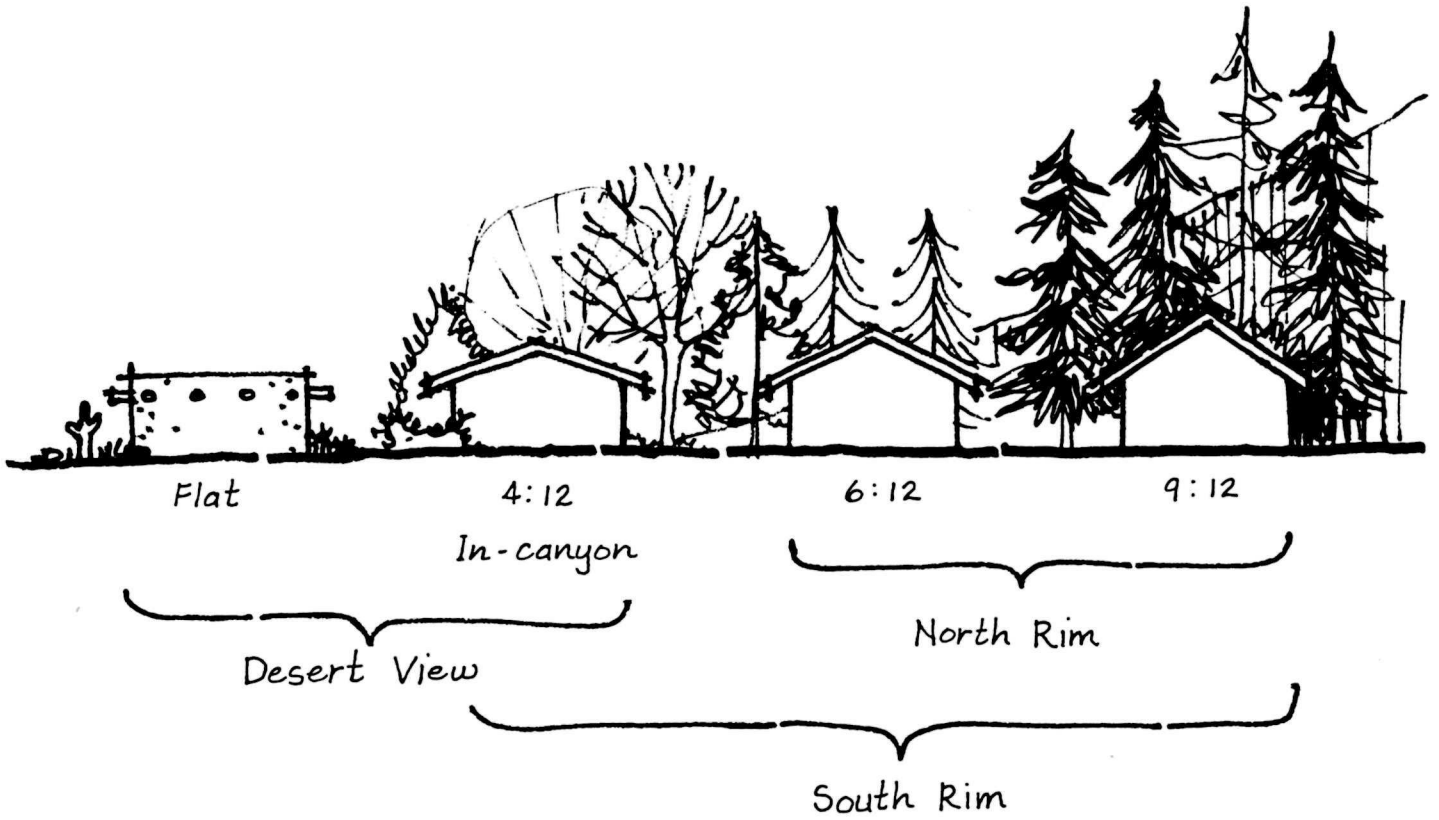
Inappropriate roof forms.

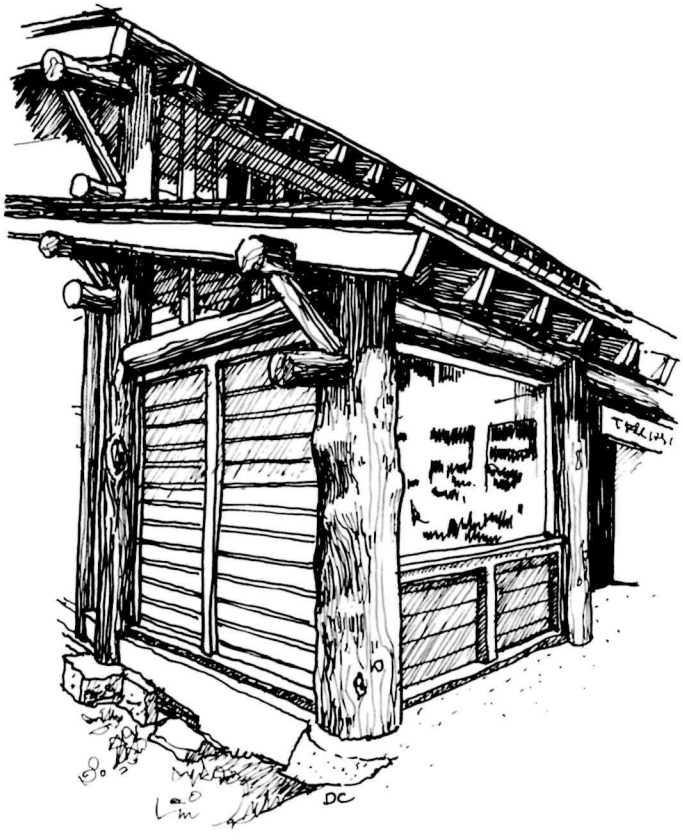
ROOF

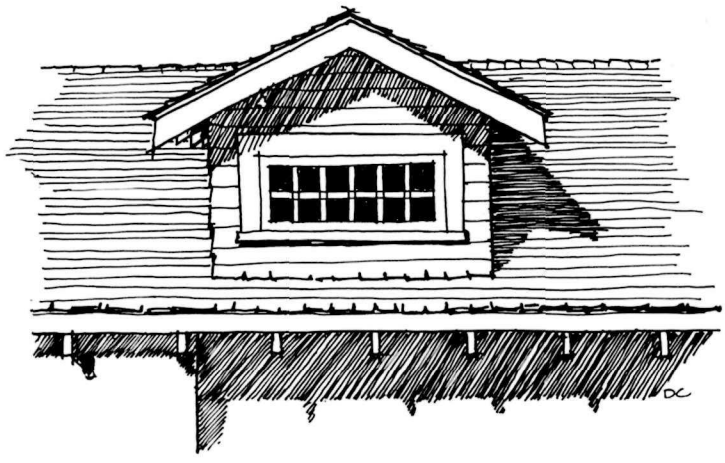
The roof should strongly express a sense of shelter. To accomplish this the roof should supersede the wall element. Large, overhanging eaves emphasize a sense of shelter while protecting the wall and openings and casting a strong horizontal shadow over the facade.

Heavy barge boards on the gable end eave, exposed rafter tails, rake end brackets, and the absence of facias and soffits all articulate the rustic roof by expressing the supporting structure. (See section on Structural Detail).

Simple gable roofs with pitches between 4:12 (4 ft. horizontal to 12 ft. vertical) and 8:12 (8 ft. horizontal to 12 ft. vertical) work best. The size and pitch of the roof varies with the scale of the natural environment. Steeper roofs allow for the use of dormers and clerestories. Roofs should be formed to avoid valleys and to direct sliding snow away from entrances and porches.







Kolb Studio, South Rim. Roof dormer element.

North Rim Inn, North Rim.



Building No. 9, South Rim clearly shows the common elements of base, mid-wall, and roof.

As a general rule, use materials and colors which blend into rather than compete with the natural surroundings, whether in stark winter or lush spring. Materials should be sized to remain in scale with the features of the surrounding landscape.



Split sandstone laid in ashlar pattern.

Rustic structures should be composed of natural materials, primarily wood and stone, that are used according to their inherent nature. Only natural building materials will respond to changes in the weather, in harmony with changes in the natural landscape.

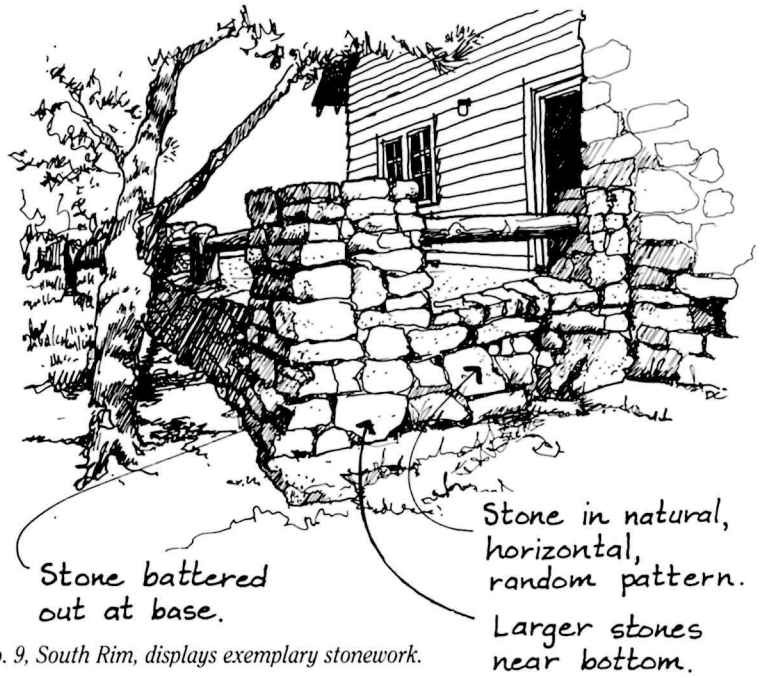
STONE

Native kaibab limestone laid in a natural horizontal random pattern using oversized stone is most appropriate, especially for public buildings. Split sandstone laid in an ashlar pattern should be avoided. If sandstone is used, a rough texture and a more random pattern should be incorporated.

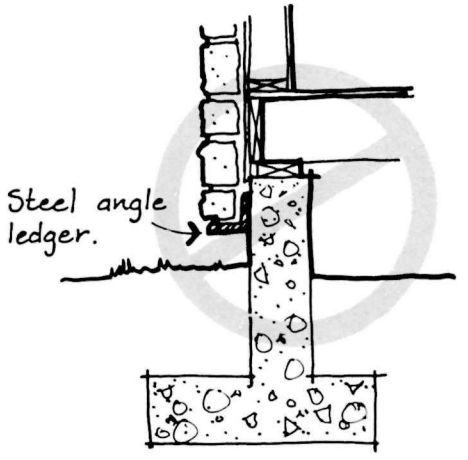
Stone is used for the building base, steps, corner columns, terraces, chimneys, retaining walls, and assorted site features. Near the canyon rim, structures constructed predominantly of stone may be appropriate.

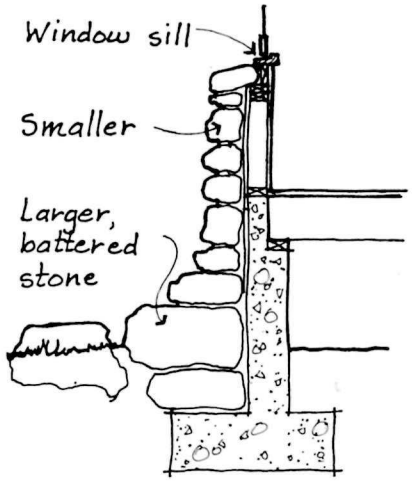
Utilize rubble stone masonry in an uncoursed, roughly squared pattern, with larger stones placed predominantly near the bottom, and a variety of sizes spread throughout the walls, diminishing as they approach the roof. Joints should look as if dry-laid. Set mortar back 1" to 2" for a strong shadow line and definition of stonework. Door and window openings should be deep set, with minimal jambs.

In some instances, masonry alternatives to stone may include stained, textured, rough-sawn board-form concrete, cast concrete molded from native stone, or split faced concrete masonry units.



Building No. 9, South Rim, displays exemplary stonework.





Stone up to window sill

WOOD

Heavy timbers and logs used as structural elements such as trusses, beams, columns, or railings are encouraged, especially in public buildings. Logs should retain their rustic character–knots, checks, and inherent crookedness are assets.

Wood siding materials should be rough-sawn and should have a heavy thickness to create a shadow line. Lap siding, board and batten, and shingles create suitable textures. Trim material is milled, 1-inch dimension lumber.

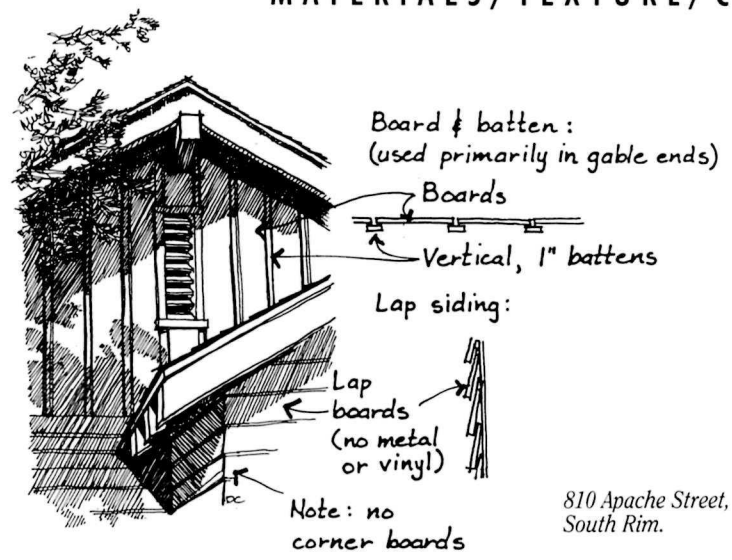
ROOFING

Traditional rustic shingles of cedar are now limited to historic districts and public buildings. Shingles should be doubled every fifth course to emphasize the horizontal. Alternative roofing materials should maintain the rough texture and color of wood shingles. Heavy weight asphalt and fiberglass shingles are approved. Non-public buildings on the North Rim use corrugated, galvanized metal roofs..

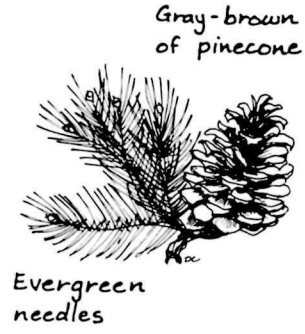
COLOR/FINISH

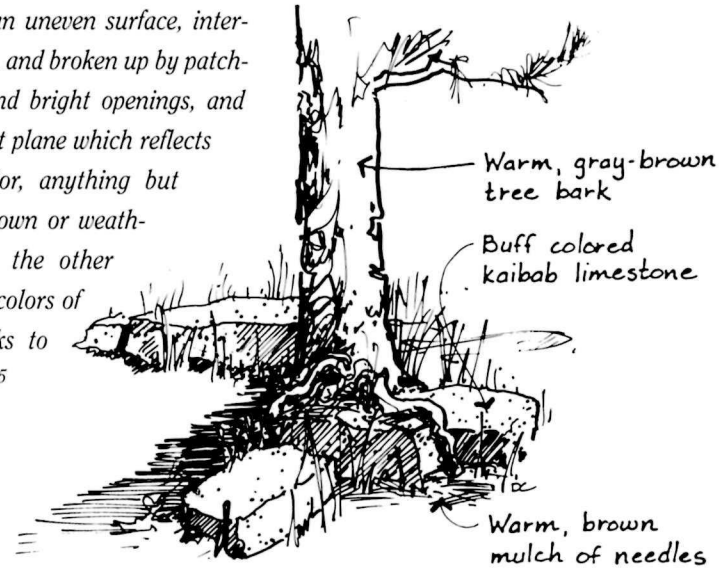
Choose finishes which weather naturally to the shades and tones of the surrounding environment. Opaque stains are preferable to clear stains. Paint, which weathers poorly, should be confined to doors, windows, and minor trim, and if used as an accent, should harmonize with the surroundings. Appropriate accent colors are light green, light buff (approaching the color of native stone), or dark green (avoid greens that fade into lime green or yellow green).

The color of exteriors, particularly the wooden portions of park structures, is another most important factor in assimilation. Naturally such colors as occur in, and are commonest to, the immediate surroundings serve best. In general, warm browns will go far toward retiring a wooden building in a wooded or partly wooded setting. A light driftwood gray is another safe color. Where contrast is desired to give an architectural accent to minor items, such as window muntins, a light buff or stone color may be sparingly used. Strangely enough, green is perhaps the hardest of all colors to handle, because it is so difficult to get just the correct shade in any given setting because it almost invariably fades to some different hue. A green roof might be expected to blend with the green of the surrounding trees, yet because a mass of foliage is an uneven surface, intermingling other colors, and broken up by patches of deep shadow and bright openings, and because a roof is a flat plane which reflects solid continuous color, anything but harmony results. Brown or weathered gray roofs, on the other hand, blend with the colors of earth and tree trunks to much happier results.[5]



810 Apache Street, South Rim.

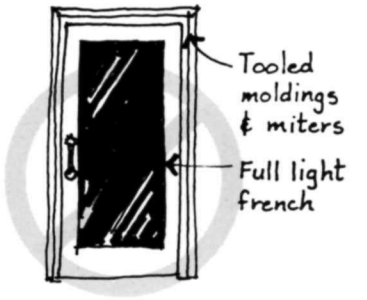


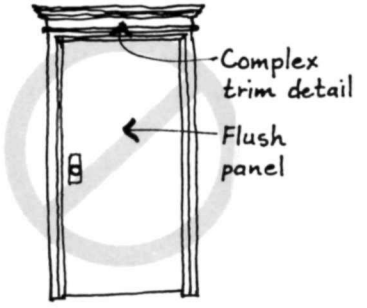


Pallete of colors which harmonize with the natural setting.

5. Good, Albert, Park and Recreation Structures. p. 6.

DOORS





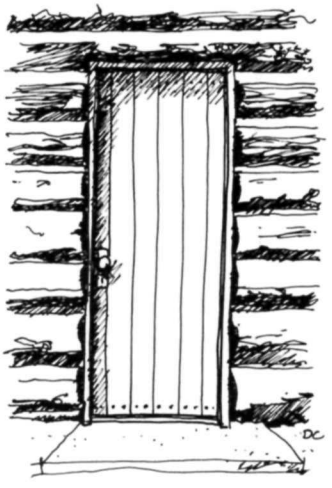
Rustic doors should be simple, crafted of wood, and should express the nature of their construction and materials.

Formal building entries may be oversized to reduce the scale of a large mass. This can be accomplished with double doors and the use of sidelights and transoms. Smaller, more private buildings should have relatively basic door elements. Screen doors should mirror the form of the door behind.

When door lights are desired, they should occur in the upper half of the door only (not a full french door).

If possible, garage doors should be single-car overhead doors rather than today's more common double-car door. Garage doors should emphasize horizontal lines rather than employing the raised panel style. Divided lights in the upper portion are very effective in establishing scale and interest.

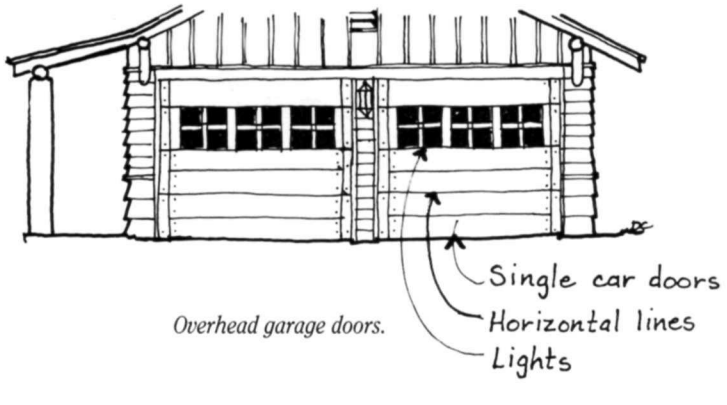






Hermit's Rest, South Rim.





Overhead garage doors.

WINDOWS

Traditional rustic architecture utilizes a vocabulary of small, vertically oriented, casement or double-hung, wood windows with divided lights, which are punched into the building facade. In wood structures, windows are trimmed in simple, applied 1" x dimension lumber. Moldings and mitered corners are not appropriate. In stone structures, windows should be deeply recessed with minimal jambs.

In larger buildings, window size might be increased somewhat to reduce overall apparent scale.

Larger openings, for south solar gain or views, can be created by grouping the typical smaller window into sets. The Phantom Ranch Dining Hall exemplifies a more extensive use of glazing to fill the area between the stone structural elements of the building.



Vertical window w/
true divided lights
1" wood trim
2" sloped sill

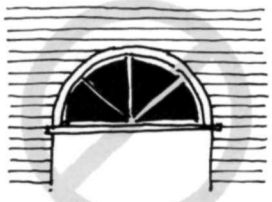
Typical single window.



Affected (trendy)
window designs



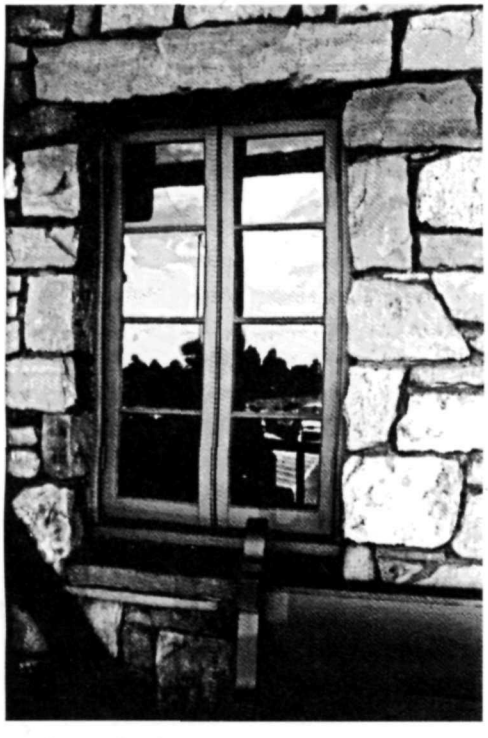
810 Apache Street: Grouped windows.



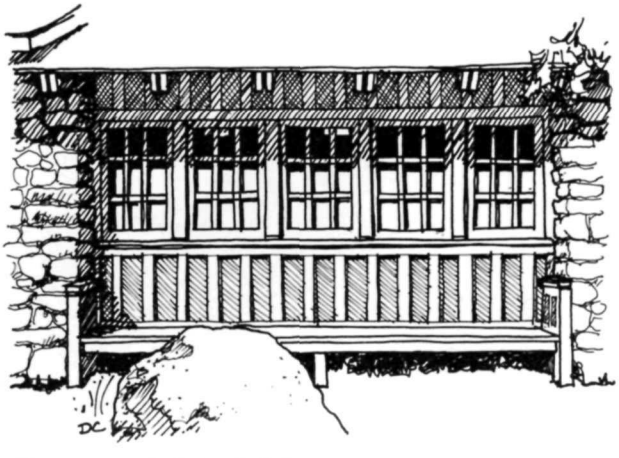
Special window
treatments



Large window
areas



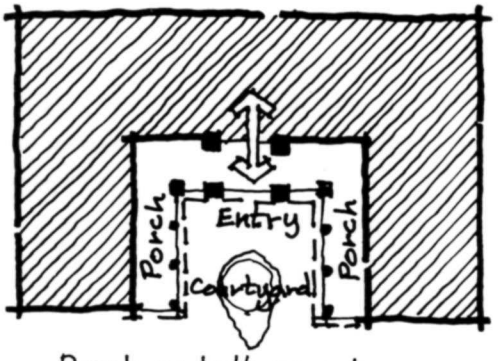
Bright Angel Lodge: Paired windows.



Phantom Ranch dining Hall, Inner Canyon: Large grouping of window units.

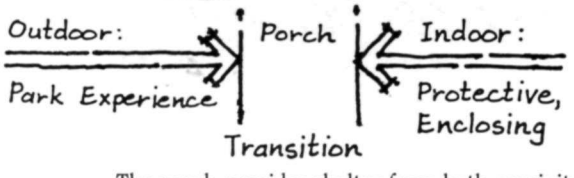
ENTRANCES AND PORCHES

As the definitive element between the distinctive park experience and the man-made shelter, the porch and entrance is the transition zone which focuses on the experience of both the building and the landscape. This element is also a significant tool in reducing perceived building mass.



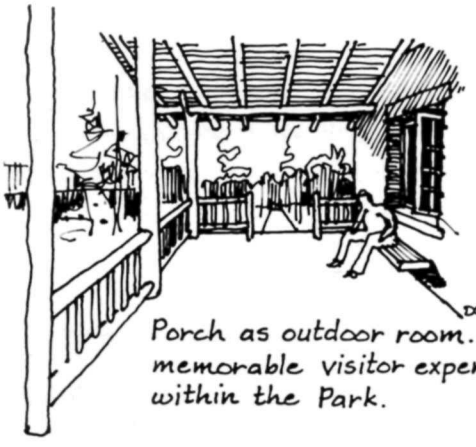
Porch as both an entry and a covered connector of spaces.



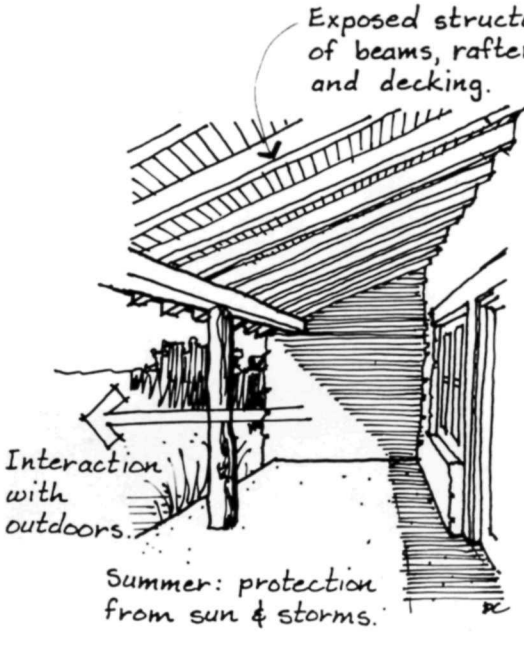


The porch provides shelter from both precipitation and sun. In the Arizona climate the porch serves as an outdoor room in both summer and winter conditions, and in many cases is a significant pre-lobby area.

Porches can often be oriented to frame a view or a specific activity space such as a walking trail, a scenic overlook, or a designated function area.



Porch as outdoor room... memorable visitor experience within the Park.





Grand Canyon Lodge, North Rim.

Porches can serve as walkways between and along the buildings.

There is typically no dropped ceiling to the porch, allowing the structure to be fully expressed. The structure is often oversized log or timber beams, rafters, and columns, sometimes grouped as triple-column elements at porch corners.



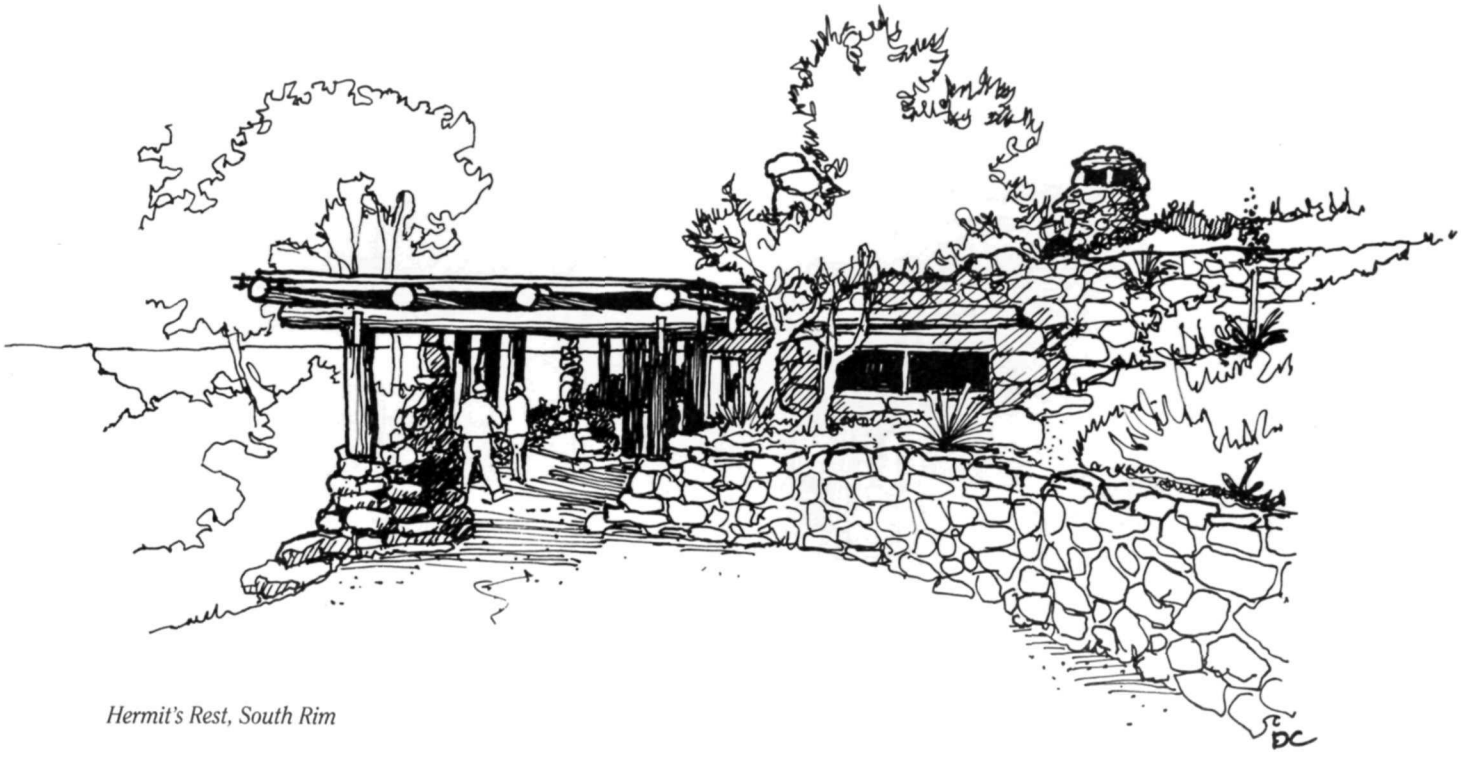
Bright Angel Lodge, South Rim: Covered walkway.



Bright Angel Lodge, South Rim.



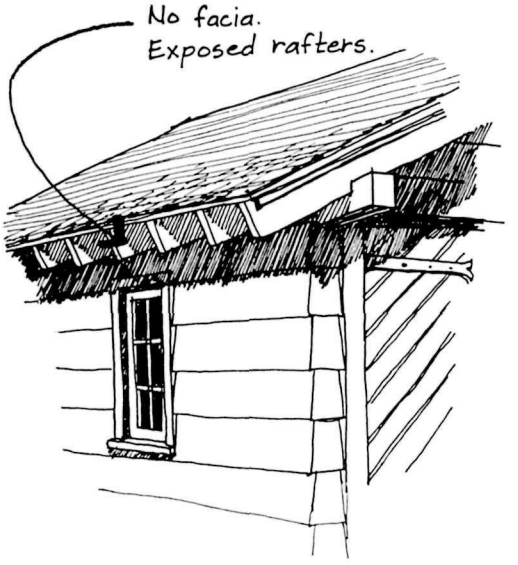
810 Apache Street, South Rim: Triple column.



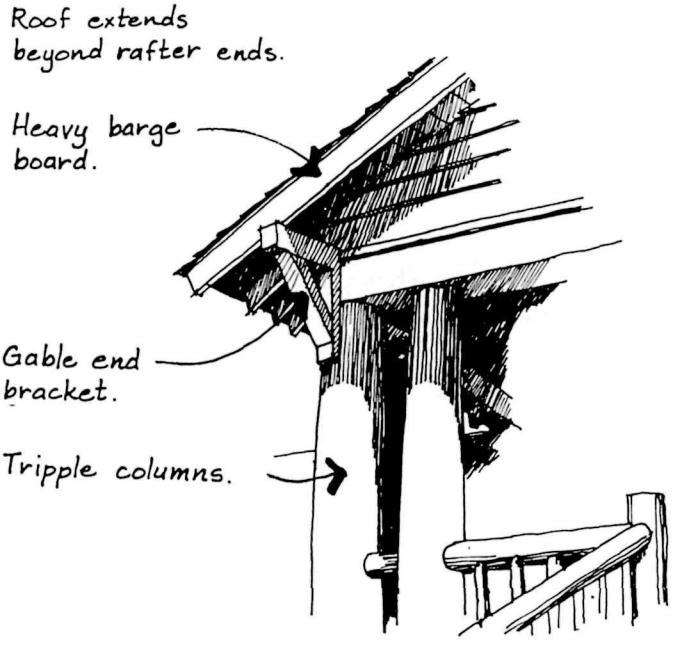
Hermit's Rest, South Rim

STRUCTURAL DETAIL

Structural expression is an important rustic design element. The use of exposed, overscaled logs and timbers on the exterior as corner columns, porch columns, trusses, and beams, and on the interior as columns, beams, and trusses, is encouraged. The interior illustrations show how unrefined, exposed timbers can help to define the space and to reinforce its rustic character. Logs should be allowed to maintain their rustic character of knots and crookedness.

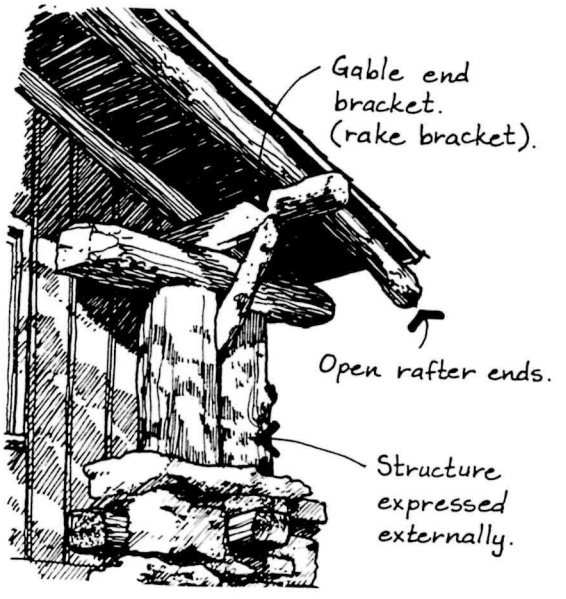


Roof eaves should have no facia, thus expressing rafters and purlins. Timber rake end brackets are a necessary part of the heavy timber structural expression. The weather surface of the roof should extend slightly to protect the ends of rafters and purlins from direct moisture.

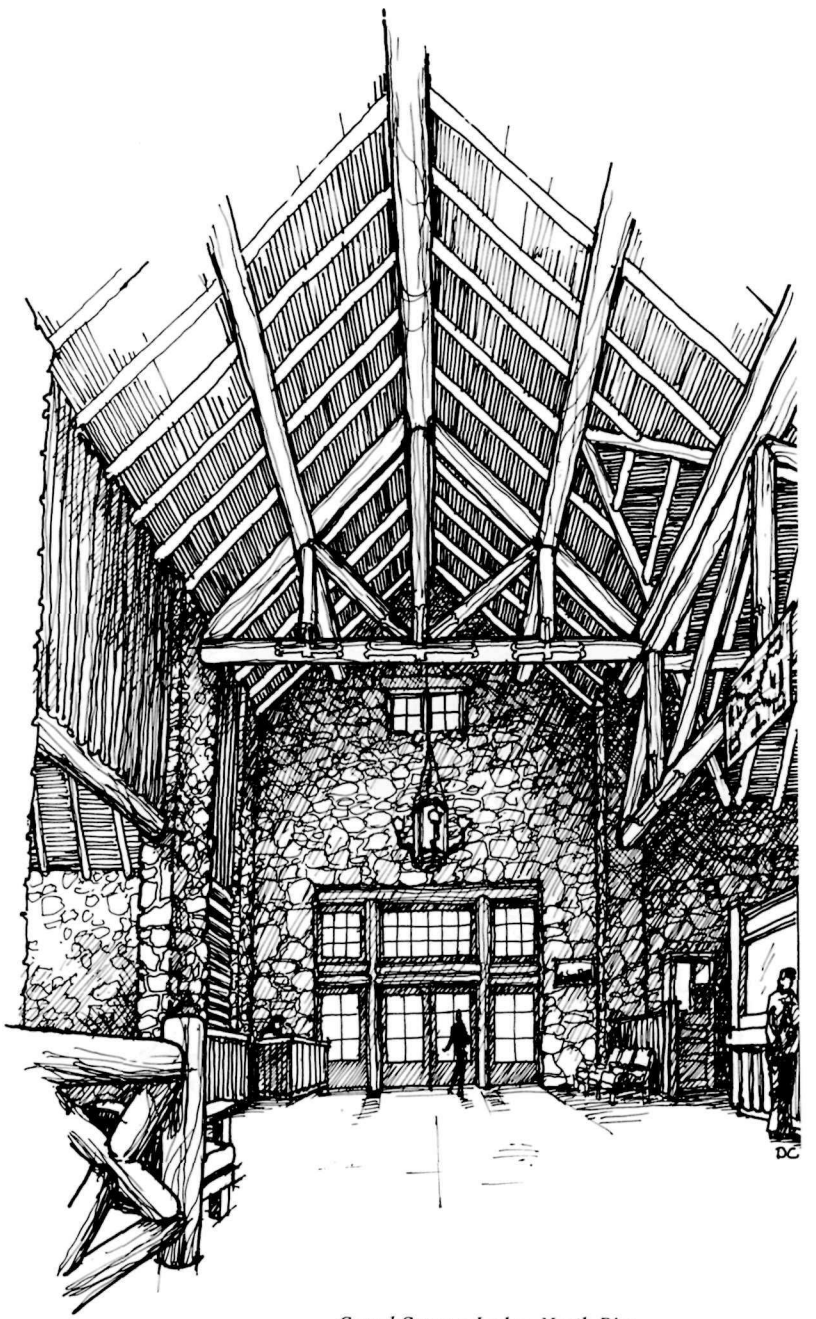




Bright Angel Lodge, South Rim.



Character of the log is allowed to be expressed.



Grand Canyon Lodge, North Rim.

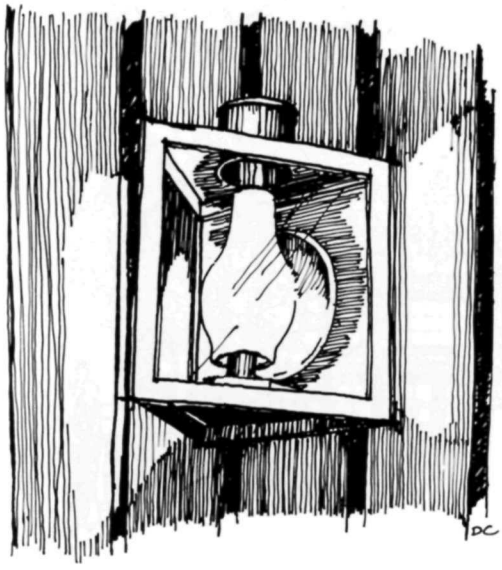
ARCHITECTURAL DETAIL

Rustic architecture is typically about simple shapes and oversized elements. Architectural details are used to enrichen the character of the structure as opportunities occur where the visitor is most likely to interact. These details should have a rustic, hand-crafted appearance rather than a slick, machine-made effect.

LIGHTING

Concealed light sources which are unobtrusive and which eliminate glare work best. Decorative lantern-type fixtures with an artistic, handmade look are also appropriate. Materials should be wrought iron, dark untreated bronze, or should be painted black. Silver, chrome, and polished brass are not appropriate. For further guidance, refer to the Grand Canyon Lighting Study.

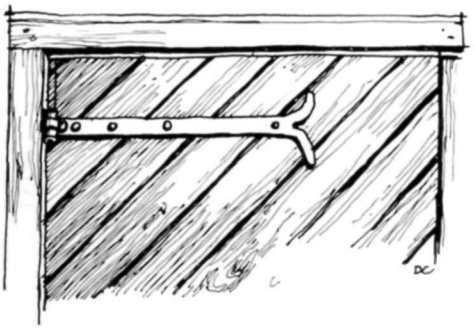






HARDWARE

Hardware should have a hand-wrought or custom-cast character and should be oversized. Appropriate materials are wrought iron and dark bronze. Avoid highly polished look.





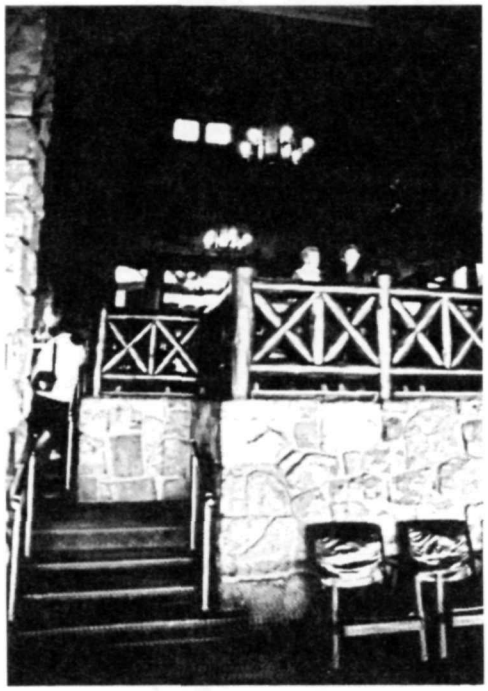
Yavapai Museum.



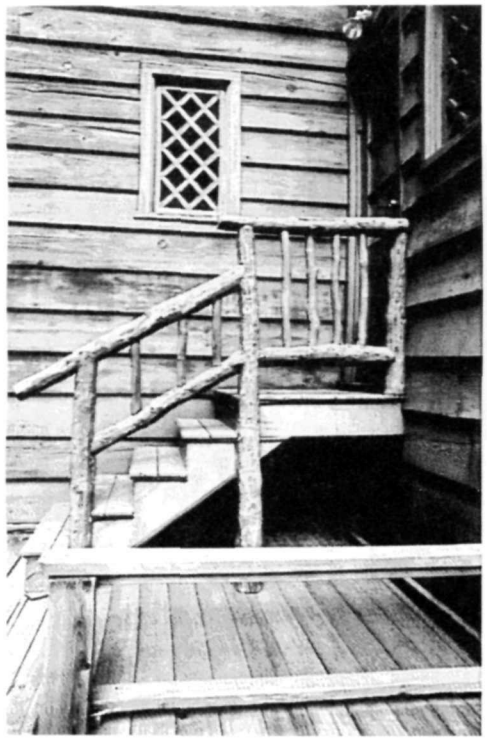
Railway Depot, South Rim.

RAILINGS

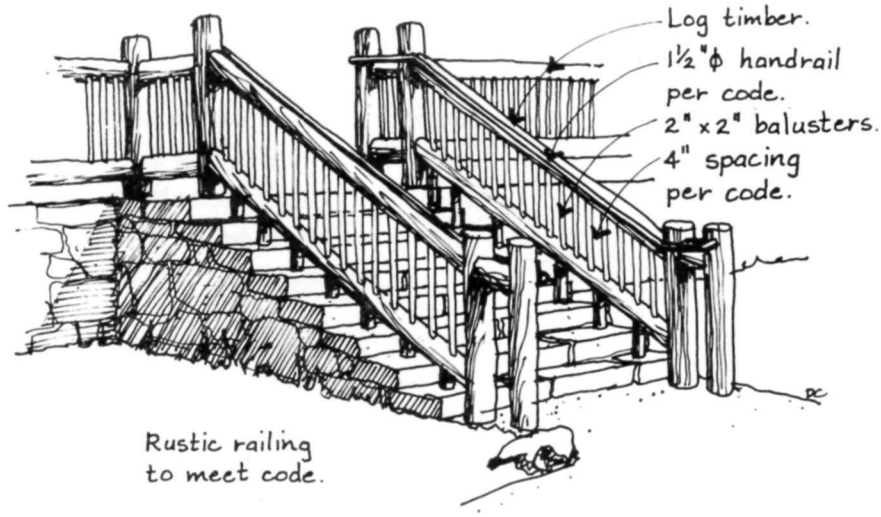
Railings should be simple and overscaled. They are typically of hand-hewn logs, providing an opportunity for natural, free-form expression.



Grand Canyon Lodge, North Rim.



South Rim Community Building.



VENTS

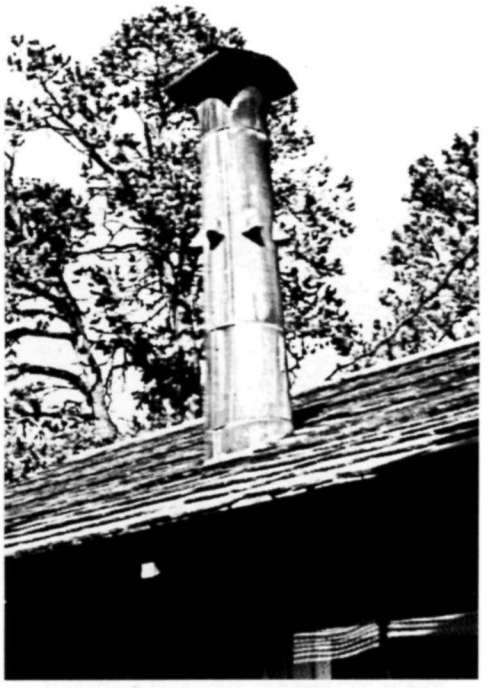
Gable-end attic vents are an important detail. They should generally be rectangular, wood, and should be trimmed to mimic the window openings. Some cases may allow a more decorative approach.



CHIMNEYS

The chimney is a good opportunity for vertical counterpoint in the predominantly horizontal rustic vocabulary. It is typically of stone and is often used to reinforce a more heavily massed corner of the facade. In general, stonework gets smaller toward the top.

The South Rim Labor Cabins are a good example of the use of the metal chimney. The distinctive detailing serves to integrate the metal chimney with the rustic style.



South Rim Labor Cabins.



Grand Canyon Lodge, Deluxe cabins.

MOTIFS

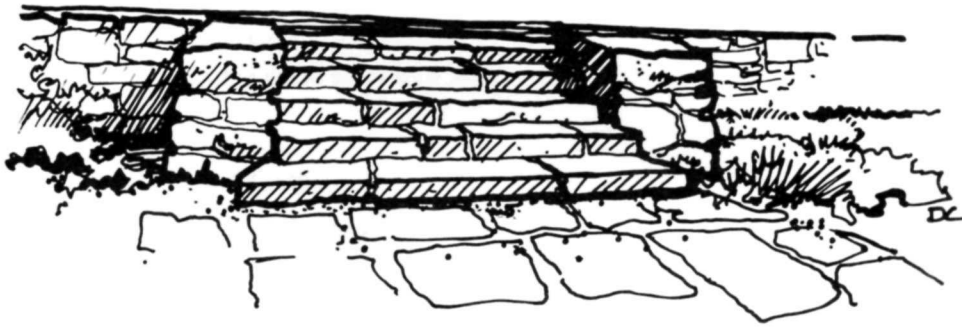
Artistic motifs, such as carved doors, which relate to local culture and to the southwest, can serve to enrich the built environment.



Yavapai Museum, South Rim.

MASONRY

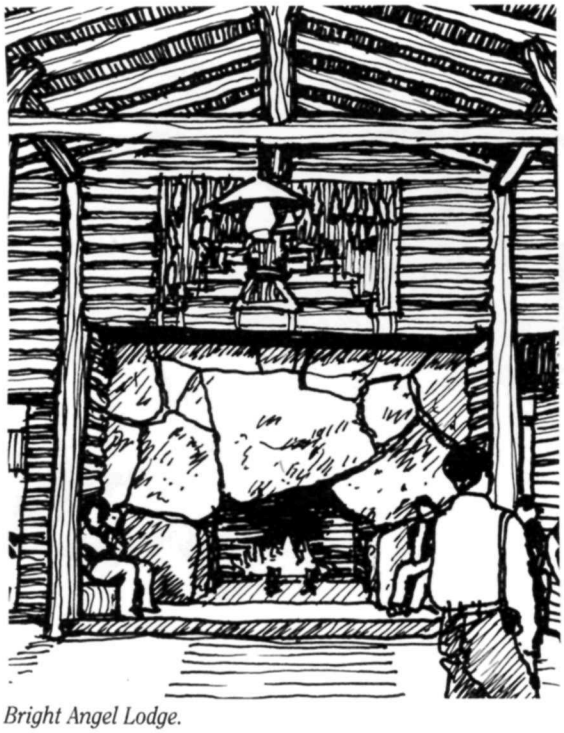
Native stone is an ideal material for special outdoor details such as scuppers and splash blocks, benches, steps, thresholds, and railing posts.



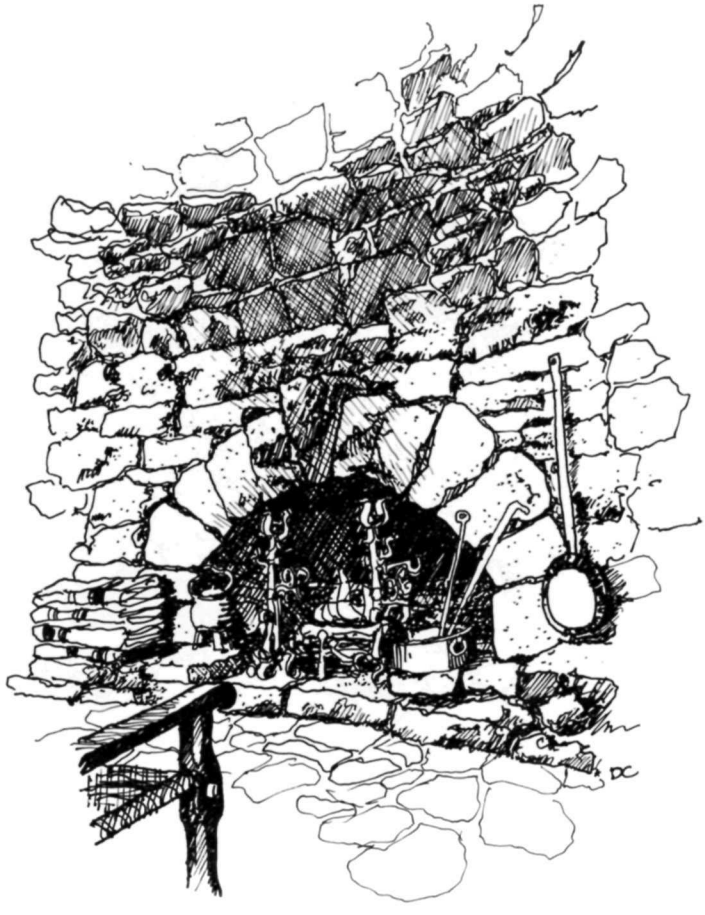
Stone steps, Community Building, South Rim.

FIREPLACES

For environmental reasons, the fireplace will be used less than in the past. However, in major public buildings it is still a major focus and amenity of the primary common space. Use of massive stone in simple form expresses the rustic character.



Bright Angel Lodge.



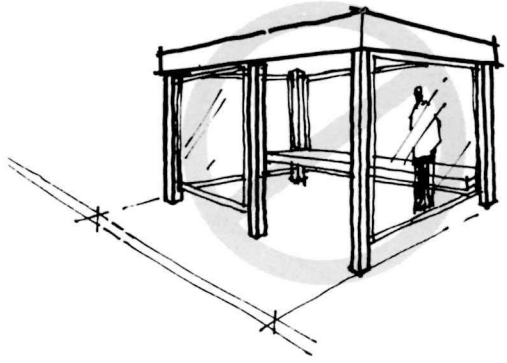
Hermit's Rest.

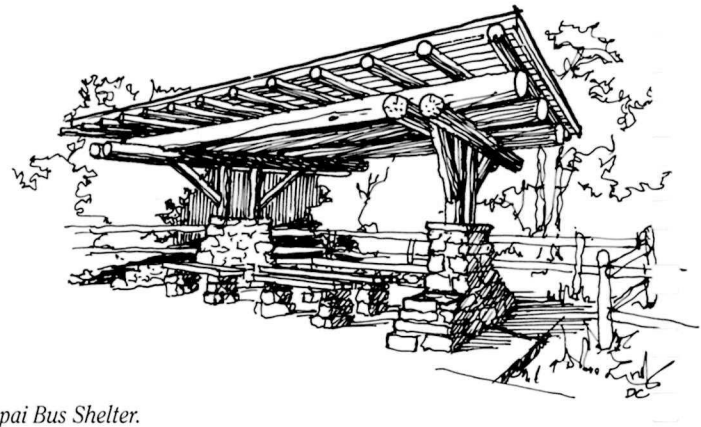
SHELTER STRUCTURES

This is a broad category of ancillary structures that have very similar forms; and yet serve a wide variety of functions. These functions may include rest areas, bus stops, information and vending kiosks, storage, maintenance, and equipment enclosures, firewood storage, trash enclosures, recycling shelters, and even gateways, such as the South Entrance Station.

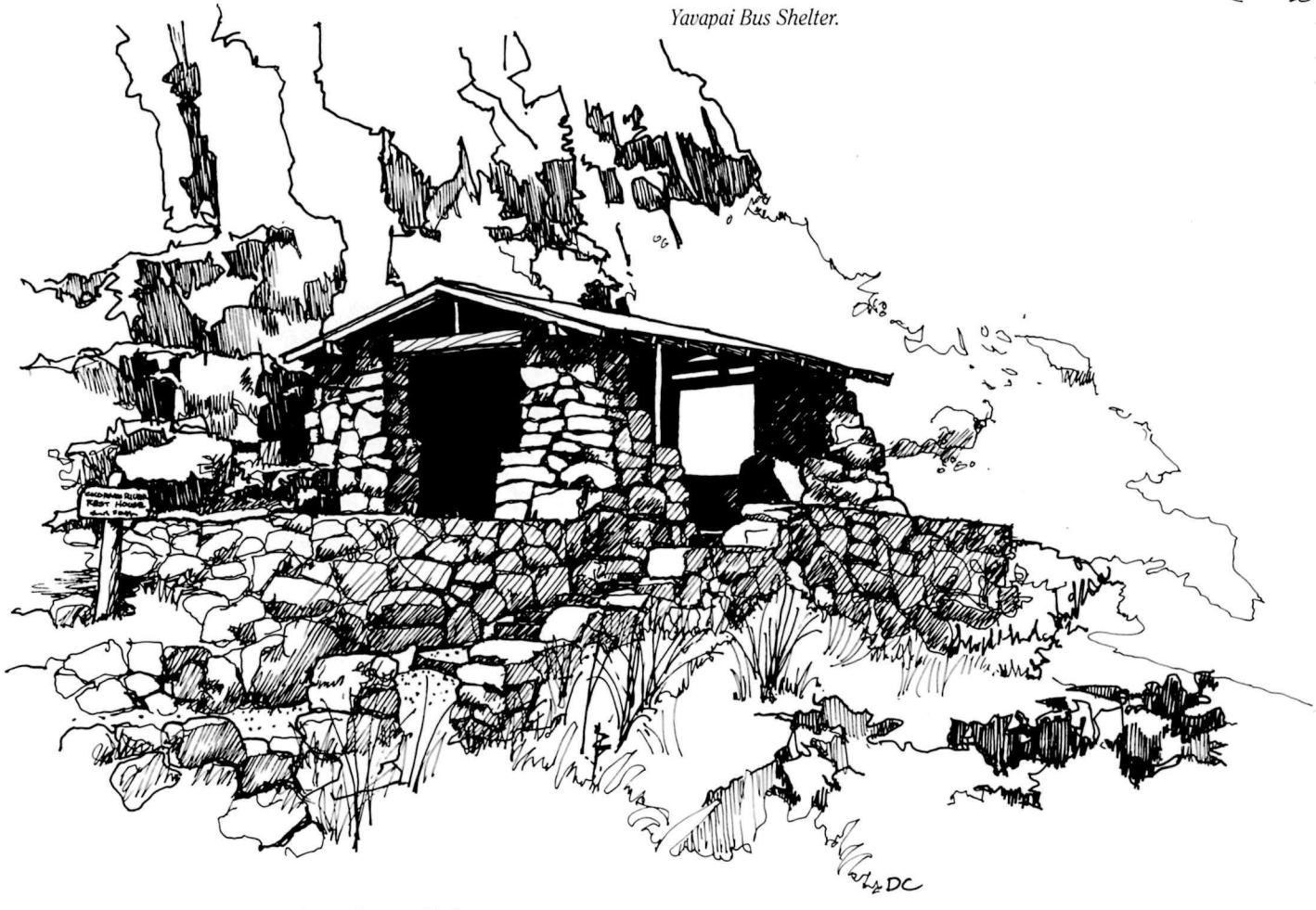
These structures are typically simple and have an open-end gable roof with broad overhangs, set over a basic rectangular plan. A great deal of attention should be paid to integrating the structure with the immediate natural environment.

Construction is of stone and oversized timbers, with the structure fully exposed to view.





Yavapai Bus Shelter.



Inner Canyon Shelter.



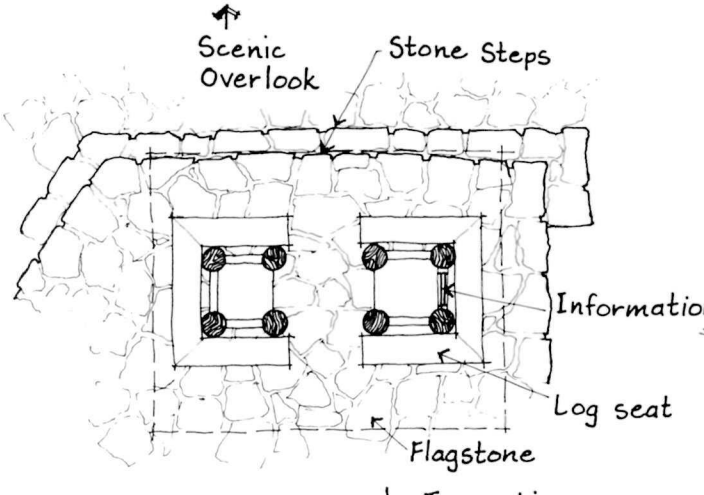
Inner Canyon Shelter.



Transformer Building at Bright Angel Lodge.



South Entrance Station.



Shelter at North Rim Lodge plan.



Shelter at North Rim Lodge.

In a National Park setting, the selection of site materials and the design of site elements is important since these features are a significant part of the manmade environment within the context of the Park landscape. These features have an important impact on the perception, safety, and quality of the visitor experience.

Site elements should be designed to harmonize with the landscape in which they occur and to be only as visible and apparent as required to accomplish their intended function. Site elements should be used and designed with restraint.

A brief discussion of appropriate design considerations for various site materials and elements follows.

SITE MATERIALS

Site materials should adhere to the same general guidelines presented in the architectural materials section. The most appropriate site materials are discussed here.

Whenever possible, stone used should be kaibab limestone, selected from local sources to match material used in historic park structures. Uncut rubble limestone is available in the park and should be used as much as possible, particularly in the Historic Districts. Jobs requiring the use of large quantities of stone may require the use of sandstone, due to restrictions on quarrying stone within the park. All stone used for site elements should have rough battered surfaces.

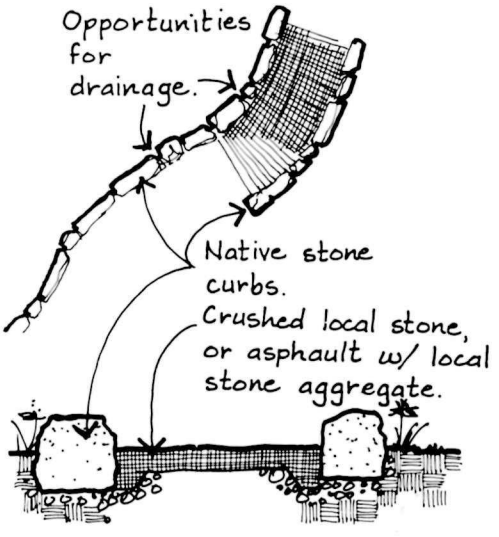
The use of stone should be compatible with historic precedents. Stone should be used for curbs, retaining walls, special paving, and other appropriate site applications.

Use wood for signs, guardrails, benches, fencing, and similar site details.

Wood for site applications should be selected from nearby sources if possible without unduly impacting forest resources. Wood should retain as natural an appearance as possible. If staining is required, a stain type similar to that used in historic Park structures should be used. Pressure-treated wood should be used to prevent rotting when wood is in contact with the ground or where moisture is expected. Environmentally sensitive wood stains and treatment methods should be used whenever possible.

Paving for roadways, parking areas, and paved trails should be asphalt using aggregate from local area sources.

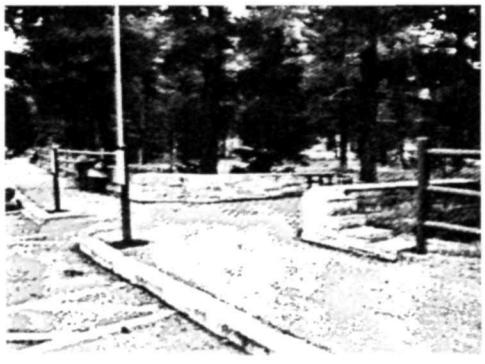
Paving of sidewalks and outdoor-use areas such as entrance walks, pedestrian plazas, outdoor dining areas, patios, and porches can be constructed of integrally colored, precast concrete unit pavers, native stone, or colored cast-in-place concrete designed to achieve a natural appearance. If colored concrete pavers or flatwork are used, colors should be subdued earth tones to appear as natural as possible.



Trails and Walkways

CURBS

Curbs should be used where it is desirable to define the edge of the roadway or parking lot or to delineate the edge of pedestrian or bicycle routes. If possible, curbs should be constructed of stone to be compatible with historic examples occurring in the Park. In areas not accessible to Park visitors, and outside of historic districts, integrally colored concrete curbs should be considered.



Vertical curbs should be used at the edges of parking lots and roadways to delineate the limits of vehicular areas. Provide breaks in curbs for access by disabled persons at appropriate locations in accessible trail crossings or in accessible parking areas.

Curbs may not be needed and should not be used in areas where traffic can be effectively limited to roadway or driveway surfaces.

Curbs should also be used on primary pedestrian and bicycle trails to help define the trail edge, provide transitions to existing grade, and to contain the trail surfacing material.

TRAILS, STEPS, RAMPS AND WALKWAYS

Trails and walkways help direct pedestrian traffic into desired corridors and discourage the random development of "social trails" which create excessive impact to Park resources. An effective trail network will encourage pedestrian access between facilities and reduce automobile traffic.





A hierarchy of trails is often appropriate and should have varying design standards for the intended use. Bicycle/pedestrian trails should be 10 feet wide and asphalt paved for light vehicular loading. Pedestrian trails should be a minimum of four feet wide, asphalt paved, concrete, or compacted crushed stone for pedestrian loading. Backcountry trails should be unsurfaced or natural surface and unobtrusive for pedestrian and stock use only.

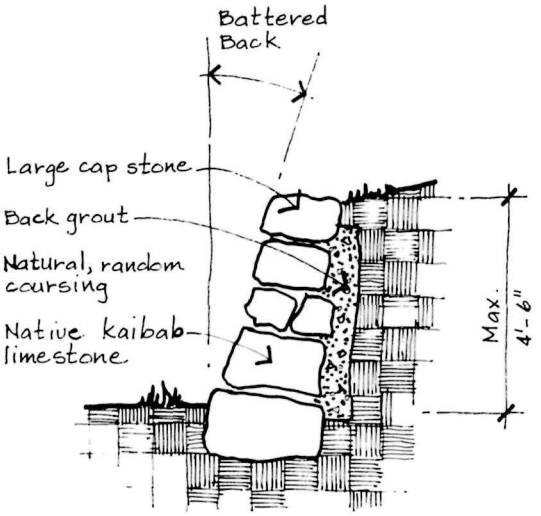
Steps and ramps can be used where path grades exceed 5% longitudinal slope. Where steps are used, access for disabled persons should also be provided by the construction of a suitable ramp meeting accessibility guidelines. Handicap-accessible ramps can slope up to 8%, provided hand rails are constructed on both sides. Ramps with slopes of 5% or less do not require handrails (see Uniform Federal Accessibility Standard/UFAS for current accessibility guidelines.)

Native stone is the preferred material for defining the edge of trails. Alternatives to stone for edge definition or step risers and treads may include treated heavy timber or shaped logs, although these generally require more maintenance and are less natural in appearance. Integral colored concrete steps (in subdued earth tones) may be acceptable if used in conjunction with other appropriate concrete paving in a more developed setting.



RETAINING WALLS

Retaining walls should be avoided to the extent possible by careful site planning and building design that fits site conditions. Where grading transitions are necessary, retaining walls should be used where slopes of 3:1 (3 ft. horizontal to 1 ft. vertical) or less cannot be achieved, or where grading is not desirable due to space limitations or impacts to vegetation or other site features. In some cases, retaining walls may also help achieve a desirable design objective such as protecting visitors from precipitous drops, providing a seating surface, or directing pedestrian traffic.



Dry-lay Stone Retaining

Wherever possible, retaining or site walls in public areas should be constructed of native Kaibab limestone to match the examples available in historic construction at Grand Canyon.

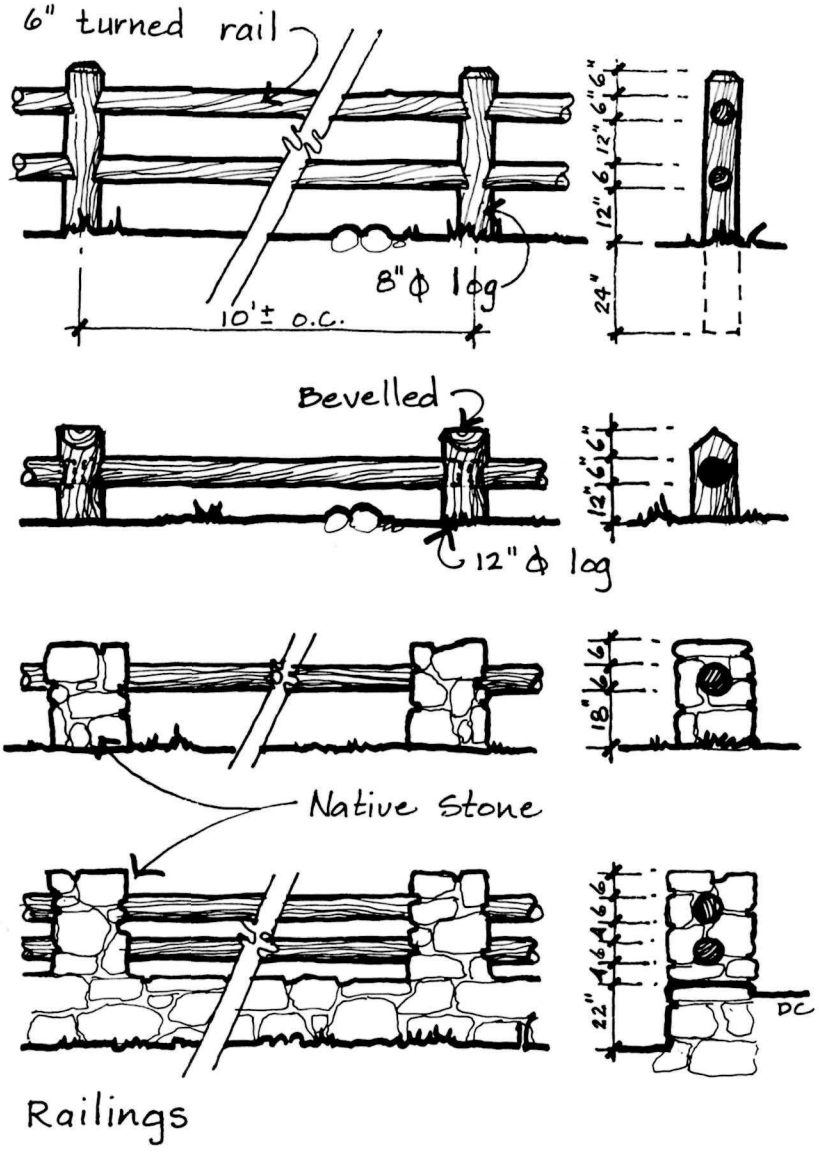
Where drops in grade present a safety hazard, retaining walls should be used in conjunction with wood or metal safety rails or other protective treatment such as plant material barriers, if permitted by applicable building codes.

Modular precast concrete retaining wall systems are discouraged. However, they may be acceptable in specific situations (outside of historic

districts and out of view of the general public) if compatible colors, scale, and textures are incorporated.

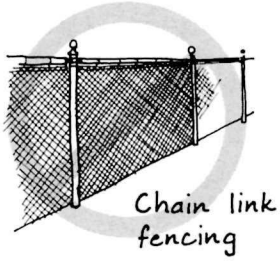
RAILINGS

Railings may be required by applicable building codes, handicap accessibility standards, or to provide a suitable level of safety for park visitors, residents, or employees. If required, the design should be carefully considered in the context of the design objectives of these guidelines and rustic architecture in general. The design of railings should be rustic in character, should generally appear to be constructed predominantly of wood, and should be fabricated and finished in a way that is consistent with historic examples. To meet widely accepted current building codes, it may be appropriate to consider the introduction of steel or wrought iron components to the design to achieve the mandated opening spacing, grab bar dimensions and locations, etc. If introduced, such metal components should be integrated into the overall design objectives to be as unobtrusive as possible.

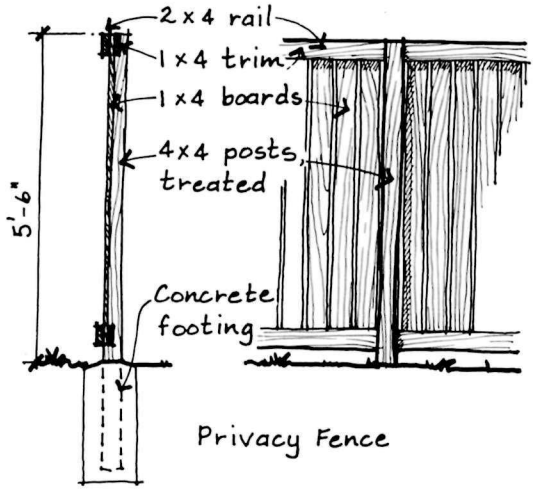


Railings

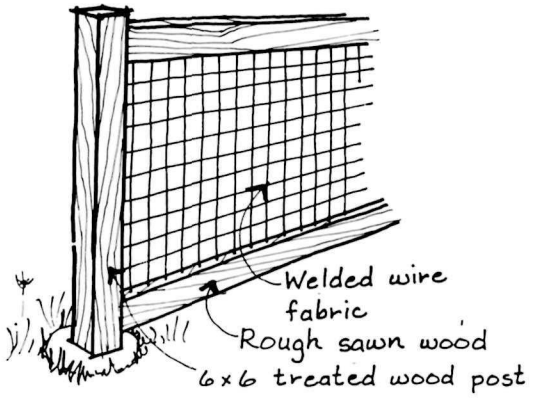
WALLS, FENCES, OUTDOOR STORAGE AREAS



Walls and fences are most effectively used to regulate pedestrian movement in order to protect vegetation or other fragile Park resources. Additional applications include screening for outdoor storage or utility installations such as transformers or switch cabinets, trash enclosures, firewood or fuel storage, or the definition of private outdoor areas in conjunction with employee housing. Fencing should reflect the principles and materials of rustic architecture.



Privacy Fence



Animal Control Fence

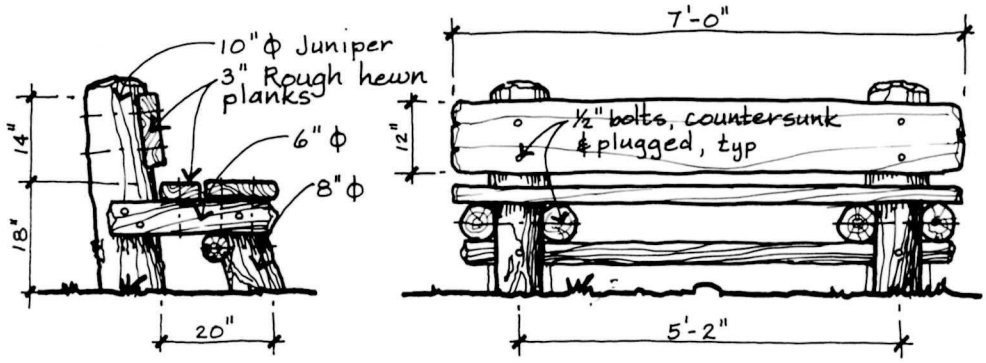
Turned rail fencing should be used to delineate desired pedestrian routes. In situations where historic fencing exists, new fencing should be designed to be compatible with the historic examples. Rail fencing should be constructed of alternating stacked rails and doweled connections to posts.

Privacy or screen fencing should be five or six feet high and should be constructed of wood with natural finishes and a rough-sawn texture. In cases where fencing is an extension of a building facade, the design should compliment the architectural treatment of the adjacent wall. The area enclosed by privacy fencing should be limited to a reasonable area needed for residential and outdoor storage use and should be located to provide minimal impact on views from adjacent residences or views from public roads or trails. Firewood should be stored inside a screened area, but away from buildings to minimize termite and fire hazards.

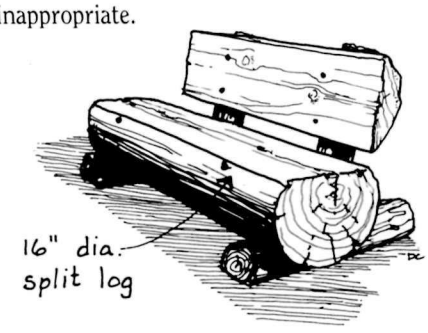
Fences for control of the animals of Park residents should be limited in area and predominantly transparent to minimize the visual prominence in the landscape. A suitable design solution utilizes steel welded wire fabric (unfinished, weathered steel) stretched over a rough sawn wood frame supported by treated wood posts. Wood elements should be left natural or stained to achieve a natural, weathered appearance.

BENCHES

The use of benches is encouraged to enhance the visitor or resident's experience in appropriate locations within the park. Examples of such locations include visitor use areas, overlooks, periodic placement along trails, pedestrian plazas, visitor centers and information areas, near amenities or common areas in residential areas.



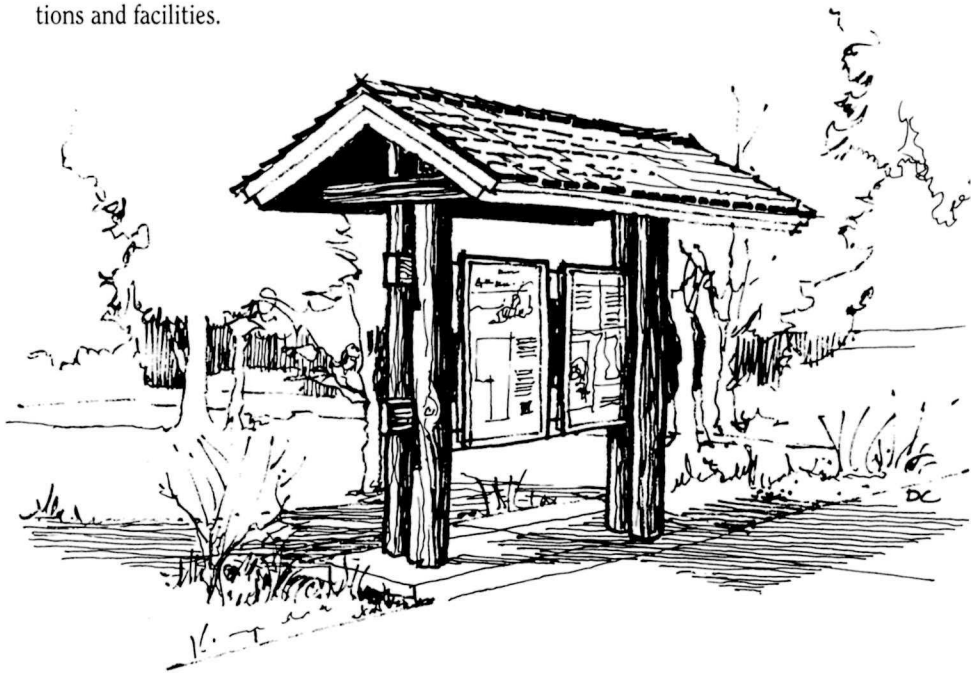
In general, benches should follow closely the design precedents established by the attractive, appropriately scaled, log benches used along the South Rim trail and at many of the South Rim overlook areas. The benches reflect a simple structural design constructed with authentic rustic materials. Bench seats should be sloped slightly to allow moisture to run off. Supports in contact with the ground should be constructed of pressure-treated lumber to resist rotting. Backs may be optional depending on the specific site characteristics. Sealers or stains may be utilized to minimize the harmful effects of the climate as long as the rustic, natural appearance is preserved. Connections and joints should be durable to minimize maintenance requirements. Wrought iron and other metal benches are inappropriate.





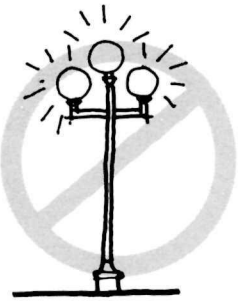
SIGNAGE

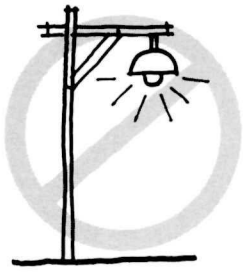
As with other site elements, the introduction of signs within Grand Canyon should be limited to individual instances where information is needed to direct visitors to key destinations or to communicate regulations for public safety or protection of park resources. Interpretive signage must also be consistent with the park's interpretive plans for specific visitor destinations and facilities.



For additional design criteria and guidelines, consult the Grand Canyon National Park Sign Plan.

SITE LIGHTING



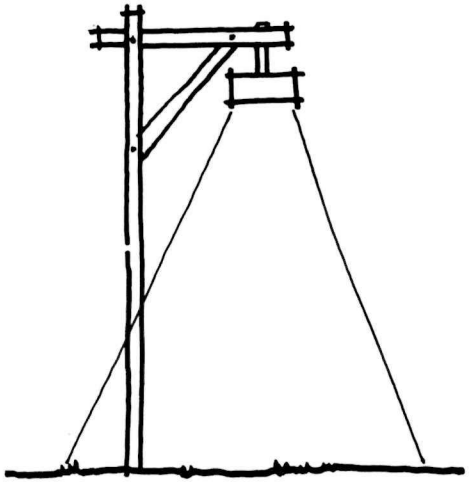


Light pollution caused by excess reflected light into the sky at or near the Grand Canyon is a serious concern. The introduction of exterior lighting in the Park should be limited to only those areas and cases where human safety requires some level of exterior illumination. Lighting for ornamental purposes is not appropriate.

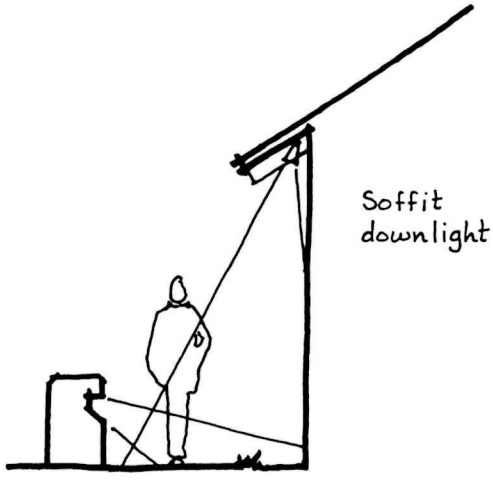
Lighting should be accomplished with fixtures designed to reflect the principles of rustic architecture wherever possible. Pole-mounted fixtures should be mounted at heights suitable for the intended lighting purpose, and mounting heights should be no higher than that required to accomplish the desired objective. Roadway or parking lot light standards should only be as high as required to accomplish the necessary illumination while being in scale with the surrounding landscape and structures. For example, pole heights could be 25-30 feet in areas where existing tree stands effectively camouflage the poles. Lights located in conjunction with a barren overlook along the rim would only be appropriate if mounted on low standards or poles to minimize intrusion of the structures in the surrounding landscape.

Poles and luminaire housings should be finished to blend with other materials consistent with the principles of rustic architecture. Light fixtures illuminating pedestrian walks or plazas should be from 12-15 feet in height in order to be appropriately scaled to the pedestrian and still out of reach of vandals.

Luminaire types should be selected for correctness of color rendition, longevity of lamp life, and low energy requirements. Light should be directed downward onto the ground surface to be lighted to the maximum extent possible, and the cutoff angle and distribution pattern should be carefully considered to achieve effective light levels without visible glare from an exposed light source. Low-level bollard type light fixtures should be considered where they can be effective without becoming too dominant in the landscape. Ornamental luminaries with visible light sources are not acceptable.



High cut-off downlight



Soffit downlight

Bollard light

LANDSCAPING AND REVEGETATION

The best landscape design is one in which the existing vegetation is maintained and the buildings and other facilities are designed around this vegetation so that the facilities and the site

appear to be in harmony. Where existing vegetation is preserved and incorporated, the landscape appears mature from the day the project is completed, and the result is a building or facility with a more attractive and natural appearance. This established appearance cannot be accomplished for many years with new plant materials alone, given the difficulty and time required for significant landscape growth in the environment of the Grand Canyon.

Landscape modifications in natural areas should be minimized unless needed to mitigate manmade impacts. Revegetation in natural areas will use seeds, cuttings, or transplants representing species and gene pools native to the area. In developed areas landscape modifications may be more appropriate if structured to enhance the intended purpose of the zone and if no adverse impacts to existing natural areas or existing vegetation result. In cultural zones, landscape elements should be designed and managed to reflect the historic landscape.

Landscape modifications should blend into the natural landscape while assisting with the objectives of the facility program.

Plant materials should be selected for adaptability to the specific climate of the site and should be drought tolerant; turf areas should be limited to small areas adjacent to residences and should utilize native or drought tolerant grass varieties.

Landscape development should complement other efforts to conserve energy by providing shade in summer and buffering cold winds in winter, as long as these objectives can be accomplished without compromising the other landscape goals.

GATEWAY ELEMENTS

In very limited cases it may be appropriate to introduce manmade entry monuments or gateway elements in the site development to help create a sense of arrival or entry to a site or group of facilities. Excellent historic precedents for such elements exist within the park and these precedents should be consulted for appropriate design treatments. The entrance to the historic cemetery near the Shrine of the Ages is an excellent example of a gateway element in a rustic style. The stone pilasters flanking the road into the residential area in the South Rim Village historic district provide a useful and appropriately subdued model for entry monuments.



Cemetery Gate, South Rim.



Gateway to Residential Area, South Rim.

NOTES

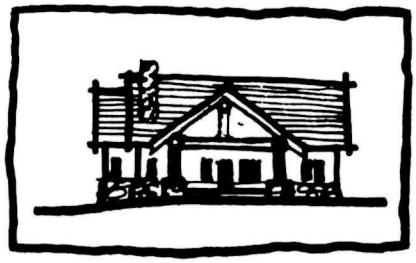
BUILDING TYPES



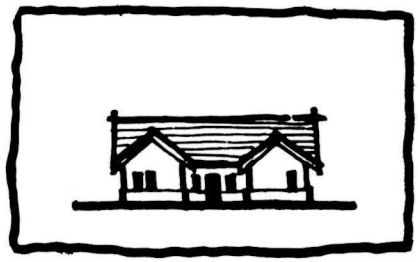
The first section of this document introduced the designer to the various developed subareas within the park, including the natural and cultural features which exist there and which create the context. The second section introduced the designer to the basic design process and to the principles inherent in developing appropriate site-specific design within the park. This section attempts to define the various building types which exist within the park and, through a careful analysis of existing buildings within each subarea, to illustrate appropriate and inappropriate ways of applying the principles of rustic design to specific building types.

Each building type is based on differing programmatic requirements and differing degrees of aesthetic importance in terms of contributing to the overall visitor experience. Each building type is first defined by how the basic principles of rustic design may be adapted or modified; then examples of existing buildings, both old and contemporary, are used to illustrate both appropriate and inappropriate applications of these principles. The designer is encouraged to review these examples, visit the sites in person, and look at other noteworthy structures as listed for each subarea in order to gain a better understanding of the architectural character of Grand Canyon National Park.

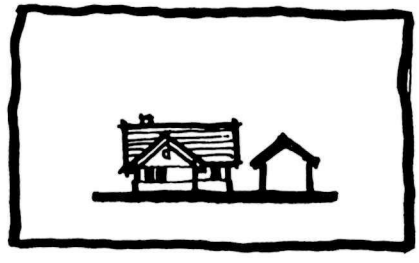
BUILDING TYPES



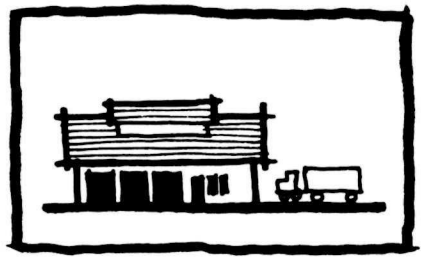
PUBLIC/VISITOR USE



COMMUNITY



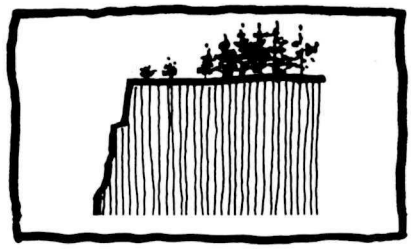
RESIDENTIAL



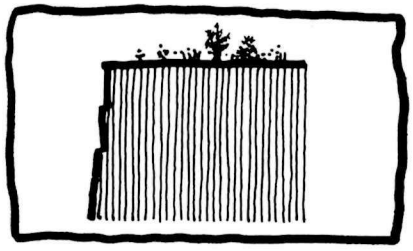
UTILITARIAN

SUB-AREAS OF THE PARK

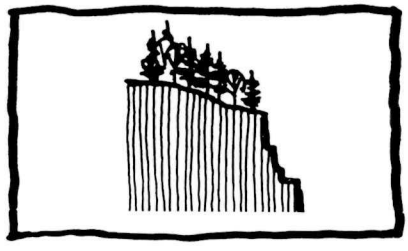
(See pages 10-11 for descriptions.)



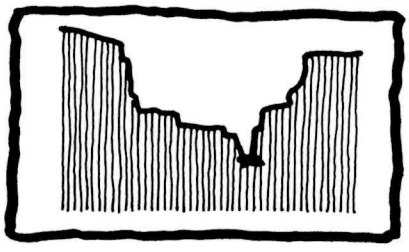
SOUTH RIM



DESERT VIEW

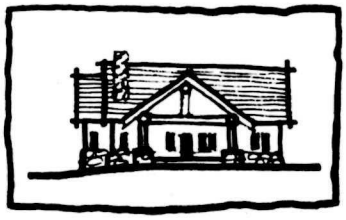


NORTH RIM



INNER CANYON

PUBLIC/VISITOR USE BUILDINGS



PUBLIC/VISITOR USE

Public/Visitor Use buildings are structures providing services for the Park visitor, as well as buildings for administration of the Park, such as visitor centers, restrooms, and museums. Also included are concessioner facilities such as stores, service stations, dining facilities, and lodging.

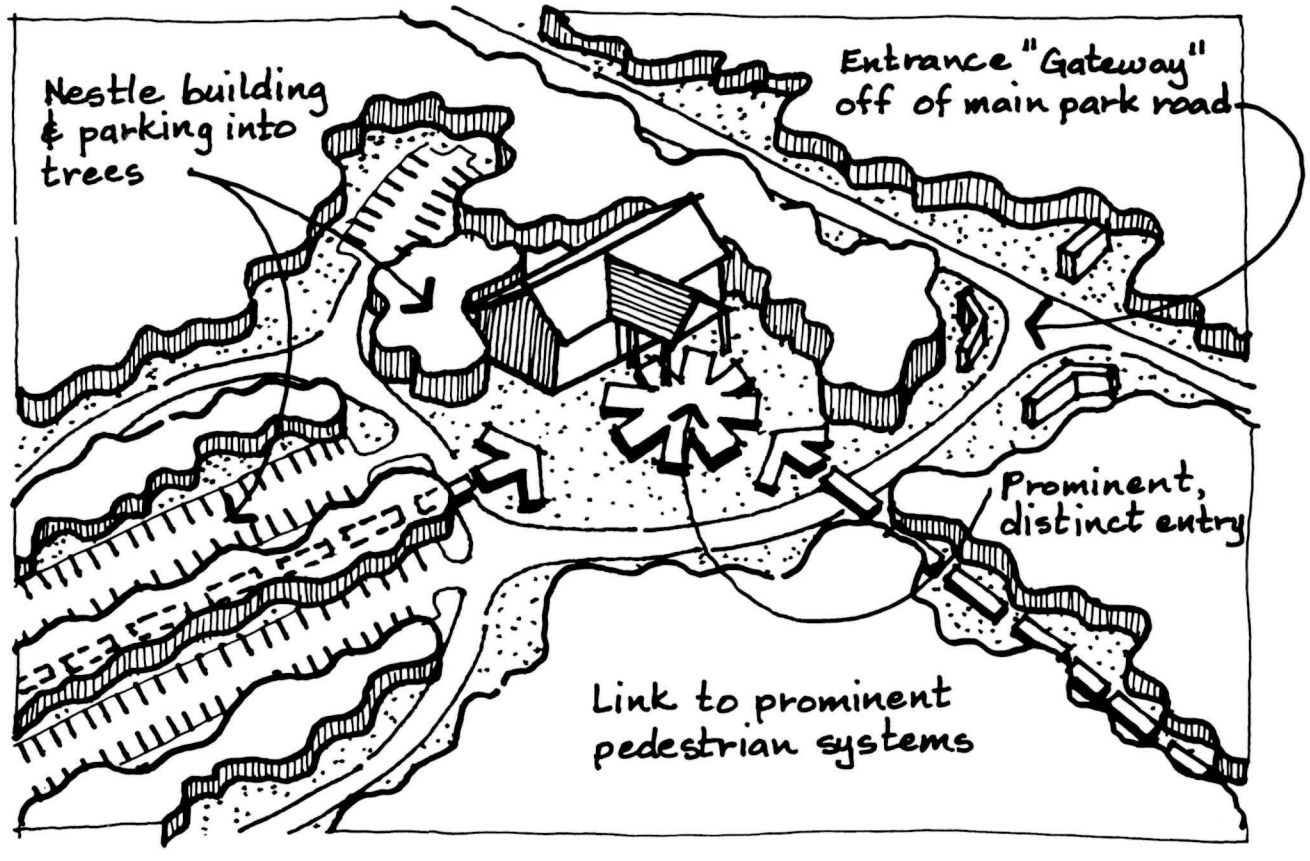
• Public buildings, more than any other Park structures, should represent the greatest expression and highest ideals of rustic architecture in all aspects of design, materials, and execution.

• Public buildings should relate in a contemporary way to the large number of historic structures in the Park in order to provide continuity with the past and to contribute to the existing sense of place.

• Public buildings should be designed to facilitate a large number of visitors and to withstand heavy use with minimal maintenance. This implies the use of the highest quality materials.

• Public buildings should follow the design guidelines presented in this document in the strictest sense. The use of wood and stone should be maximized, architectural details should be carefully conceived and custom-made if necessary, and colors should be restricted to those which are in harmony with the natural setting.

• The interiors of public buildings are more likely to emphasize the exposed, rustic, heavy timber structure and to feature such elements as stone floors, fireplaces, and benches; timber



Site Considerations.

railings and stairs; and custom, handcrafted detail in lighting and furnishings.

• Public entries should be prominent, distinct, easily identifiable, and accessible for all potential users. Outdoor spaces should be provided for public use and should relate integrally with the structure through the use of porches and arcades. Signage, site design, and lighting should work together to orient the visitor to the facility.

• Site aspects of public buildings include all of the considerations stated previously in these guidelines. Specific site objectives of this building type include the following:

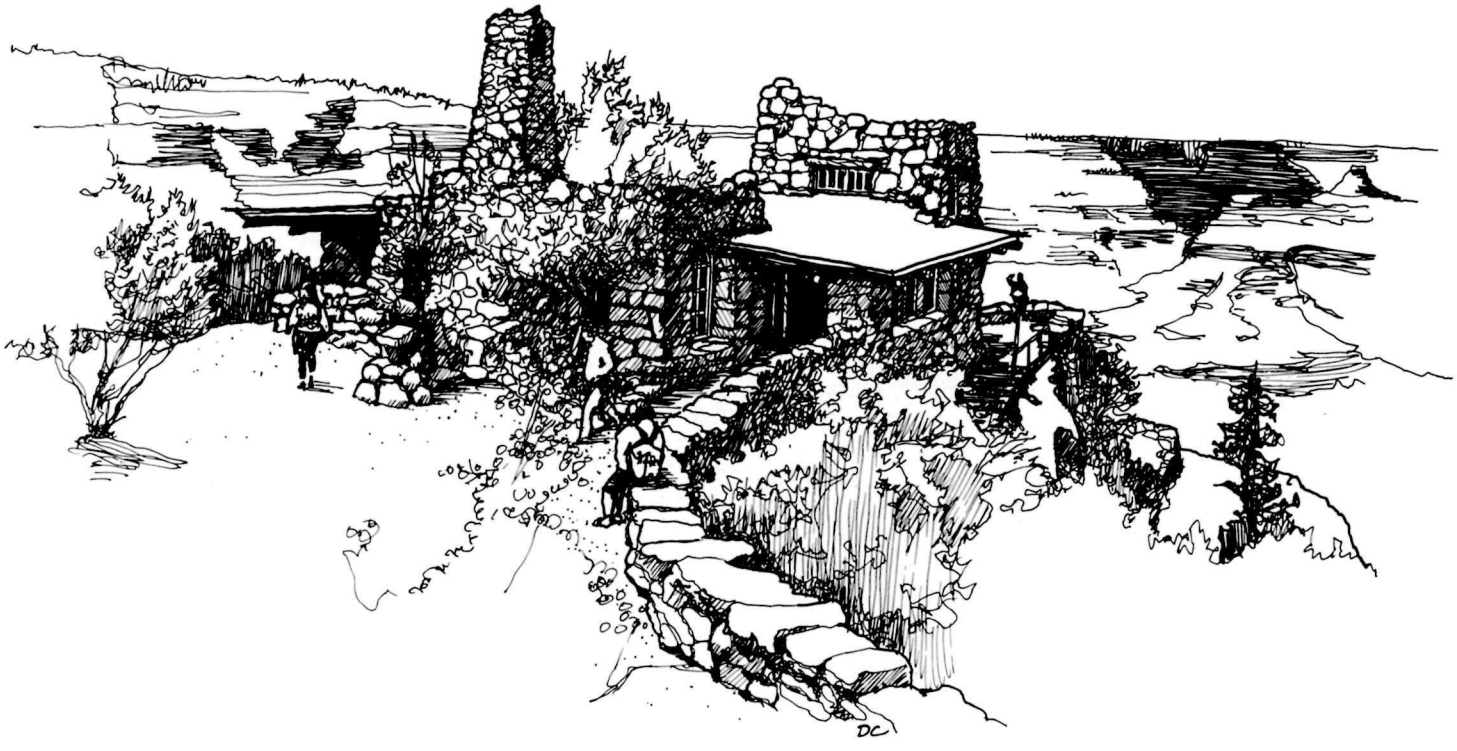
Establish a clear sense of visitor orientation and a carefully conceived entry experience to maximize the visitor experience and enhance the visitor's appreciation of the Park resources.

Optimize the indoor/outdoor relationships to maximize contact with the outdoor environment around the facility.

Provide ease of access and circulation for all visitors, including those with disabilities, small children, and the elderly.

Locate parking facilities carefully, to minimize the intrusion of automobiles and buses on the visitor experience.

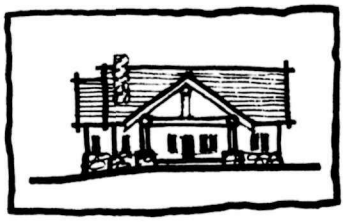
• Design for passive solar and other sustainable strategies is encouraged within the principles of rustic design.



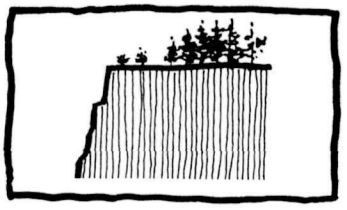
Lookout Studio, South Rim.

PUBLIC/VISITOR USE BUILDINGS

MASWIK TRANSPORTATION CENTER



PUBLIC/VISITOR USE



SOUTH RIM

The Maswik Transportation Center is the terminus of the future railroad shuttle spur. It is located at the west end of the South Rim Village Historic District. Visitors coming by train from the airport, as well as visitors parking their vehicles in this area will be welcomed by Park staff, information panels, restrooms, storage lockers, and seating areas within the Center. It will serve as a major shuttle bus transfer station, providing free transport to various destinations within the Park.

At this time, the facility is not yet fully operational.

Year Completed: 1993/94

Size: 5,700 sf covered area

SUCCESSFUL FEATURES

SITE:

The overall quality of the design and materials of the facility and the related site development is exemplary and certainly incorporates much of what is good about rustic architecture. The generous plaza and walkways will make visitors feel welcome and comfortable upon their arrival at the Park. The site materials and detailing are appropriate and inspiring.

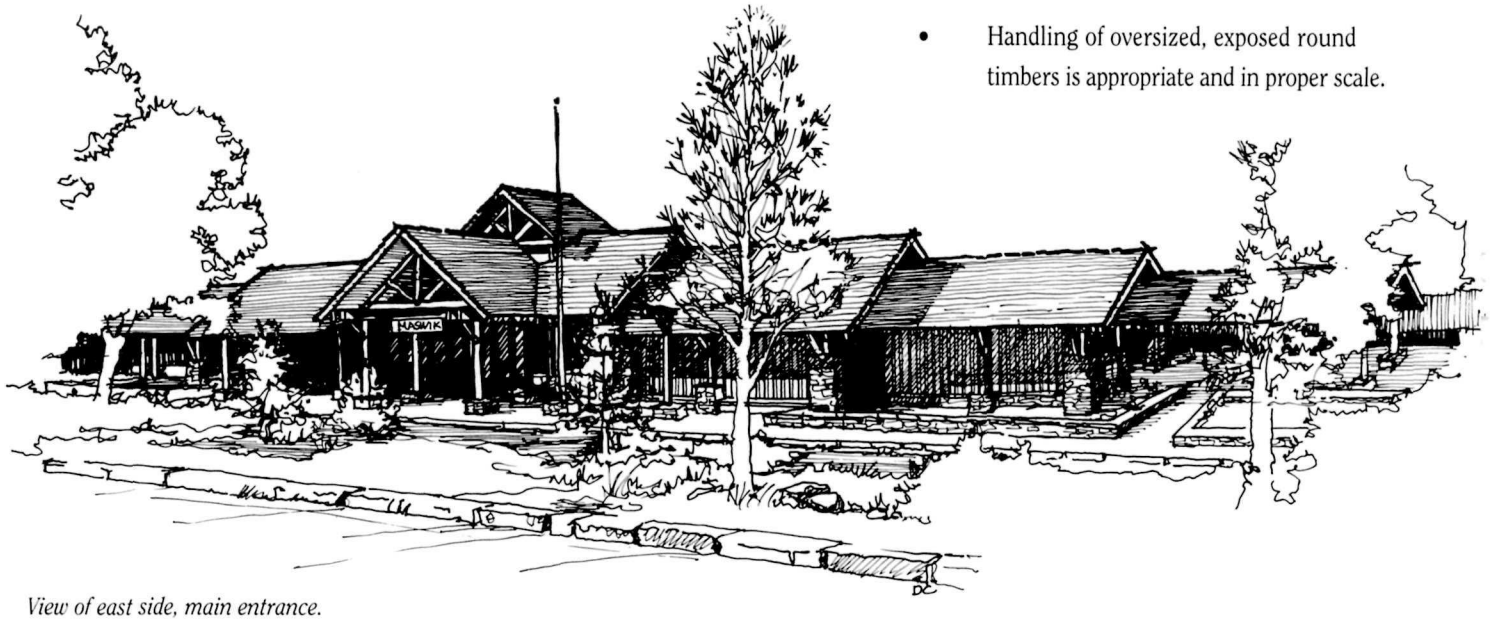
Drivers must pass in front of the facility entry prior to parking, making it easy to find. Stone curbing and large planted islands will soften the wide expanse of parking once the vegetation grows. Concrete pavers of different colors create Navajo-style patterns in the plaza and walkways throughout the facility. The facility responds to the pedestrian movement approaching from the parking areas with exterior spaces flowing into the interior. Views out of and into the facility tie the building to the site, as do the stone, wood and "railroad-wrought iron" materials used in site railings and other site details.

BUILDING:

Overall, this recently completed contemporary structure is an excellent example of the application of rustic design principles to current public use development in the South Rim area.

Massing

- The large, pitched roofs with large over-hangs create a strong sense of shelter.
- From the high main entry point, or center, the roof form telescopes down toward both ends.
- Handling of oversized, exposed round timbers is appropriate and in proper scale.



View of east side, main entrance.

Form

- There is a very strong sense of "entry" on the pedestrian/street side created by the large, high, open-end gable roof.
- The 8 in 12 roof pitch is appropriate in this area.
- The gable end roofs at pedestrian entry points effectively shed snow and water away from these high use areas.
- All of the structure is exposed, and the detailing is appropriately rustic.

Materials and Details

- The natural-weathering wood shingle roof is appropriate.
- There is great restraint in the use of color and in limiting the palette of materials. Color was added to the plaza paving materials.
- The dark stained columns and small wall area reinforce the effect of the large roof floating over the strong ground plain, thus emphasizing the horizontal.
- The metal "railroad guardrails" contribute to the sense of place as a railroad interface with other transit modes.
- The street lighting utilizes heavy timber post and arm detailing combined with a high cut-off down light fixture.
- Stone curbing and plaza paving are effective materials.

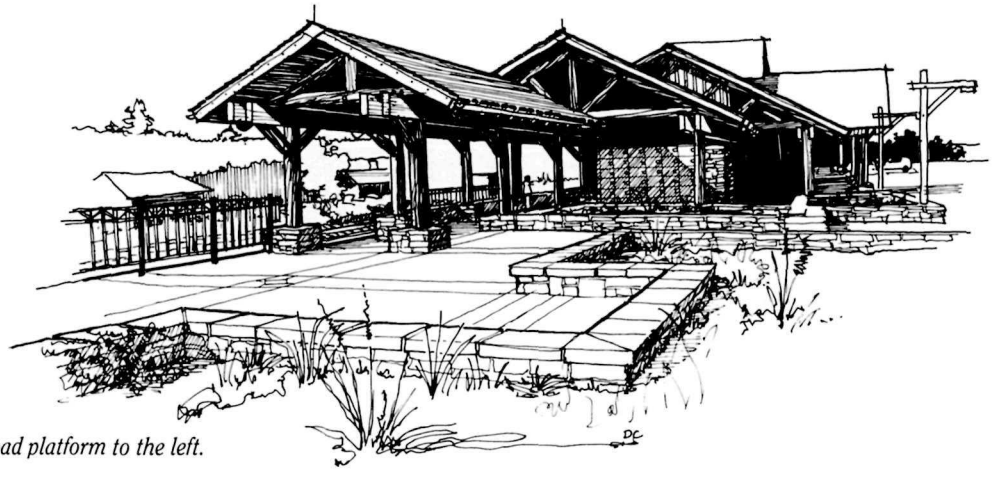
UNSUCCESSFUL FEATURES

SITE:

The available site for this large facility is very narrow, forcing extremely tight turning movements and little transition between parking and the building.

BUILDING:

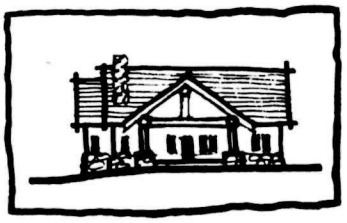
- The large roof plane could have been further textured by doubling the shingles every fifth row (often seen in rustic structures).
- The size of the stone seems too small compared to the other major elements of the structure. Native limestone set in a natural random pattern would be much preferred to the sandstone set in ashlar pattern as used.
- The round timbers would have been more rustic if allowed to show their natural imperfections (burls, checks, branches, crookedness, etc.).



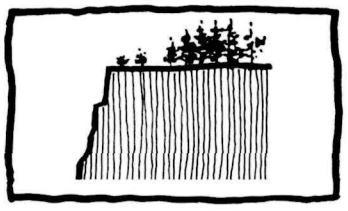
South side, showing the railroad platform to the left.

PUBLIC/VISITOR USE BUILDINGS

NPS VISITOR CENTER



PUBLIC/VISITOR USE



SOUTH RIM

Located in a heavily travelled area just off of the South Rim entrance road, the NPS Visitor Center is intended to serve as the primary orientation and interpretation center for the Park, although much of its space has been converted into staff offices.

Year Completed: 1957

Size: 22,000 sf

SUCCESSFUL FEATURES

SITE:

The site includes a generous plaza in front of the building for people to gather and wait, and a protected interior courtyard with effective interpretive displays of native vegetation and historic river boats in a setting where people can enjoy them.

This facility is easily found, adjacent to the main park road.

BUILDING:

The storage/service yard is screened from public view. There is a recognizable front entry porch.

UNSUCCESSFUL FEATURES

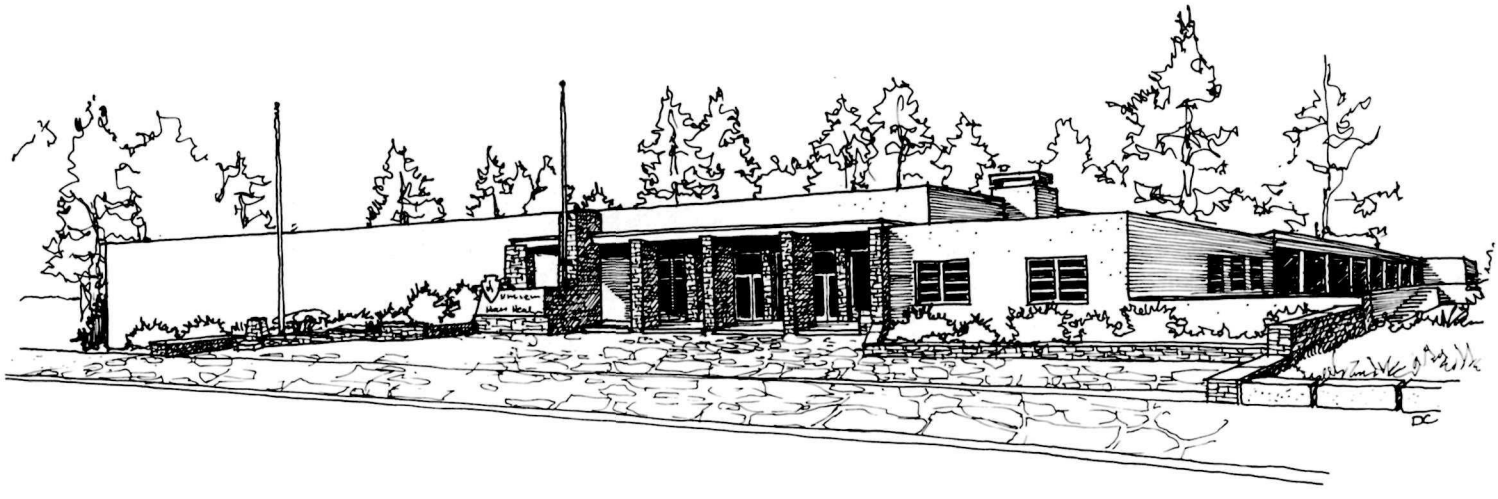
SITE:

Limited site area, the predominance of high traffic volumes and vehicles, and the relatively long distance to the South Rim trail interpretive opportunities all detract from the building's effectiveness as an interpretive facility.

The interior courtyard is somewhat out of the way and behind glass doors and may not be experienced by all visitors who would like to see the displays.

BUILDING:

This building does not relate to the principles of rustic architecture. It was designed in the



Front facade.

International style, at a time when the principles of rustic design had been rejected. The structure now feels very much out of place within the context of architecture in the Park.

Massing

- Somewhat reminiscent of southwest/ Mexican architecture, though this did not appear to be the intent of the massing.
- The mass was stripped down to a very simple block shape.

Form

- In contrast to, rather than in harmony with, the environment.
- Stark and severe.
- Flat roofed. Lack of roof overhangs means less summer solar shading leading to higher air conditioning costs.
- Turned inward on its interior patio, as if to fortify itself from the outside environment.

Scale

- Blank walls without windows give little sense of scale.
- The entry porch, with its high, severe columns and very minimal flat roof, projects a monumental scale, out of proportion to its actual size.

Windows emphasize a strong horizontal, rather than vertical. Frames are of steel. The entry facade under the porch is an aluminum-framed curtain wall.

Materials and color are chosen to contrast with the environment, rather than seek harmony. Walls are of light stucco, and the stonework at the porch, though of native limestone, is cut in a precise ashlar pattern.

The porch does not serve well to provide an effective transition between the extension of the Park and the interior, and it is neither large enough nor planned to serve as a comfortable outdoor room/space.

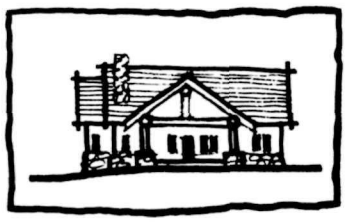
In many ways the NPS Visitor Center is a good example of the antithesis of the principles of rustic design.

OTHER NOTEWORTHY PUBLIC BUILDINGS ON THE SOUTH RIM:

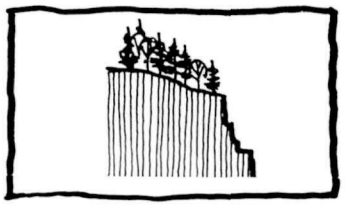
- Yavapai Museum
- Lookout Studio
- Hermit's Rest
- Railroad Depot
- South Entrance Station
- Ranger Operations Building
- El Tovar
- Hopi House
- Bright Angel Lodge

PUBLIC/VISITOR USE BUILDINGS

GRAND CANYON LODGE COMPLEX



PUBLIC/VISITOR USE



NORTH RIM

Located at the very tip of Bright Angel Point on the North Rim, the Grand Canyon Lodge seems to cascade into the canyon and boasts spectacular views from both its inside rooms and its expansive exterior patio. The lodge offers visitor information, lodging registration (the actual rooms are located in cabins surrounding the main building), dining, restrooms, space for interpretive programs, a bar, a post office, a gift shop, and a small cafeteria.

Year Completed: 1928

Rebuilt after Fire: 1936

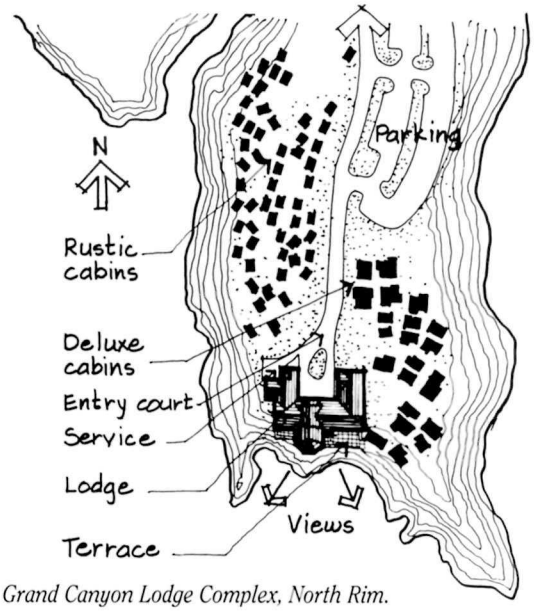
Size: 25,000 sf

SUCCESSFUL FEATURES

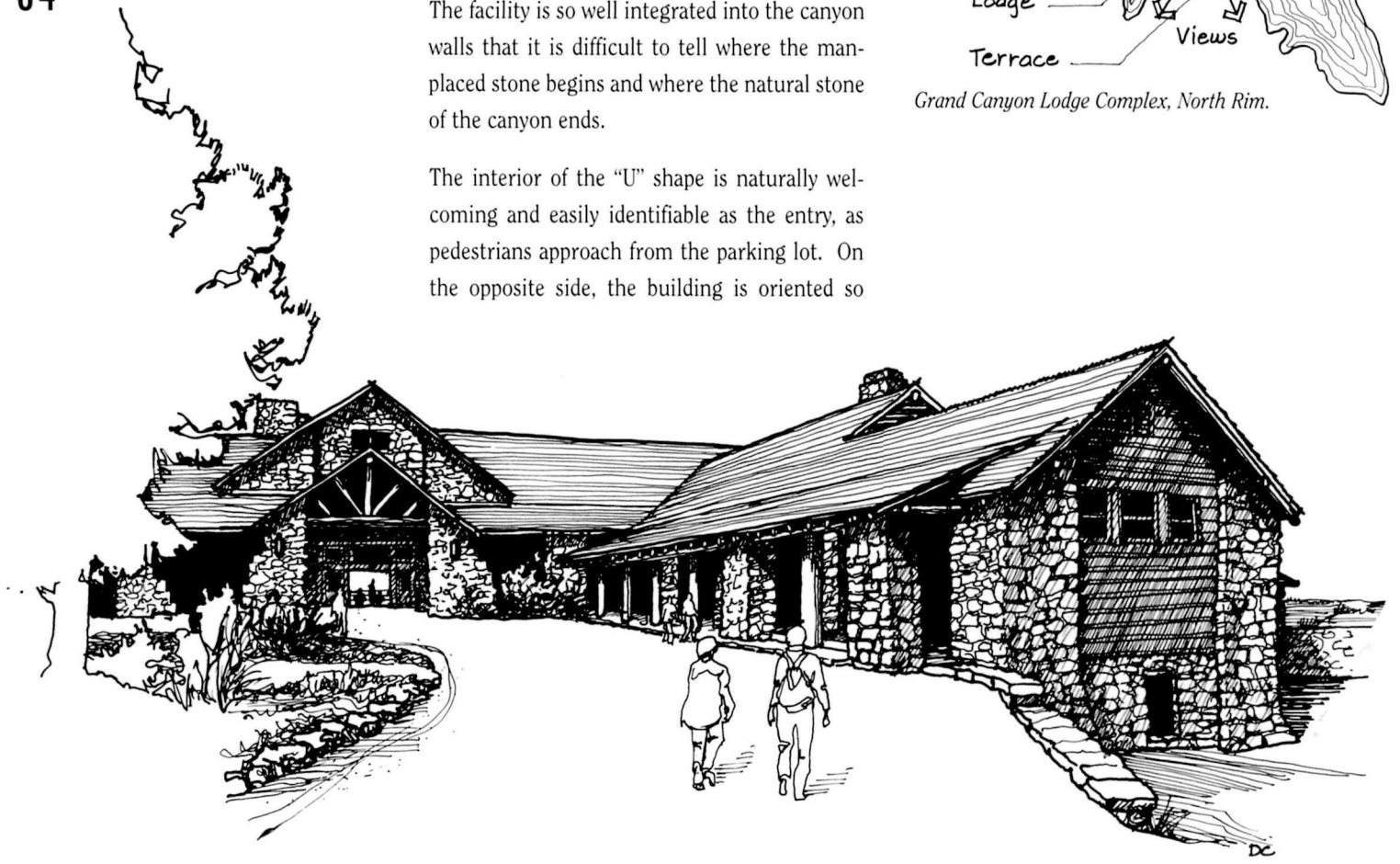
SITE:

The facility is so well integrated into the canyon walls that it is difficult to tell where the man-placed stone begins and where the natural stone of the canyon ends.

The interior of the "U" shape is naturally welcoming and easily identifiable as the entry, as pedestrians approach from the parking lot. On the opposite side, the building is oriented so that even the wings have views of the canyon. The main terrace overlooking the point creates a strong transition between the interior and exterior spaces. The terraces provide a dramatic setting for interpretation of the canyon through ranger talks, reading, or simple enjoyment of the magnificent views into and across the canyon.



Grand Canyon Lodge Complex, North Rim.



Entry side, Grand Canyon Lodge Complex, North Rim.

BUILDING:

The lodge building, together with its flanking rustic and deluxe guest cabins, is an exceptional example of rustic design for a public building adapted to the rough, forested setting of the North Rim.

- The mass of the lodge has been reduced by the fact that the guest rooms are not included in the main building, but rather are cabins scattered among the adjacent trees.
- The "U" shape of the lodge reduces the impact of the mass of this building while the flanking wings create an effective entry court. This shape also responds well to the site and takes maximum advantage of the canyon views.
- The steep, 9 in 2 roof pitch is appropriate for this heavy snow zone and for the mature forest conditions of the North Rim.
- The veranda porch wrapping the entry court is effective in providing protected exterior circulation and in serving as an outdoor room.
- The gable end entry element with its high volume, exposed, oversized stone and timber truss structure is a correctly-scaled transition between the exterior and the large interior space. The gable end redirects snow and water away from the entry. The entry is placed on axis with the sunroom which opens out to views of the canyon.
- The stonework on this predominantly stone structure is an excellent example of rustic principles, incorporating oversized native kaibab limestone, random natural coursing, deep set mortar, and battering of stone at the base. The effect of these elements is that the building appears to grow out of the stone of the canyon.



Deluxe Cabins.

- The windows, while very large for view-capturing, maintain the necessary vertical, punched window vocabulary, and are in scale with the size of the building.
- The interior and exterior structure of the building is fully expressed in stone and heavy timber.
- The south terrace is a highly successful major public outdoor space.
- The interior of the lodge has a sense of quality which is achieved not through the use of luxurious materials, but through the incorporation of simple, durable, natural rustic materials of stone and heavy timber. The space is generous and all structural materials are exposed.
- Lodge detail is hand crafted, as in the massive stone fireplace, wood railings, and light fixtures.

GRAND CANYON LODGE COMPLEX

- The individual cabins in the surrounding woods of the lodge give the visitor a wonderful park experience. The corner piers of the deluxe cabins are oversized native stone in random patterns, and are battered at the base. Infill between the stone corners is taken with windows and dark stained log siding. Porches are large enough for socializing and have an exposed, rusticated timber structure.

UNSUCCESSFUL FEATURES

SITE:

The primary entry to the building is located at the back of a drop-off loop constructed of asphalt paving. Walking toward the building when cars are negotiating the loop or parked in front during loading operations is inconsistent with the high quality experience available on the interior of the building or on the patios facing the canyon. The shaded north exposure of the entrance and the drop-off loop creates a cold and uncomfortable environment during the early spring and late fall times of the season.

The service area for the dining room is located adjacent to the entrance and drop-off loop and while it is generally fenced off, its location in close proximity to the primary visitor entrance, detracts from the visitor experience during delivery and loading operations.

BUILDING:

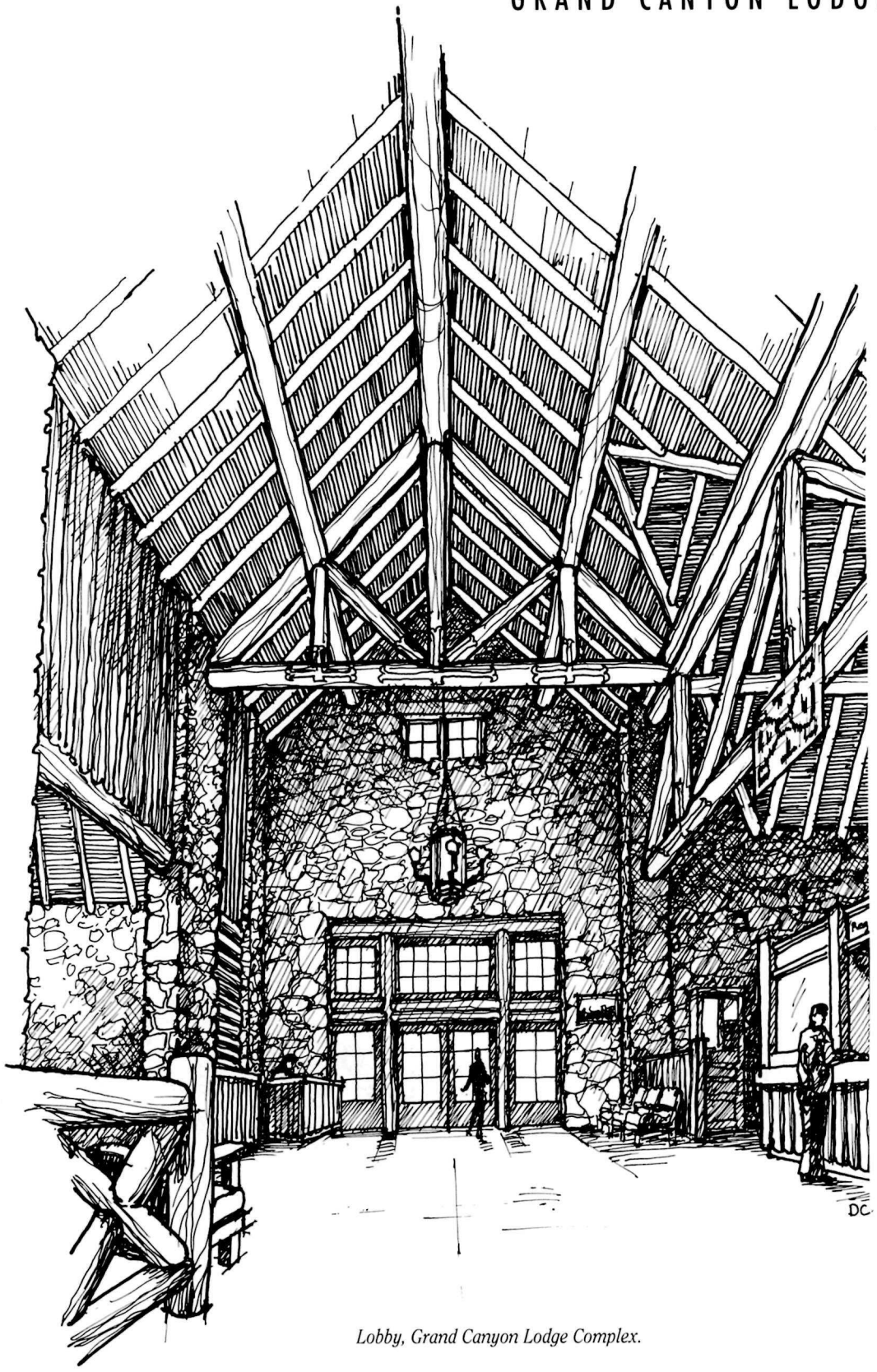
- Roof overhangs could extend further to express a stronger sense of shelter.
- Original windows have been replaced with aluminum sash.

OTHER NOTEWORTHY PUBLIC BUILDINGS ON THE NORTH RIM:

- North Rim Inn
- Shelter Northeast of Lodge



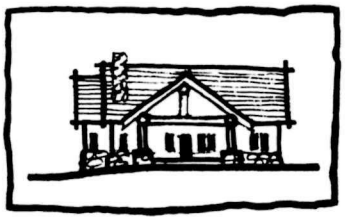
Canyon side.



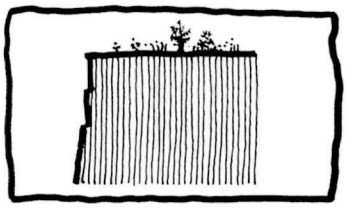
Lobby, Grand Canyon Lodge Complex.

PUBLIC/VISITOR USE BUILDINGS

DESERT VIEW WATCHTOWER



PUBLIC/VISITOR USE



DESERT VIEW

Designed by Mary Colter after her intensive research of southwest Indian ruins, and decorated by local Hopi and Navajo artists, the Desert View Watchtower sits on the edge of the canyon and provides both viewing opportunities and a large gift shop for visitors to the eastern section of the rim drive.

Year Completed: 1932

Size: 5,600 sf

SUCCESSFUL FEATURES

SITE:

The facility is well integrated into the cliff side. The circular form of the building walls create an interesting sense of place and provide an outward focus with windows which feature spectacular views of the canyon.

BUILDING:

- This highly unique and fanciful tower structure is not likely to be repeated, either in form or in function. It is designed to represent an old Native American structure built upon the ruins of an earlier structure. This recognition of a strong cultural influence is positive.
- For such a tall and singular structure, the watchtower still fits well into its setting, largely from the exclusive use of native stone reflecting archeological stratifications. The tower appears to project up naturally from the canyon rim.
- Details such as the stone motifs, chimney, and stone steps on the low roof are artistically impressive.



View of Watchtower from the west.

The small transformer outbuilding located approximately 100 feet to the west of the watchtower exemplifies the successful translation of traditional rustic design and strong cultural influence into the unique setting of the Desert View area.

- The vertical wood plank doorways have a simple, rustic, handcrafted appearance. The door is set back into the stone wall with an untrimmed wood jamb.
- This small building is appropriately scaled to the landscape of juniper and scrub brush.
- The building is of native stone in random horizontal coursing.
- The roof is flat, with a stone parapet, and with exposed log vegas of the Indian/ Southwest tradition.
- There is no porch structure over the entry door, but the doorway is deeply set back in the masonry face. The flagstone entry steps are exemplary.
- Vegetation is effectively used to break up the building mass and to make the structure subservient to the natural setting.
- The dominating vertical mass of the structure calls attention to itself rather than to the spectacular natural setting. Stonework is intended by the designer to emulate archeological stratifications rather than matching the natural bedding patterns of the rim edge.



Transformer Outbuilding at Desert View Watch Tower.

UNSUCCESSFUL FEATURES:

SITE:

The entry to the facility is incidental and difficult to locate.

BUILDING:

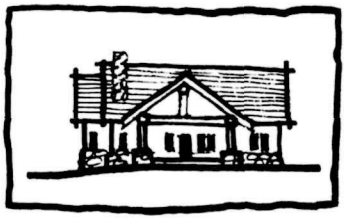
- With the exception of the effective use of native stone, the rich details, and a recognition of the strong cultural influence, this is not a building which can be emulated in contemporary structures.

OTHER NOTEWORTHY PUBLIC STRUCTURES IN DESERT VIEW:

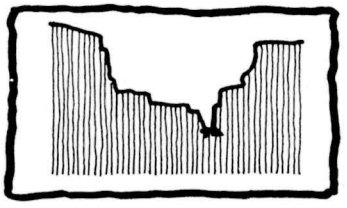
- Tusayan Museum
- East Entrance Station
- NPS Visitor Contact Station
- Babbitt's Store

PUBLIC/VISITOR USE BUILDINGS

PHANTOM RANCH DINING HALL



PUBLIC/VISITOR USE



INNER CANYON

At the end of a long mule ride or hike to the floor of the canyon, Phantom Ranch, designed by Mary Colter, is a welcome sight for tired travellers. The Dining Hall and its overnight cabins are the only group of visitor-use buildings in the canyon. The Dining Hall offers food, refreshments and a family style dinner to employees, campers, hikers, and boaters.

An addition in 1928 tripled the size of the building to its current configuration and reoriented the main entrance.

Year Completed: 1921

Size: Approx. 900 sf

SUCCESSFUL FEATURES

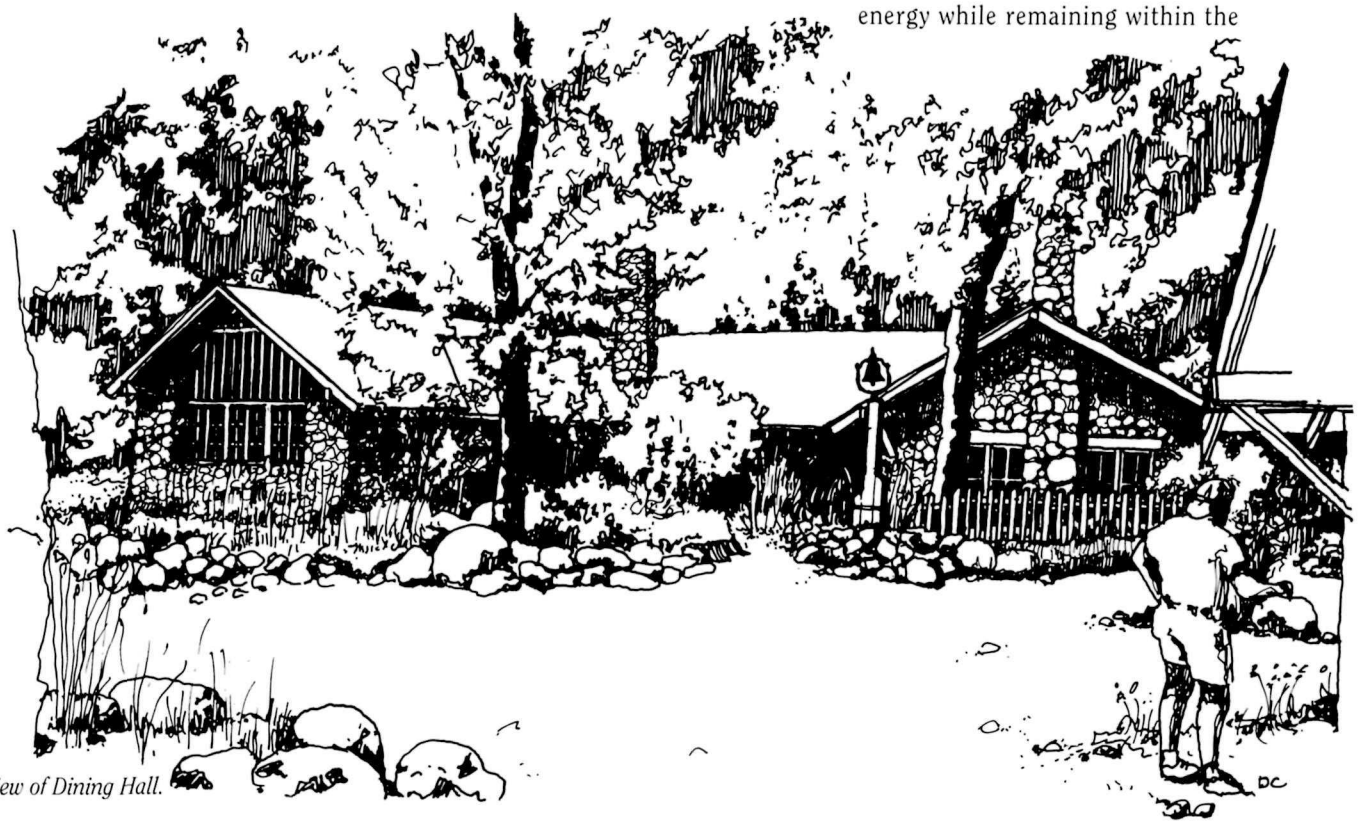
SITE:

The overall layout of buildings in the Phantom Ranch complex is well thought out and provides clear circulation throughout. The path leads to the dining hall entry on the south wing. Windows and wide steps connect the dining room with the surrounding site.

The structures are nestled among the cottonwoods. This siting integrates the buildings with the natural setting and provides much needed shade.

BUILDING:

- The Dining Hall, and its group of cabins, are exemplary structures.
- The "U" shaped massing allows this building to be perceived at a scale in keeping with the surrounding small guest cabins.
- Stone walls as the predominant structure are very appropriate for public buildings. Corners of the structure are of stone, creating a "bookend" effect for the deeply inset areas of windows and wood siding.
- The larger, south-facing glazed areas of this building illustrate an effective approach for providing passive solar energy while remaining within the



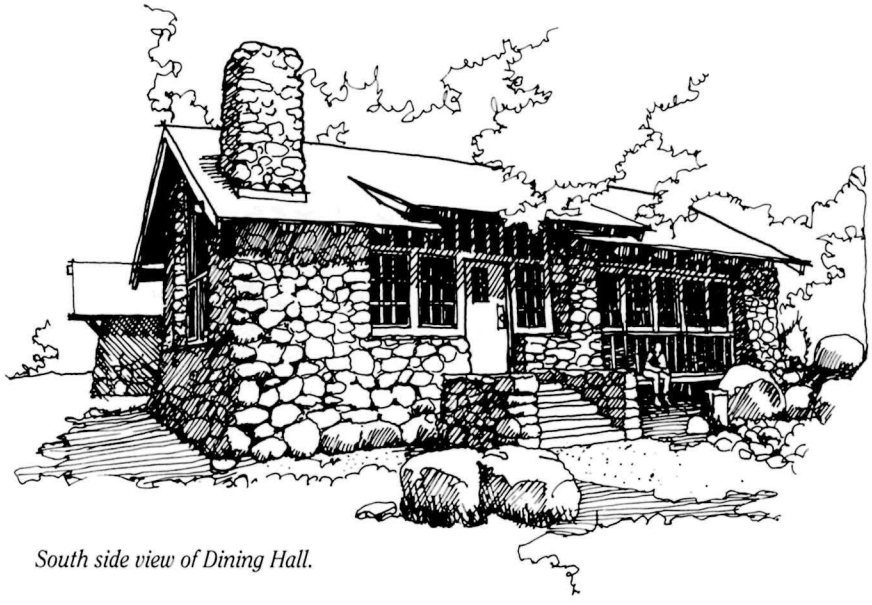
East side view of Dining Hall.

context of rustic design. A group of traditional, vertical, multi-paned windows make up the glazed area.

- The stonework, unique to the Inner Canyon, utilizes rounded river rock, which is prevalent in the river bed site at Phantom Ranch. Large stones are predominantly near the bottom of the wall, and are battered out at the base. Very large boulders are grouped around the building, adding to the ground-to-building transition.
- The 8:12 roof pitch, the broad roof overhangs, and the shallower pitched eyebrow roof over the entry are all effective elements.
- The roof structure is well expressed with exposed rafters, no eave facia, and heavy barge board and rake eave brackets on the gable ends. There is a unique use of doubled rafters at Phantom Ranch.
- Stone chimneys provide vertical counterpoint to this horizontal building.



Typical cabin, Phantom Ranch.



South side view of Dining Hall.

UNSUCCESSFUL FEATURES

SITE:

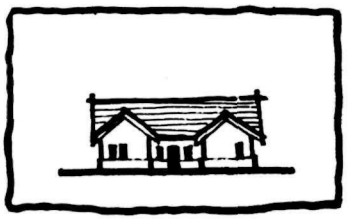
None.

BUILDING:

- There is some confusion as to where the main entrance is located. The building design would indicate that the entrance should be at the center of the courtyard within the "U" rather than on the south side, which would work better as a secondary entry.
- The interior could be reorganized and revitalized to maximize the utilization of this gathering place.

OTHER NOTEWORTHY PUBLIC BUILDINGS IN THE INNER CANYON:

- 1-1/2 mile Resthouse, Bright Angel Trail
- 3 mile Resthouse, Bright Angel Trail



COMMUNITY BUILDINGS

Community buildings serve as the public buildings of the local residents, and are similar to the Public building type in both scale and function. However, the expectations for costly natural materials and details used in pure rustic design will be relaxed for Community buildings, as they are not for the use of the Park visitor. Contemporary solutions to basic rustic design concepts are expected.

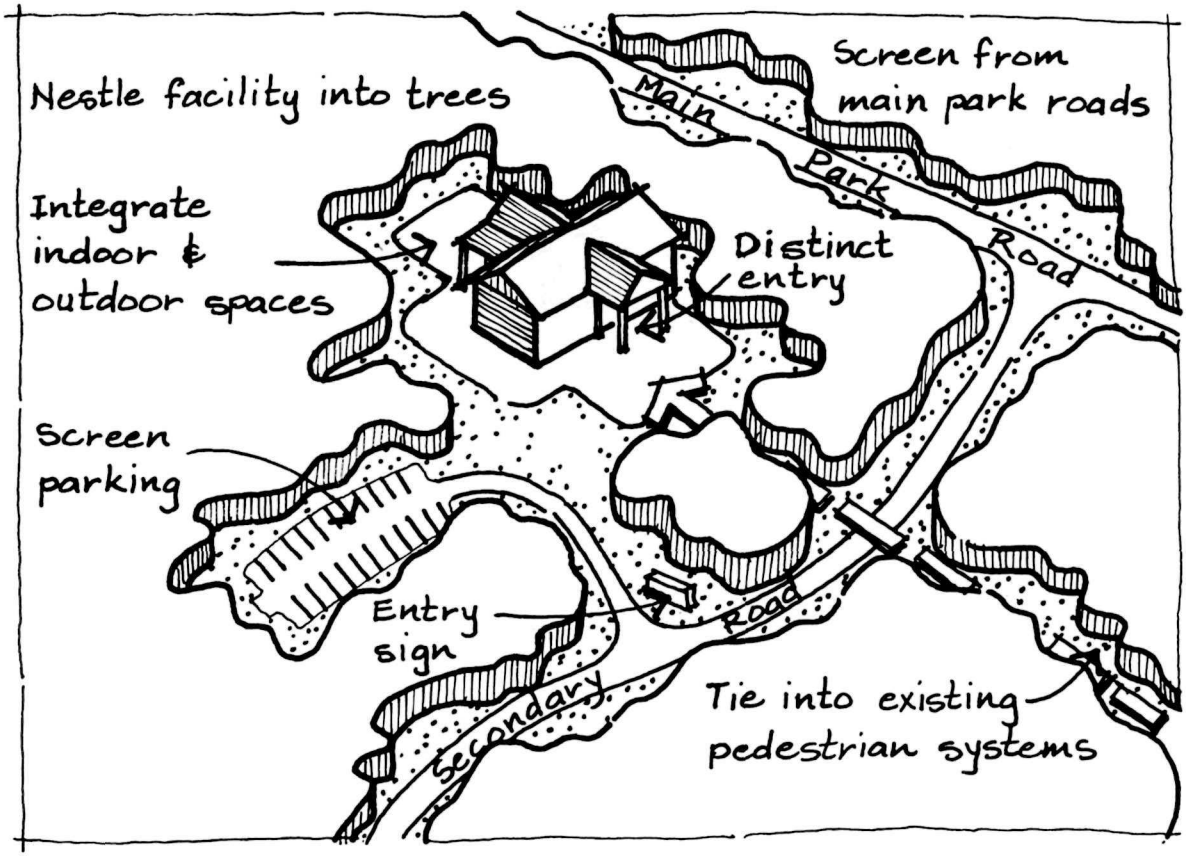
- Examples of anticipated community building uses include schools, day care centers, clinics, recreation centers, and meeting rooms.

- A wider range of contemporary materials and construction methods will be considered to achieve durable, economical, functional design, while maintaining sound design principles.

- Entries are also important on community buildings and should be distinct, prominent, easily identifiable, and accessible. Outdoor space should be provided for community functions and integrally related to the structure. Porches and arcades are encouraged.

- Wood and stone should remain the dominant materials; however, modern substitutes such as asphalt shingles, splitface block, or dimensioned timbers rather than logs, may be used if they are used according to their nature. Substitutes which imitate another material such as vinyl siding are inappropriate.

- Architectural detail may be limited to critical areas such as entries and porches.



Site Considerations.

• Color should follow the principles outlined elsewhere, but will not be limited to park service brown and green. Warm shades of grey and brown will be acceptable for body colors, and a broader range of earth tones such as greens, reds, and browns, will be limited to trim.

• The siting of the structure should take into account existing and proposed circulation patterns, particularly pedestrian systems between the structure and residential areas.

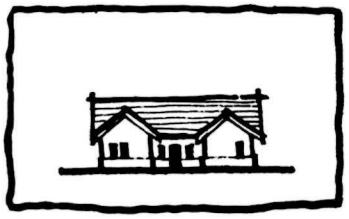
• Design for passive solar and other sustainable strategies are encouraged within the principles of rustic design.



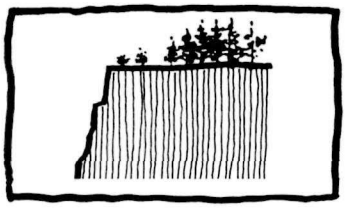
Natural History Association, formerly the hospital.

COMMUNITY BUILDINGS

SOUTH RIM COMMUNITY BUILDING



COMMUNITY BUILDINGS



SOUTH RIM

Located in the Village Historic District off the Village Loop Drive, the Community Building was originally designed to house community functions for Park employees. One area houses a multi-media slide show for visitors, while a portion of the building is used for storage.

Year Completed: 1935

Size: 4,100 sf

SUCCESSFUL FEATURES

SITE:

Walkways lead from housing and other village functions to this facility. Two entrances lead into the building from the eastern and western corners. Limited parking is located immediately adjacent to the structure, at the western entrance. The building entries are easily identifiable and stone steps enhance the entrance. A stone patio with wood railings integrates the indoor functions with the outdoors and the site.

BUILDING:

Massing

- This building is an excellent example of massing for a medium/large structure.
- This two-story structure is wrapped on three sides with a one-story pitched roof form. The second floor thus appears to be a clerestory element.
- Adjacent trees break up and screen the mass. The full, two-story north facade is well screened with trees.

Form

- The two corner entries are unusual, but function well. The exposed structure is very appropriate.

The stone base, used to create a level building platform, is exemplary. The choice of native stone and the handling of stone in walls and steps is a good standard for future development.



View of west entrance.

The structural details of exposed log porch columns and beams, exposed rafters, and gable end brackets are very appropriate. There is no eave facia and the roof edge is minimal.

Carefully detailed gable end roof vents add architectural character.

The materials palette of dark stained lap board siding (no corner boards), stone base and steps, wood shake roof, and dark green trim is exemplary.

UNSUCCESSFUL FEATURES

SITE:

The overall site plan needs improvement to define automobile parking, drive access, and pedestrian circulation to the building entrance from parking area. The Park could construct a new sign to make the facility more visible to the community, and a kiosk could be added to announce upcoming events. Heavy activity has caused deterioration in vegetation at the ground level.

While the community building was appropriately located initially, changes in surrounding land uses have occurred over the years. These changes have led to conflicts between the high levels of visitor traffic and the use of the outdoor spaces adjacent to the building.

BUILDING:

Windows

- Although there are some exemplary vertical punched and grouped windows, there are also several anomalies which make the overall window image confusing.
- The very large floor-to-ceiling windows and the similar terrace door sets are not typical of rustic design. Given this, the division of glass areas and divided lights do help bring them into context.
- The diamond pattern grill over some windows is not in context.
- Some windows are divided into very small lights.

The hip roofs at the entry corners are very uncommon, though effective in this building.

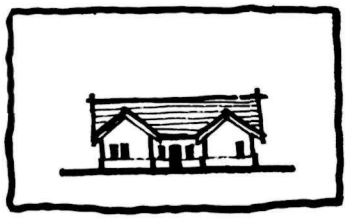
The exterior door head trim is more elaborate than needed or desired.



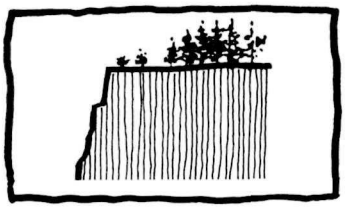
View of large floor-to-ceiling windows, not common in rustic design.

COMMUNITY BUILDINGS

DAY CARE CENTER



COMMUNITY BUILDINGS



SOUTH RIM

The Day Care Center is located adjacent to the school campus off of North Mohave Street. The center provides day care for pre-school children of Park residents.

Year Completed: 1993

Size: 6000 sf

SUCCESSFUL FEATURES

SITE:

The building is surrounded on three sides by existing trees, with a selected group of trees accenting the front view. Users pass the front entry as they park, making it easy to identify. Every parking space is easily accessible to strollers. Black wrought iron fencing is nearly invisible and allows views of the surrounding trees from the facility's many windows. The playground is easily accessible from each classroom, and trees were integrated into the playground design.

BUILDING:

This contemporary structure shows an understanding of simple massing in addition to the basic elements which make up a successful facade.

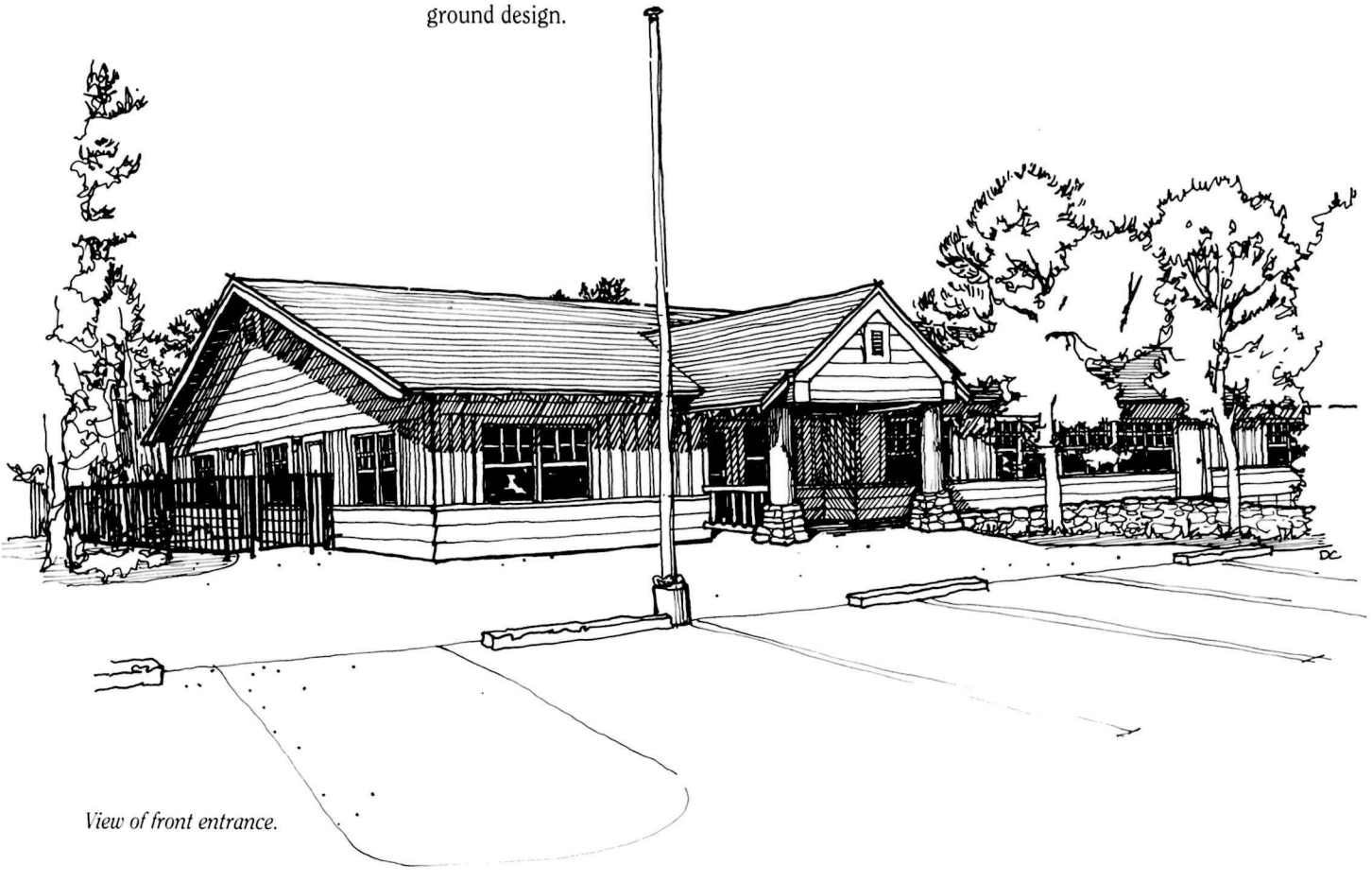
Massing is a simple, one-story, rectangular form with a gable end roof and a gable end entry porch.

The entry is recognizable and adequate in size for this function.

The structure expresses the major elevation elements of base, mid-wall, and roof.

Broader, 10" lap siding on the lower wall creates an effective wall base. Above this base, the continuous 2" sloped horizontal band is an effective cap, doubling as the sill for windows.

Roof eaves have exposed rafters with no eave facia or soffit.



View of front entrance.

The stone base is a good example of large, irregular shaped, native limestone laid in random, horizontal coursing.

The fiberglass shingles are an acceptable option in this application.

UNSUCCESSFUL FEATURES

SITE:

The parking lot is shared by other community users and is inadequate at times. No additional landscaping has been incorporated into the site, leaving bare soil and eroding areas.

BUILDING:

The form of this structure, as shown in the east gable end elevation, seems too broad to be contained within the gable end roof form. The 4 in 12 pitch is proportionally too shallow. The large 4 in 12 roof pitch is not reflected in the 8 in 12 pitch of the entry porch roof.

The gable end lap siding starts low down on the building elevation rather than starting where the gable roof meets the wall. There is no transition between the board-and-batten siding and the lap siding of the gable end.

The 12" wide lap boards of the upper wall and the gable create a heavy feel to the top of the building. Using finer textured, lighter material as the facade goes up would have been a better choice of materials.

Windows have a strong horizontal appearance rather than the vertical orientation of rustic design. Windows are grouped into very long horizontal sets, thus losing the punched window vocabulary.

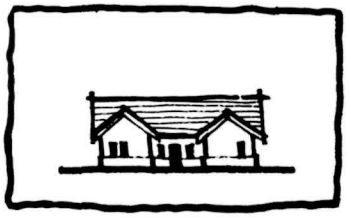
Window trim and vent trim appears very broad compared to the more typical 1" x 4" board trim in the Park.

The entry roof, positioned below the main roof eave line, gives the entry a low, squat feel. There is no roof overhang on the entry gable end, therefore the opportunity to project a sense of protection and shadow line is lost. The 12" barge board is heavy, and the transition to the much smaller rafter ends is not worked out. The 18" round log columns are very oversized, making them out of proportion with their stone base and with the remainder of the structure.

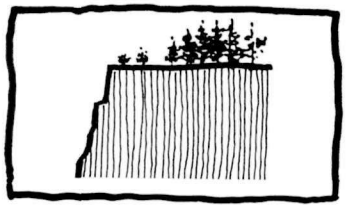
The main entry door is an aluminum storefront with aluminum hardware rather than a more natural wood door. The full, single light glass door is not as true to rustic design as would be a half panel glass door with divided lights.

Wood windows would be preferable to the metal windows used.

SHRINE OF THE AGES



COMMUNITY BUILDINGS



SOUTH RIM

The Shrine of the Ages, located adjacent to the Visitor Center and the cemetery, houses an auditorium and small classrooms for the use of both visitors and Park staff. Concerts, meetings, religious services, and interpretation gatherings all occur within this building.

Year Completed: 1969

Size: 9800 sf

SUCCESSFUL FEATURES

SITE:

The entry to the building is grand. The many windows are a connection between the inside space and the beautiful pines outside.

BUILDING:

Even though this 1960's International style structure does not utilize rustic design principles, it is successful in achieving a dramatic, uplifting response in the visitor/user.

Massing is simple and rectilinear.

Placed among mature trees, the building is integrated with the natural setting, and uses the vegetation to screen the building mass.

There has not been an attempt to call attention to the building at the expense of the natural setting.

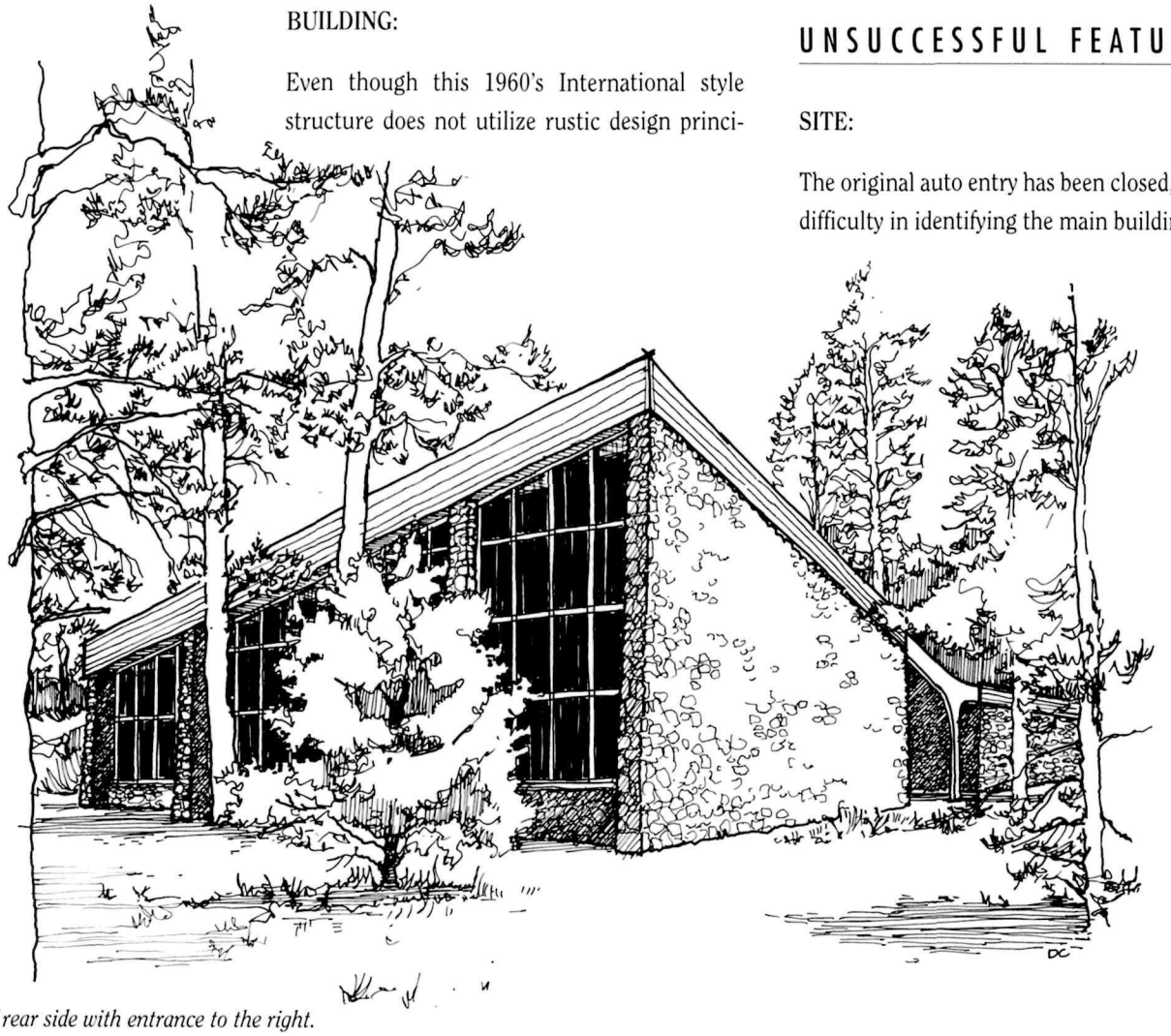
The extensive use of native stone in a random setting pattern is appropriate, though there are better examples of rustic stonework in the area.

The technique of containing large glass areas by placing them within the stone masonry structural masses is effective.

UNSUCCESSFUL FEATURES

SITE:

The original auto entry has been closed, causing difficulty in identifying the main building entry.



View of rear side with entrance to the right.

From the parking area visitors try first to enter through the classroom entrance. A small drop-off and parking area was originally paved in front of the grand entrance, removing many trees. The actual walkway and entry plaza is very small and cannot accommodate the use this facility receives. During concerts the public gathers outside at intermission and stands on the bare ground. Seating and additional flagstone paving would have worked better to accommodate the needs of the users.

BUILDING:

The form and facade treatment of this Mission '66 building does not follow the rustic design philosophy of building in harmony with the natural setting.

Massing

- Though the building is only one story high, it is still a very large box, with wall heights exceeding 16 to 24 feet.

Form

- The roof is essentially flat, with one corner flairing up to a peak, creating a building which seeks attention.
- There is a strong vertical emphasis, with vertical stone columns containing vertically oriented window walls.
- There are no roof overhangs or eaves.
- The large, unrelieved stone wall areas tend to dominate everything, including the natural site.

Scale

- The very large glass curtain wall areas and the massive stone walls push this structure toward a monumental scale, contrary to rustic philosophy.

There is not an easily recognized main entrance for this building.

The side courtyard does not serve well as a transition space to bring the inside space out into the surrounding environment.

The large, sweeping glu-lam beams, though made of wood, are not a part of the natural timber expression of rustic design.

The very large silver metal and glass window areas, and the metal storefront entry doors are not a part of the rustic vocabulary.

The stone work is an example of several things not desired in rustic stonework:

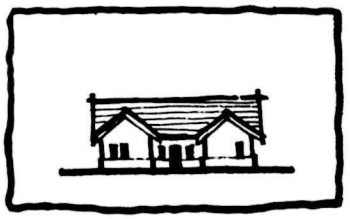
- Stone is too small, and is uniform in size.
- The pattern is completely random, without the characteristic horizontal laying.
- Stone size does not progress from larger at the base, to smaller at the top.

The glu-lam arched beams have a natural light wood finish, while the remainder of the wood trim (used only as a frieze element) is almost black. The result is a building of strong contrasts which stands out, even through the surrounding trees.

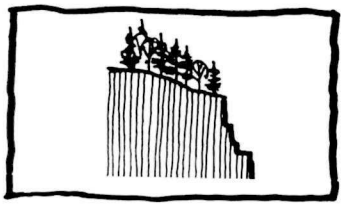
OTHER NOTEWORTHY COMMUNITY STRUCTURES ON THE SOUTH RIM

- Grand Canyon School Complex
- Natural History Association (formerly the Hospital)
- Magistrates Office

NORTH RIM EMPLOYEE DINING HALL



COMMUNITY BUILDINGS



NORTH·RIM

Located off of a secondary road and adjacent to employee dorms and trailers, this contemporary employee dining hall houses cafeteria services, laundry, and recreational facilities for the use of concessioner employees.

Year Completed: 1994

Size: 9,000 sf

SUCCESSFUL FEATURES

SITE:

Easily identifiable entry with stone embellishments, ramp, and covered porch.

The structure is well placed among existing mature trees.

The site design incorporates a well constructed existing stone foundation wall as a front yard retaining wall.

The entrance is prominent, facing the employee dorm complex across the street.

BUILDING:

This contemporary structure is a good example of achieving the spirit of rustic design using today's materials and construction techniques.

The one-level structure is well massed into an "L" shape, creating roof elements which are simple and appropriate. Broad overhangs emphasize the horizontal and cast strong shadow along the walls.

The entry is effective as a covered outdoor space and as a strong and recognizable doorway to this central community function. Note that a handicap access ramp has been worked into the basic porch structure.

The stonework is well done, using a random, natural pattern and stepping out at the bottom of the base. The stonework effectively creates a platform for the rest of the building and reinforces the building corners by stepping up.

The main entry effectively uses a common rustic two-panel door (though the cross-buck is



Front elevation.

not desired) with a light on the top half, and achieves more entry statement and added light by providing side lights on both sides of the door.

This building shows an effective way of increasing glass area by pairing the individually vertical, divided-light windows to fit between the expressed structural framing members.

The metal roof is common on the North Rim and is appropriate for this non-visitor type of use. Gable ends at the entries shed snow and water away from pedestrians.

Hip roofs are not common in rustic structures at Grand Canyon, although they are a good solution for this building, considering the width of the walls needing to be spanned. A major reason for the success of the roof form is that the gable end form is still expressed around the building and at the top of the hip roof elements.

UNSUCCESSFUL FEATURES

SITE:

Few trees exist to break up and shade the parking area and very little space is available as a transition between the parking lot and the building.

This new building is currently placed very close to a maintenance building which is scheduled to be removed.

Service access for large produce trucks appears to be very difficult.

The site lacks an appropriately developed outdoor gathering space as well as a strong relationship between the interior spaces and functions and surrounding outdoor spaces.

BUILDING:

The high windows tend to emphasize the horizontal.

The wood structural members should be more oversized.

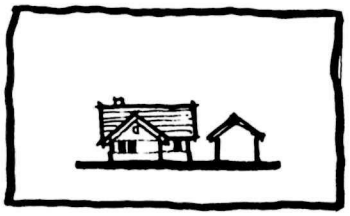
The roof eave facia is covered, rather than allowing the rafters to be exposed. The 5 in 12 roof pitch is shallower than is common on the North Rim.

An opportunity was lost to expose the roof structure of the entry porch.

The exterior expressed structure vocabulary is imitated here with only applied trim.

OTHER NOTEWORTHY COMMUNITY BUILDINGS ON THE NORTH RIM:

None.



RESIDENTIAL BUILDINGS

RESIDENTIAL BUILDINGS

• Residential buildings in this section are limited to those used by Park and concessioner staff. Visitor-use housing is addressed in the "Visitor Use" section.

• Residential structures, both single and multi-family, should have modest compact plans and should be composed of simple forms. Rectangular plans and gable end roofs work best. The details of rustic roofs should be maintained.

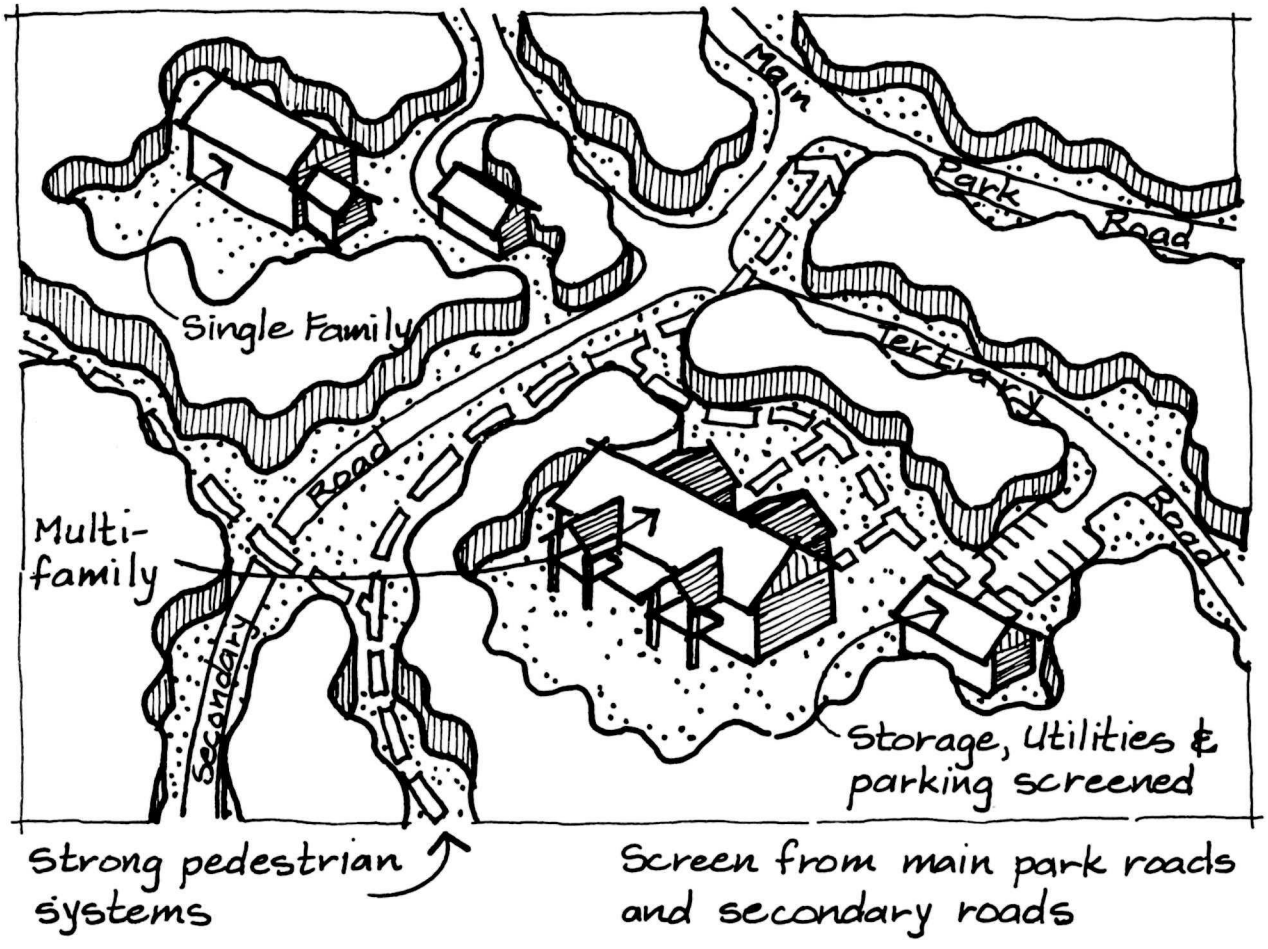
• Entries should be well protected and relate directly to circulation patterns. Porches are an important element as a transition space between indoors and outdoors, and between public and private spaces.

• Residential structures should be sited to provide private outdoor space for residents. They should take advantage of existing vegetation to insure and provide privacy.

• The predominant building material will be wood. Stone and timbers are expected to be used less frequently because of budget constraints. Alternative materials will be considered if they are used according their nature and not in imitation of natural materials. Vinyl siding is not appropriate.

• Architectural detail should be simple and should relate in a contemporary way to details found on historic housing throughout the park.

• It is important that windows retain the established proportions and shape found in rustic examples.



Site Considerations.

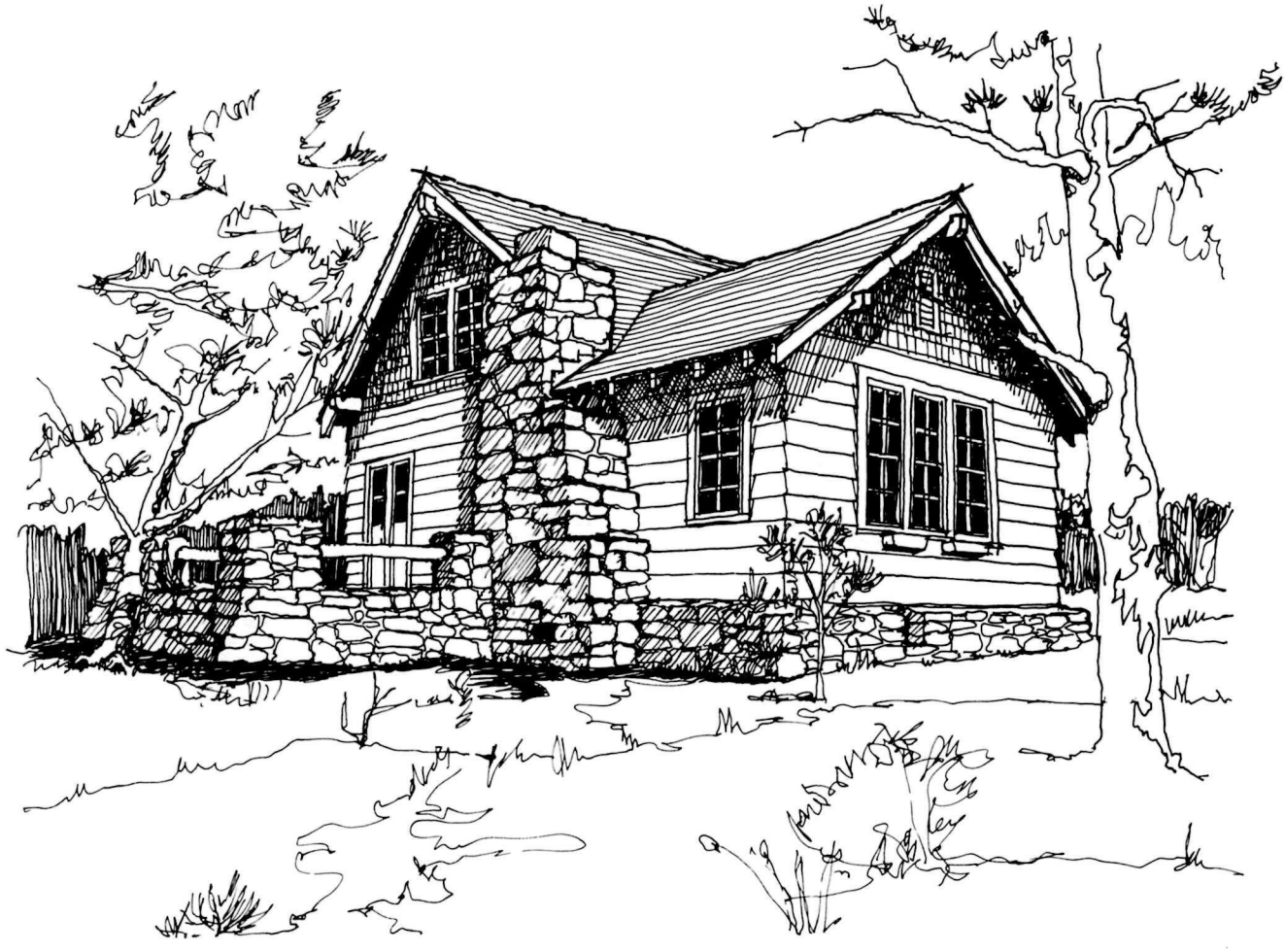
• The impact of garages should be minimized by reducing size to one car, by detaching from the house, and by placing away from the primary pedestrian entrance. Garage doors should be limited to single-car doors.

• Heavy fiberglass shingles are an acceptable substitute for the traditional cedar shake shingles.

• Color should follow the principles outlined elsewhere, but will not be limited to park service brown and green. Warm shades of grey and brown will be acceptable for body colors and a broader range of earth tones such as greens, reds, and brown, will be limited to trim.

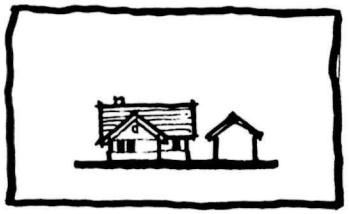
• Parking, storage, fencing and utilities should be screened from view, integrated into the site, and compatible with the structure.

• Design for passive solar and other sustainable strategies are encouraged within the principles of rustic design.

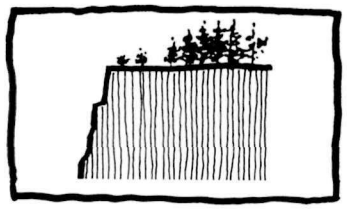


Building No. 9, South Rim.

810 APACHE STREET



RESIDENTIAL BUILDINGS



SOUTH RIM

This home has two bedrooms, with one bath.

Year Completed: 1934

Size: 1,050 sf

SUCCESSFUL FEATURES

SITE:

The house is nestled into the surrounding trees. The foundation wall takes up grade changes of the site. The front porch is large enough for a couple of chairs and provides a welcoming entry and transition into the house. The garage and parking are located behind the house along the alley, as are the utilities. This reduces clutter around the front of the house and allows the garage to assume a secondary role to the main house.

BUILDING:

This historical residence is exemplary for small-scale residential structures on the South Rim.

Massing

- The shape of this building is a simple rectangular plan with gable end roof elements.
- The garage is detached from the house, making the massing more manageable.
- The smaller telescoping form on one building end serves to mitigate the building roof mass.
- The roof pitch, at 8 in 12, is appropriate for the South Rim, and the 24" eave overhang provides horizontal shadow and protection.



The gabled, front porch is effective in establishing a sense of entry and in providing an outdoor covered seating space.

The roof structure is clearly expressed in its detail.

- Rake end eaves have a heavy barge board, while the low eaves have a minimal facia, allowing the rafter tails to be exposed.
- Rake end brackets are oversized.

Triple columns on the porch are common on rustic structures on the South Rim.

The elevation elements of this structure show clearly many rustic design elements. The use of building materials strongly expresses the major elevation elements of base, mid-wall, and roof, with a strong emphasis on the horizontal.

- The base/foundation of well-laid native stone creates a level building platform.
- The establishment of a base wall up to the window sill, using broader lap board siding with no corner boards, further establishes a strong horizontal base element to the structure. Smaller lap board siding is used in the mid-wall element.
- The roof element is further defined by changing the siding in the gable ends to board and batten.

Windows are vertically proportioned casements, with divided lights. There is an excellent example of the ganging together of two or three standard windows to create larger glazing areas for accommodating views and for passive solar design (see Appendix: Design With Climate).

The front door is a good example of a two-panel door with the upper half in divided lights. Side lights to either side add light and create a stronger entry statement.

Gable vents add detail as simple vertical rectangles, trimmed in 1" x 4" boards.

The colors are effective, with semi-transparent stained siding, and light green window trim.



UNSUCCESSFUL FEATURES

SITE:

The front porch is very close to the street,and some parking is allowed in front of this house. This occasionally obscures and blocks the front porch. The rear yard is dedicated to storage and utilities but is unfenced, creating to a sense of visual blight and clutter. The building is low in relation to street. Lack of sidewalk along Apache Street is a negative for community access. Wood storage presents fire hazard. A screen wall or fence around a small portion of rear yard could improve privacy and screen storage areas.

BUILDING:

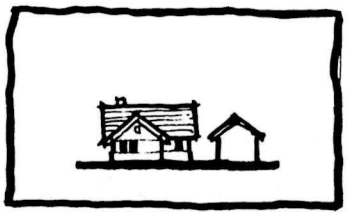
The recently added silver aluminum screen door detracts from what is otherwise a very good front door entry.

Asphalt roof shingles (which have replaced original cedar shingles) are an undesirable dark green color, and could have a more pronounced shadow/texture by using heavier shingles and by doubling every fifth row.

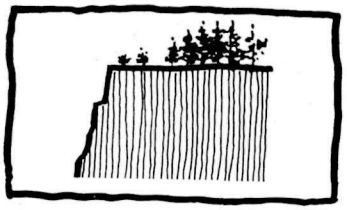


RESIDENTIAL BUILDINGS

HOUSES #367 AND #369 SUNSET DRIVE



RESIDENTIAL BUILDINGS



SOUTH RIM

Located in the Park housing area off of a tertiary road, this contemporary pair of single family houses was designed to minimize the impact of the structures on the site, to minimize costs, and to maximize the energy efficiency of the units. One of the homes is handicap-accessible.

Year Completed: 1991

Size: 1,100 sf each

SUCCESSFUL FEATURES

SITE:

This was a duplex plan which was split apart into two single houses. By cutting the footprint in half, the foundation walls more easily take up grade changes and the houses nestle into the existing mature trees. The front porches are adequate to promote socializing; the rear covered porches are more private, as they are screened from view. The generous setback from the street provides a natural appearance.

BUILDING:

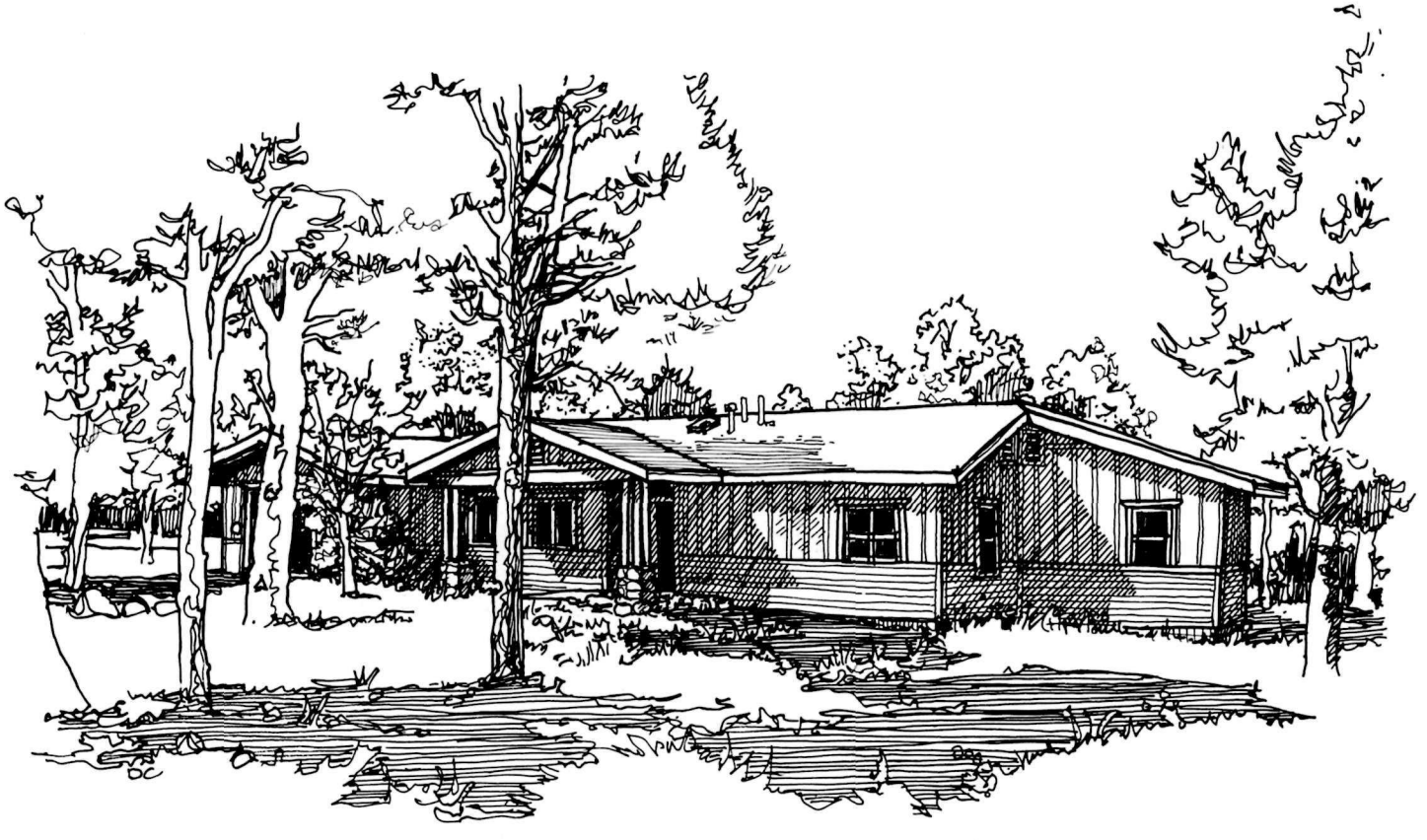
The building massing is a simple rectangle with gable roof and gable end extensions for the garage and the entry. The single-car garage mass is much more easily accommodated within the overall building mass than would a two-car garage.

Establishment of a strong wall base element of horizontal siding is effective.

The use of stone work for porch column bases and around the rear porch is effective.

The triple column at porch corners is common on the South Rim. Rustic design could be improved by over-sizing these column members.

Most window proportions are vertical.



House No. 369 from front street.

UNSUCCESSFUL FEATURES

SITE:

A neighborhood trail comes very close to these units, which infringes on the residents' privacy. Some existing trees were left too close, shading the front porch and causing winter icing problems. The larger setbacks impact more site area and decrease the feeling of community along the street. The garage and driveway parking located in front of these units detracts from the streetscape appearance. RV's should be accommodated in off-site storage.

BUILDING:

The bedroom attached to the end of each house has an odd cutoff hip roof. This could easily have been a smaller gable end roof, contributing to a diminished mass of the structure.

The roof pitch, at 4 in 12, is at the shallow end for the South Rim among mature trees.

Siding is shiplap rather than the characteristic rustic lap board siding.

The heavy eave facia hides the exposed rafters.

Windows and doors are aluminum rather than the preferred wood. The window header trim which has been detailed as a cornice is not used in rustic design. Simple square butt joints are best.

The cast concrete stone on column bases and around the porch is laid in a random pattern, but many stones have been placed vertically rather than in a more preferred natural horizontal bed.

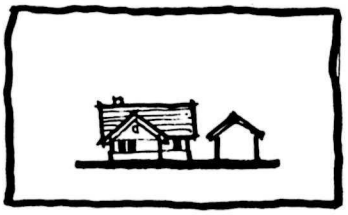
The use of round globe wall-mounted bracket lights rather than a more customized bracket light loses an opportunity to add character and detail to the house.

The gray main body color of #369 would have been better as a darker gray to blend with the branches of surrounding vegetation.

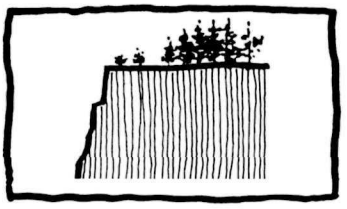


Front view of House No. 367.

#800 MOHAVE STREET FOURPLEX



RESIDENTIAL BUILDINGS



SOUTH RIM

This contemporary fourplex is located off Mohave Street. Each of the living rooms has a two-story, vaulted ceiling.

Year Completed: 1993

Size: 1,000 sf per unit

SUCCESSFUL FEATURES

SITE:

The entry drive and parking area are screened from the road by a large strip of mature trees. The building has been well placed among the mature trees.

A large landscaped area in the center front of the building serves well to break up the parking. Large native stones are used to border this area.

Individual entry porches and back decks for each unit are effective.

BUILDING:

Massing

- The concept of attached, two-level townhouse units is successful in scale and massing.
- The gable roof telescopes down as the building steps down with the fall in grade.
- The one level porch and gable end roof element work well to diminish the two-story building mass.
- Gable end roofs, with a pitch of 8 in 12, are appropriate on this heavily wooded site.

Front porches are large enough to create a sense of entry and provide for covered seating. Porch rafters and beams are exposed underneath, creating interest and larger volume.



Front view from auto entry.

Horizontal lap siding below window sills creates a strong wall base.

The roof gable ends are expressed with a change in direction of siding.

UNSUCCESSFUL FEATURES

SITE:

Propane tanks at the end of the building need screening.

There is no significant front yard between the parking and the building.

BUILDING:

The upper level gable ends create an unnecessary complexity to the roof form.

The 12" eave overhang should be larger.

The heavy eave facia board hides the exposed rafters.

The half round upper windows and gable vents create a foreign "designer" motif.

The use of 1" x 6" , rather than 1" x 4" trim focuses undue attention on window and corner elements. 1" x 8" corner boards at the base wall are too heavy, where typically there would be no corner boards.

Windows would be better if more vertical, especially at the double-clustered windows, which have no vertical divider post. Slider windows are not common. Metal windows are less desirable than wood.

Custom-crafted fixtures would be more appropriate than round globe wall bracket lights.

The light gray main color and light gray fiberglass shingles are too light to blend with surrounding vegetation. The kelly green trim should be darker. The green trim is overused by painting the vertical boards at the corners of each unit. The result emphasizes the vertical rather than the horizontal which is stressed in rustic design.

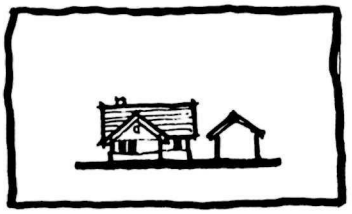


View of front.

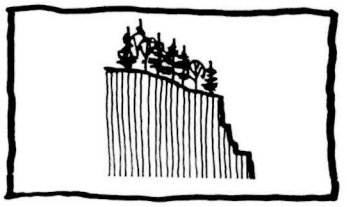
OTHER NOTEWORTHY RESIDENTIAL STRUCTURES ON THE SOUTH RIM:

- Building #9, single family residence
- Kaibab Street single family residence
- Building #1, (originally Superintendent's house)
- Colter Hall, Concessioner employee dormitory
- New Havasupai Street houses
- Apache Street houses

#102 DISTRICT RANGER'S HOUSE



RESIDENTIAL BUILDINGS



NORTH RIM

This historic residence is located in the NPS North Rim employee housing area, close to other houses as well as to the District Ranger Station and the North Rim maintenance area. The home has two bedrooms with one bath.

Year Completed: 1931

Size: 1000 sf

SUCCESSFUL FEATURES

SITE:

This house is set into tall pine, spruce, and aspen.

The 1-1/2 car garage is detached from the house, allowing the house to maintain a simple form and an appropriate mass and scale. The stone foundation wall takes up any natural grade changes in the site, which minimized grading and tree removal during construction. The large front porch is both inviting and helps to link the building to the site.

BUILDING:

This historical house is exemplary of rustic architecture on the North Rim.

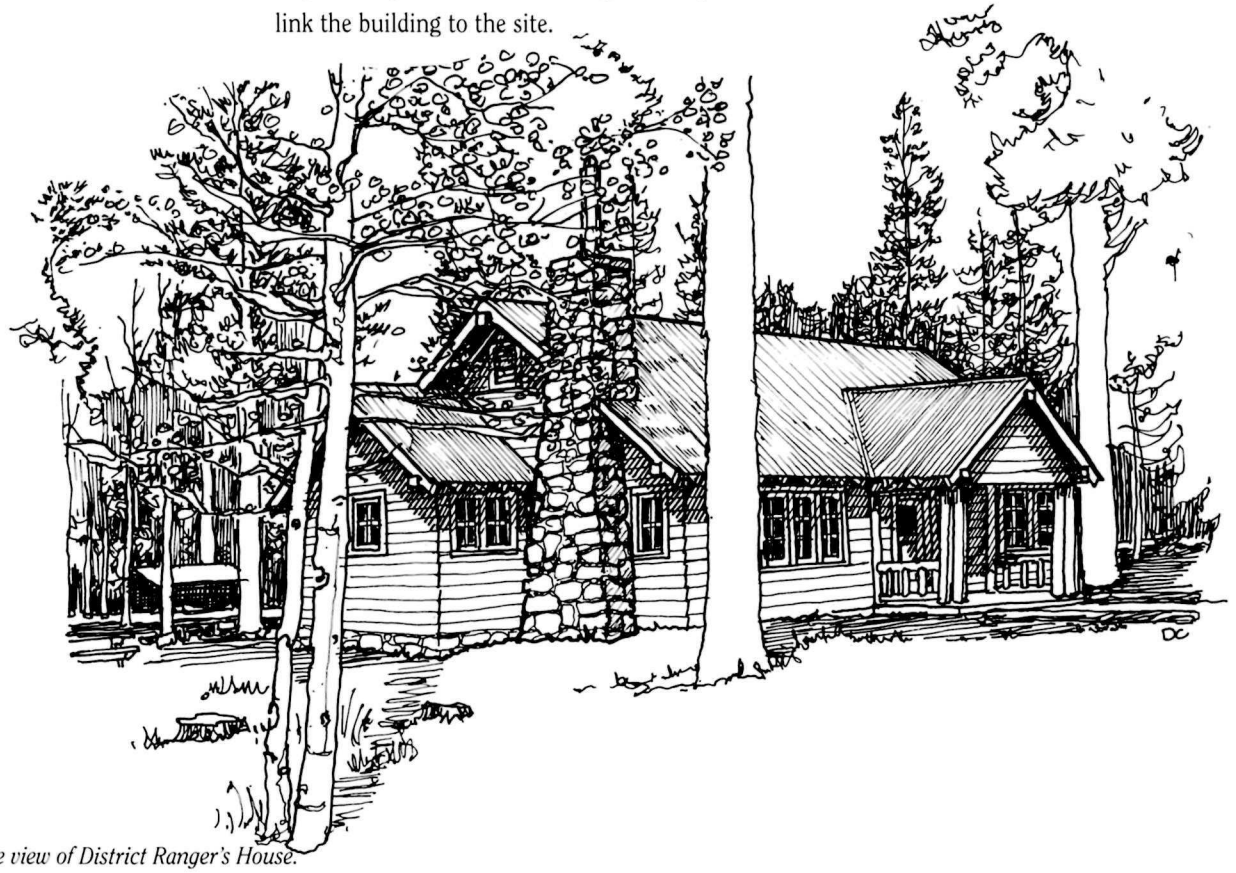
Massing is very good. With the garage detached, the mass of the house is very simple rectangle forms with gable end roofs.

The front porch is predominant, with a gable end roof supported by paired, oversized round log corner columns.

The smaller, gable-roofed addition on one end serves to break down and balance the building mass.

The stone base provides the building platform, and the massive stone chimney provides the vertical counterpoint to the structure.

The wood horizontal lap siding has no corner boards.



Front side view of District Ranger's House.

The roof represents good rustic design:

- The 9 in 12 gable roof pitch with a characteristic galvanized, corrugated metal roof is very appropriate for the tall forest setting of the North Rim.
- There is a heavy barge board on the rake eave, while the low eave facia is minimal, allowing rafter tails to be exposed.
- Broad eave overhangs create shadow and protection.
- Heavy timber brackets support the rake eaves.

The casement windows are vertical, with divided lights.

Doors are two-panel with a light in the upper half.

Gable vents are vertical.

Trim is simple 1" x 4" board. Window sills have the narrower 2" sloping sill plate.

The color is NPS brown stain with lichen green trim.

UNSUCCESSFUL FEATURES

SITE:

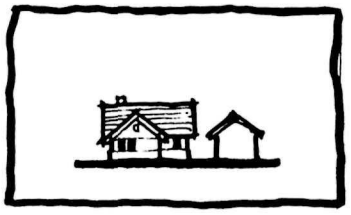
The neighboring Ranger Station attracts visitors to this residential area, reducing the sense of privacy for the residents–particularly this house located near the entry.

The present configuration of roads and parking has led to the back of the house becoming the main entry, rendering the front porch as an incidental entrance.

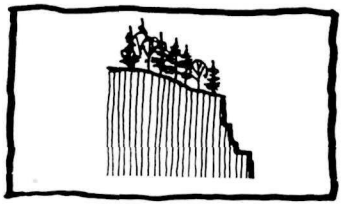


Rear view of District's Ranger's House.

TWS DORMITORIES



RESIDENTIAL BUILDINGS



NORTH RIM

Located within the employee residential area, this large contemporary dormitory complex is made up of four buildings with 13 rooms in each structure. The dorms house concessioner employees during the summer months.

Year Completed: 1989

Size: 4,300 sf/building

SUCCESSFUL FEATURES

SITE:

These residential units are located out of the view of park visitors, along a service drive and adjacent to the new employee dining hall.

Propane tanks are screened.

BUILDING:

Horizontal wood siding has been added to what were apparently light-colored stucco buildings. This is an improvement.

Color on the buildings is brown: Brown metal roof, dark brown wood siding, and darker brown trim. While not very interesting, this does cause the buildings to recede into the setting.

UNSUCCESSFUL FEATURES

SITE:

More trees were removed than necessary to provide maximum parking and building space, creating the sense of a barren site and units which are not integrated with the landscape. The area has not yet been replanted.

No exterior living spaces, such as porches or decks, have been provided.



View of two of the four dormitory buildings.

BUILDING:

These structures are modular double-wides. The corridor running down the center was created as the tie between the pair of modulars. This is the reason for the raised roof vent area over the corridor. The buildings are very long and narrow, about 140 ft x 30 ft, unrelieved by porchs or other forms.

The roof pitch is a very low 2-1/2 in 12. The rake end eave is flush with the wall, giving no relief to the end of each structure. The low eave does have an effective two foot overhang. The eave overhangs have flat soffits rather than exposing rafters. Eave facias are of sheet metal rather than wood.

The siding is beveled shiplap rather than lap board siding common to rustic design.

The expressed structure on the outside walls (which is common to many North Rim rustic structures) is, in this case, only 1" applied trim.

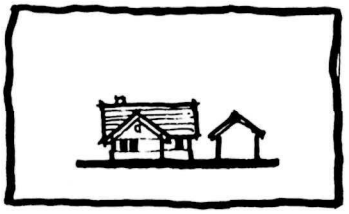
Windows have a horizontal proportion, rather than the vertical proportions of windows of rustic design. They are aluminum sliders.

Doors are white aluminum with an out of place cross-buck pattern in the bottom panel.

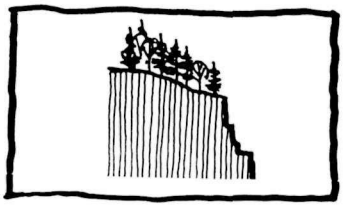
Wall bracket lights are small white globe fixtures which add little to the character of the building.

RESIDENTIAL BUILDINGS

1991 SINGLE FAMILY HOUSES



RESIDENTIAL BUILDINGS



NORTH RIM

Situated at the back end of the North Rim residential development, these three contemporary houses are accessed from a minor road. The homes were designed to be compatible with the existing historic houses while using modern materials; to save as many trees as possible; and to orient the living spaces to the south. One of the units is handicap-accessible.

Year Completed: 1991

Size: 1,200 sf

SUCCESSFUL FEATURES

SITE:

Site grading is minimized, and the houses are located to save trees. The front porches are covered and large, providing barrier-free access to the front doors. The back decks are private outdoor living areas for residents. The scoring pattern on the concrete walkways resembles the design of the Grand Canyon Lodge Deluxe Cabin walkways.

BUILDING:

Building massing is simple rectangles.

The one car garage is more appropriate in mass to the main structure than a two-car garage (which would become highly problematical.)

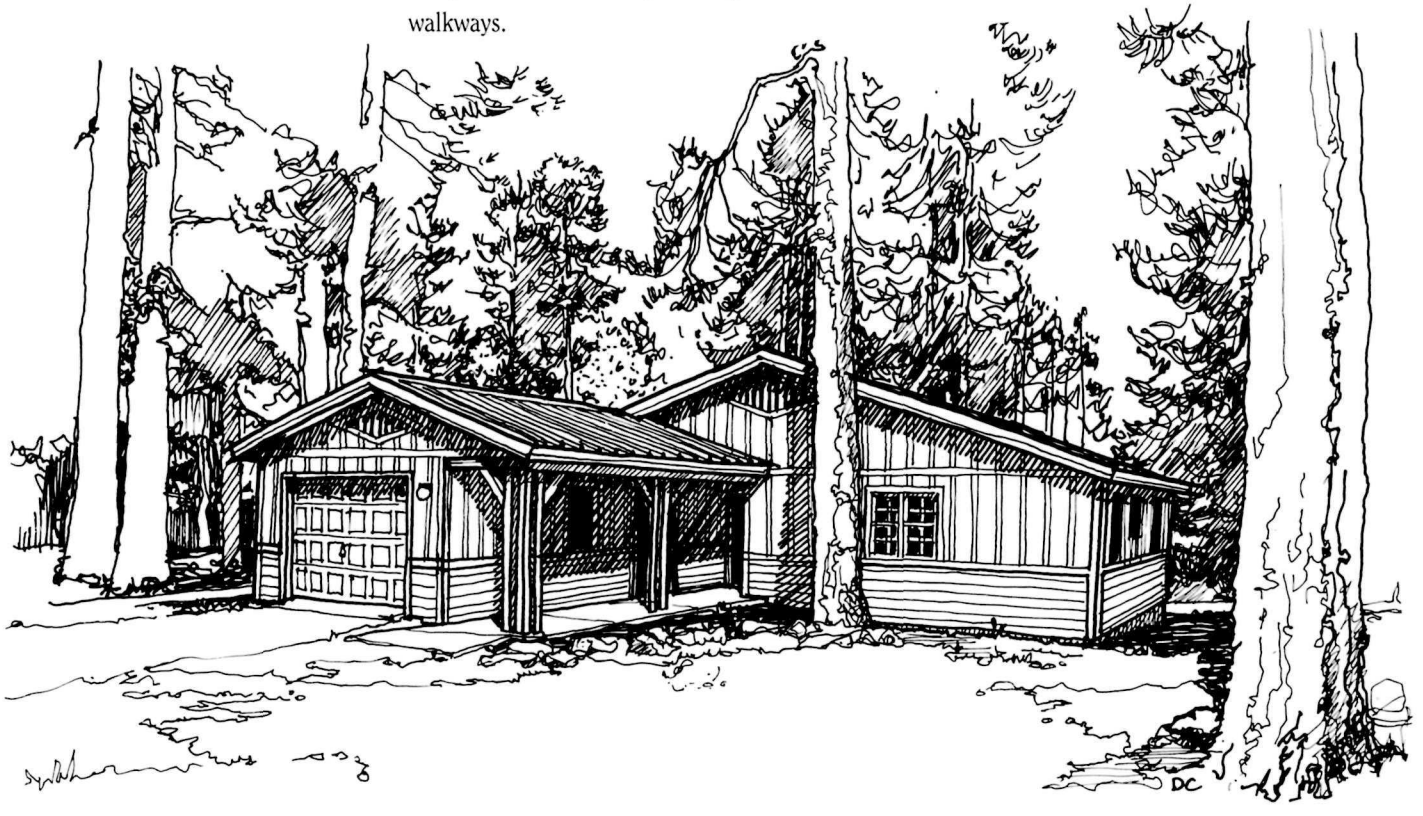
The entry porch provides covered access on the north side of the house. The triple corner column treatment is common, but could be improved by over-sizing the members more than has been done here.

The metal roof is appropriate on the North Rim.

Horizontal siding, run up to under the window sills, creates a strong wall base statement.

The double-hung windows provide vertical proportions.

The use of concrete block for the foundation/ platform is an acceptable cost-cutting alternative to the traditional native stone base.



View of the front from the street.

UNSUCCESSFUL FEATURES

SITE:

The back decks are large and prominent, and are not screened from neighbor's views (landscaping can mitigate this problem in the future).

BUILDING:

The garage, as it is located attached to the front of the house, is overly dominant. A detached garage set to the side or rear would be the most successful massing solution.

The low roof pitch, at 4 in 12, is not consistent with the North Rim and nearby historical residences which typically have 8 in 12 pitches. The eave overhang is narrow at 12" rather than the more successful 18" or 24" overhangs common to the area.

The standing seam metal roof is being found to be less successful than the historical corrugated roofs:

- There is less texture.
- Flashings at ridge and eaves are too heavy.
- The standing seam has more maintenance problems with winter snows.

The low eave facia is too large, hiding the exposed rafters.

The shiplap horizontal siding provides less shadow and detail than the lap siding found in rustic design.

The 4" wide window sill detailing could be improved by using the traditional, sloped 2" sill, and allowing it to continue as the cap trim for the horizontal base siding.

The raised panel pattern of the garage doors is not appropriate in rustic design.

The diamond shape of the gable end vents is not as appropriate as the vertical rectangle vent typical to rustic structures in the Park.

The light gray color of one house would better blend with natural surroundings if it were darker.

The small, plain globe wall bracket lights could be improved to add character and detail.



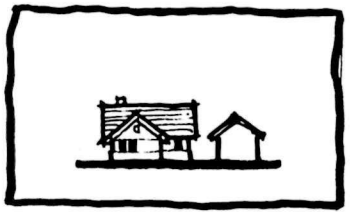
Rear side view.

OTHER NOTEWORTHY RESIDENTIAL STRUCTURES ON THE NORTH RIM:

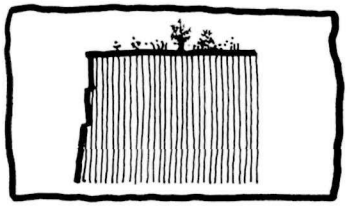
- Original superintendent's Cabin at North Entrance Station

RESIDENTIAL BUILDINGS

NEW NPS DUPLEX - 1990



RESIDENTIAL BUILDINGS



DESERT VIEW

These 1990 units, located within the Desert View residential area, adjacent to the east entrance station, are two single-family houses pulled together at their garages. The result is a long narrow structure. These duplexes are among the very few residences constructed in the Desert View area, and do not show the possibilities for a distinctive desert rustic style, based upon a harmony with the low spare natural environment, and upon an awareness of the southwestern and Indian cultures.

Year Completed: 1990

Size: 1,100 sf per unit

SUCCESSFUL FEATURES

SITE:

A long curving driveway and several trees screen this duplex from the road. The structure is sited so that the living spaces face south. Entries are embellished with large covered porches and back decks provide private outdoor space. The building has been carefully sited so that trees completely envelope the large mass of the buildings.

BUILDING:

The low overall mass of the structure is consistent to the low vegetation of the area.

The 4 in 12 roof pitch is quite appropriate for the Desert View environment. The dark gray fiberglass shingles blend in well with the natural setting.

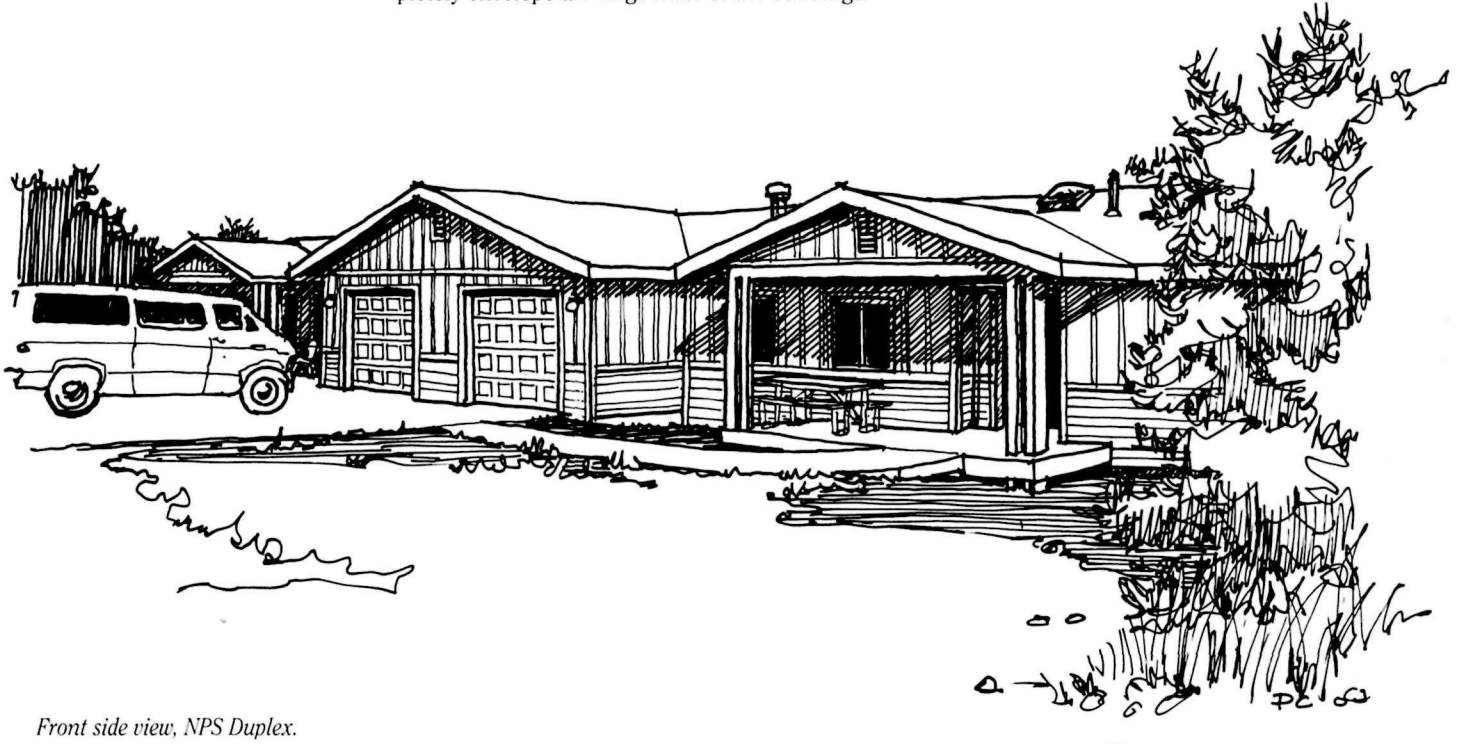
The front entry porch is large enough to provide a sense of entry and to provide shelter for seating.

The concrete block foundation/base is an acceptable substitute for the traditional native stone base.

The horizontal siding is effective in creating a strong horizontal base wall element for the structure.

The vertical proportions of the double hung windows and the gable vents are appropriate.

The gray color of the structure works better here in the Desert View area than in other areas of the park, through it could be darker to blend better with surroundings.



Front side view, NPS Duplex.

UNSUCCESSFUL FEATURES

SITE:

Even though the building is nestled within the trees, the garages are too prominent and the 140 foot length of the building is too long.

BUILDING:

This building design was taken from the South Rim residential area and placed in the Desert View area. There has not been an attempt to integrate it with the natural desert surroundings nor to modify forms and details to the influences of the Native American and southwestern cultures.

The building is too long to integrate into the natural setting.

The attached double-car garage dominates the front of the structure.

The cut off hip roof over the end addition is foreign to the rest of the gable roof forms.

The 12" eave overhangs should be broader for shading in this desert environment. The heavy eave facia covers the exposed rafters.

The plastic bubble skylight is inappropriate to rustic design.

The triple porch column motif is more appropriate to other areas of the park.

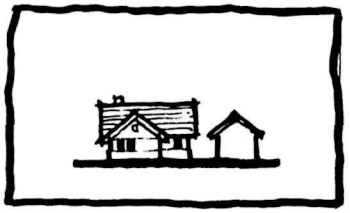
Aluminum windows are less preferable than wood windows.

Shiplap siding is not common to rustic design.

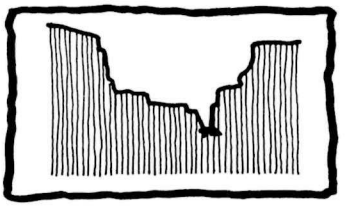
OTHER NOTEWORTHY RESIDENTIAL STRUCTURES IN DESERT VIEW:

- Historic Residence No. 149

INDIAN GARDENS RANGER STATION AND RESIDENCES



RESIDENTIAL BUILDINGS



INNER CANYON

Within a significant and well-visited inner canyon developed area, this contemporary unit is one of four residences situated among desert scrubs. The canyon walls surround three sides of the structure, while the front view is out into the canyon. The station houses two rangers and has a shared bathroom.

Year Completed: 1989

Size: 1,100 sf

SUCCESSFUL FEATURES

SITE:

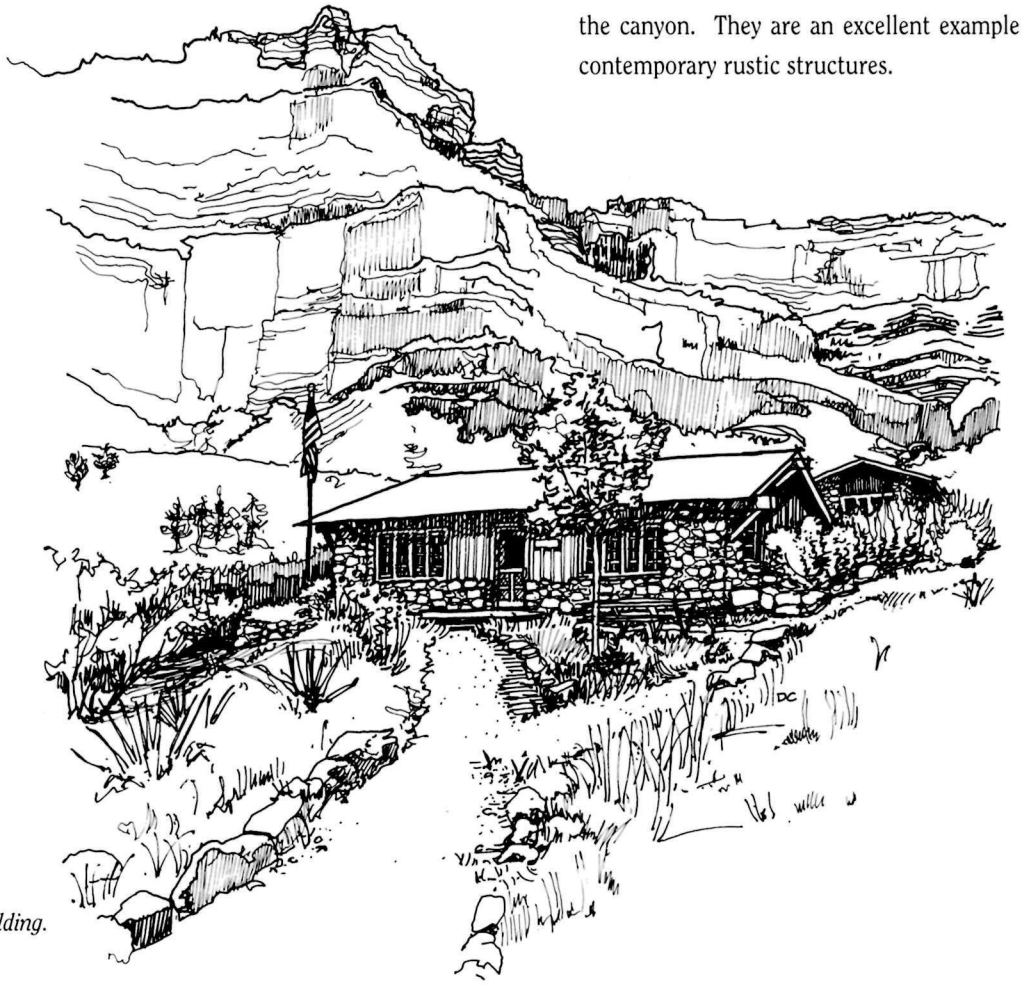
Rock-lined pathways, stone retaining walls, and irrigated landscaping form a nice setting for this house. Because it is a ranger station as well as a residential building, it is a publicly visible building which has an appropriate level of detail in the site features. The living room window opens up towards a spectacular canyon view.

The units are on a terraced shelf of the hillside. They are clustered together to form a courtyard which creates a sense of enclosure and efficiency that is appropriate for this sensitive site. When viewed from the South Rim high above, the complex appears to fit well into the landscape and is a minimal intrusion on the canyon views.

BUILDING:

This complex of four buildings could, programmatically, have been one large building. The choice of a grouping of small structures results in building masses which are of a scale with the low, sparse, sage brush setting.

The group of structures are simple rectangles with gable roofs. In many ways they are similar to the cabins of Phantom Ranch further down in the canyon. They are an excellent example of contemporary rustic structures.



Ranger Station/Residence, NE Building.

The roofs are a 4 in 12 pitch, which is very appropriate of these inner canyon structures. Eaves have broad overhangs for much needed shading.

A minimal eave facia exposes rafters which have a double rafter detail characteristic of Phantom Ranch. The rake eave is supported by heavy timber angle brackets common to rustic design.

Walls are primarily stone masonry, with stone at the building corners. The remaining wood inset wall allows for windows and doors.

The stone work is native "found" stone laid up in a completely random pattern (it could be improved by a horizontal layering in a random pattern responding to the layering of the surrounding canyon walls). Walls batter out at the base as in rustic design.

The windows, which are vertically proportioned casements with divided lights, are good examples of rustic design.

The brown fiberglass shingles are a good alternative to wood shake shingles in this area.

The colors and materials of stone, dark siding, and pale green door and window trim, work well in harmonizing with the surrounding setting of stone cliffs and sage and scrub vegetation.

UNSUCCESSFUL FEATURES

SITE:

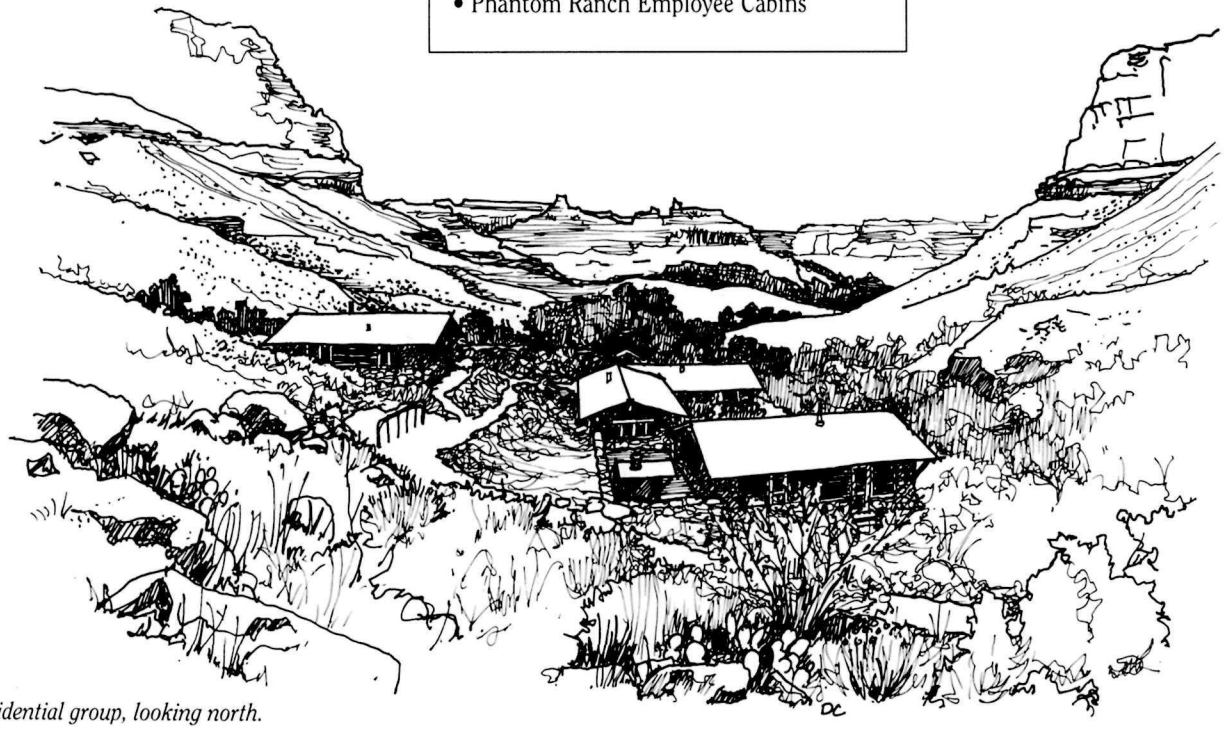
Visitors are unclear whether this is a public or private area.

BUILDING:

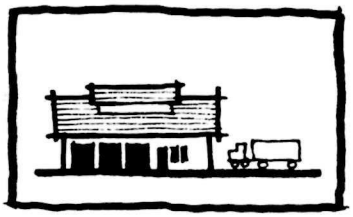
The roof could be improved with more shadow lines and texture by using heavier shingles.

OTHER NOTEWORTHY RESIDENTIAL STRUCTURES IN THE INNER CANYON:

- Cottonwood Ranger Station
- Phantom Ranch Trail Crew Bunk House
- Phantom Ranch River Ranger House
- Phantom Ranch Employee Cabins



View of residential group, looking north.



UTILITARIAN BUILDINGS

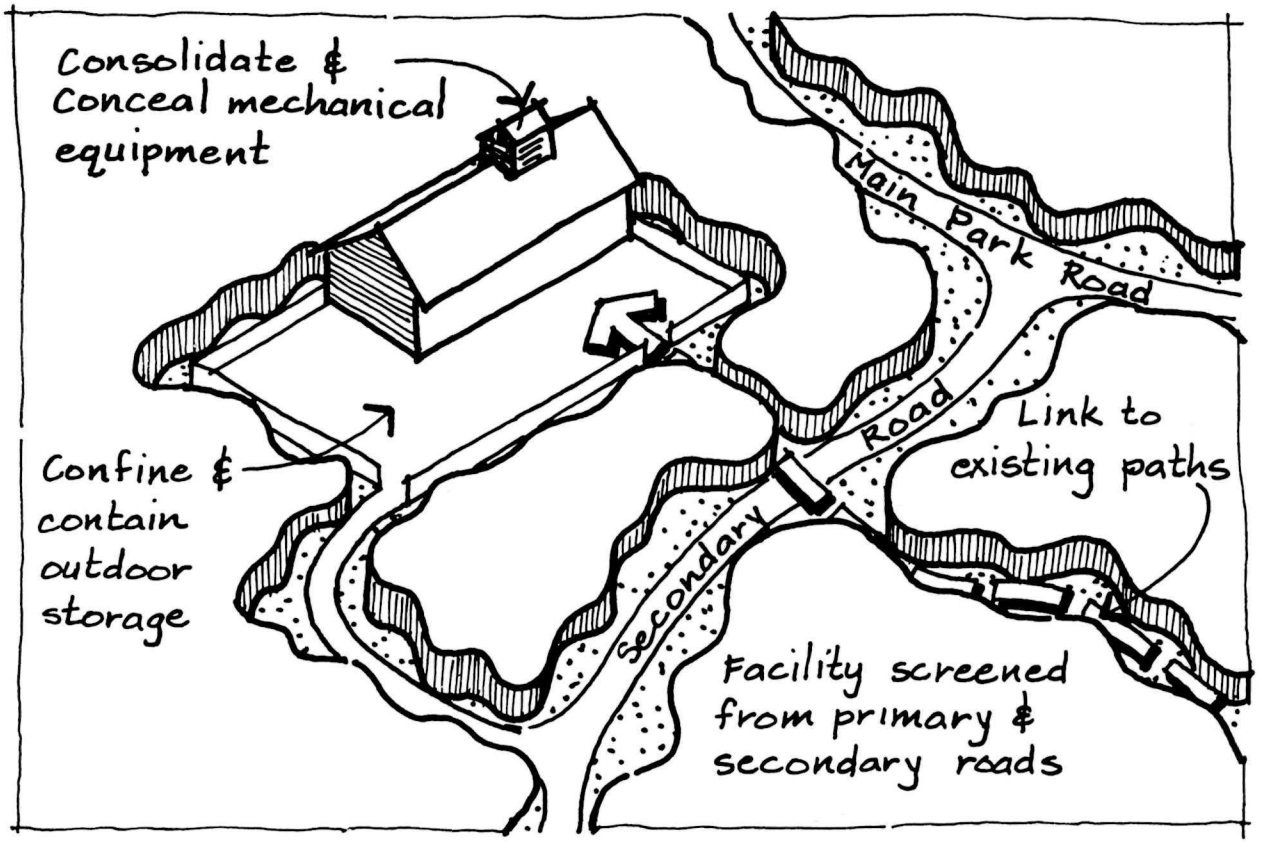
• It is recognized that utility buildings, by the nature of their different needs, and because of construction cost limitations, can not be expected to meet the design criteria for more public rustic structures. However, utility buildings should be custom designed and sensitively sited according to principles outlined in this document to harmonize with the environment to the extent possible. Structures which appear to be prefabricated are not appropriate in national parks.

• Utility buildings should be screened from public and community view and their adjacent outdoor uses should be adequately confined and well contained.

• The color of utility buildings should effectively blend the structure into its immediate surroundings. Materials should be natural as well as functional, and should be chosen for ease of maintenance.

• Mechanical equipment, vent stacks, and other visible mechanical components should be grouped and located in such a way as to avoid a cluttered, unplanned appearance.

• Design for passive solar and other sustainable strategies are encouraged within the principles of rustic design.



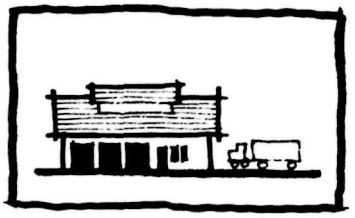
Site Considerations.



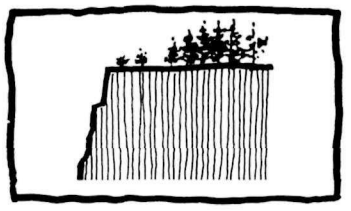
Transformer Building at Bright Angel Lodge.

UTILITARIAN BUILDINGS

MULE BARNS AND LIVERY STABLE



UTILITARIAN BUILDINGS



SOUTH RIM

Set within the utility zone of the historic district, these two large structures are among the oldest in the Park and continue to serve as barns and related maintenance facilities for the Park's mules. (Mule rides into the canyon are a popular way for visitors to explore beyond the rim.) The structures maintain a high degree of historic integrity.

These two barns predate the development of what we now call NPS rustic architecture in the Grand Canyon. They have wonderful design qualities of the Craftsman era, but there are several features which should not be emulated when designing contemporary rustic structures. These features are addressed in the "Unsuccessful Features" section below.

Year Completed: 1907

Size: 6,300 sf (barns) / 10,400 sf (stable)

SUCCESSFUL FEATURES

SITE:

Originally, the buildings and associated corrals were tucked away from public view. Trees screened the facility, and it functioned as it was intended to. With the expansion of the village, however, the visitors now pass by it every day. Visitors seem to love to look at the mules and the buildings themselves. The character is representative of this "old western resort". The buildings are angled so that the doors are oriented toward pedestrians.

BUILDING:

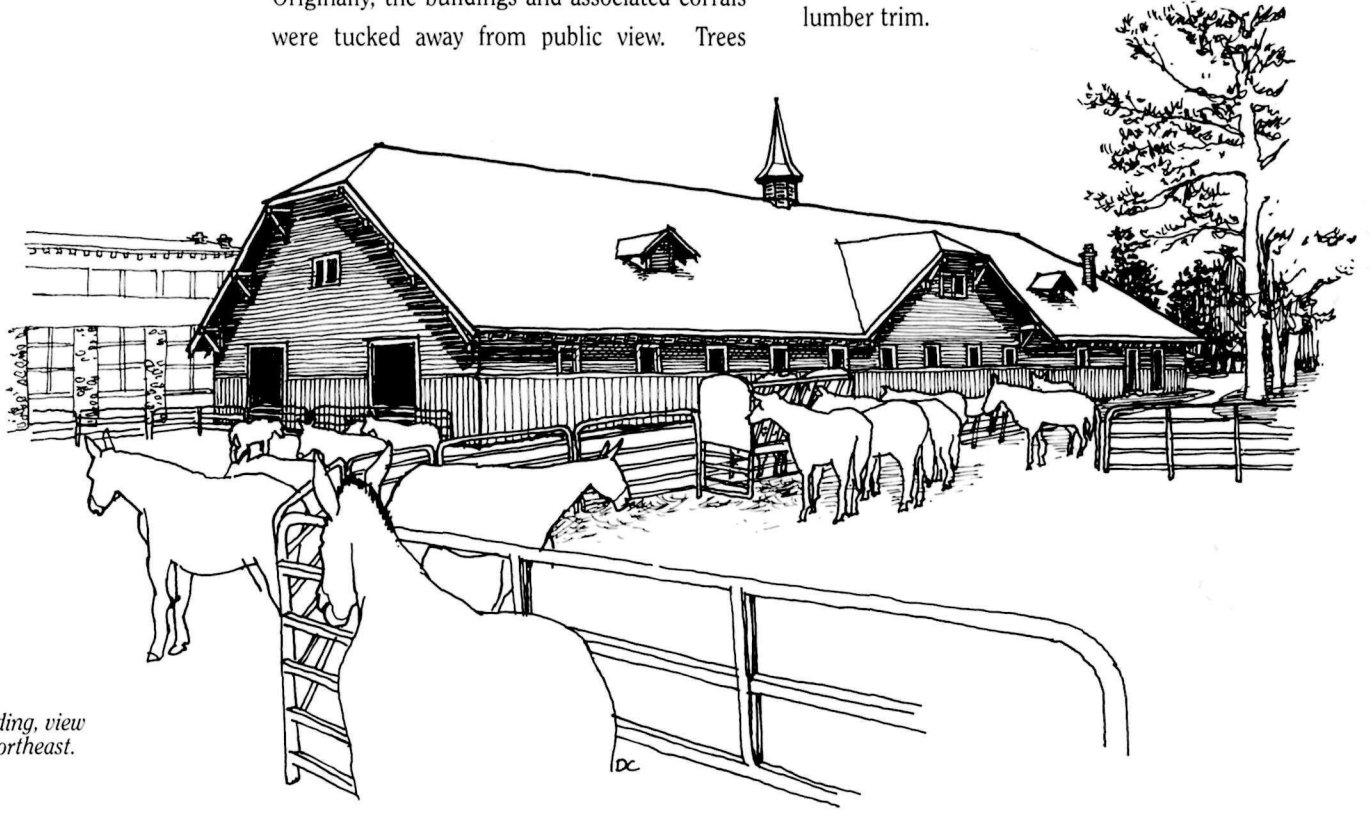
The mass of each building is a large, but very simple, rectangle with a simple roof form.

The board-and-batten wall base element is actually a lot higher than normal on these very large buildings, which results in a reduced building scale (the building looks smaller than it is).

Broad shadows provide strong horizontal lines, and rake eaves are supported by heavy diagonal braced brackets.

Low eaves have a minimal facia, and rafters are exposed.

Windows are generally of a vertical proportion, with divided lights, and simple 1 x 4 dimension lumber trim.



West building, view looking northeast.

The side rolling barn doors are possible alternatives to contemporary overhead doors.

The major wall siding element of cedar shakes is not common in rustic design, but is highly effective on these Craftsman buildings.

UNSUCCESSFUL FEATURES

SITE:

Drivers stop to take pictures of the mules and create traffic jams along the road. The odor emanating from the corral is overwhelming at times. The facilities site development should be updated in the context of the growth in the village, park visitation, and the popularity and interpretive potential of the mules and barns. Adequate definition of vehicular and pedestrian circulation, parking, and signs is needed. Overhead power lines are a significant negative factor in the area; power lines should be underground if possible. A landscape or other buffer could be employed to protect visitors from mules. The check-in area for visitors taking mule rides is not designed well to handle the traffic volumes. Signage is needed for information, regulatory, and interpretive purposes. The dumpster should be screened by a durable, attractive enclosure. Drainage on the uphill side of the building appears marginal.

BUILDING:

The roof gable ends are clipped off with a hip element (sometimes called a Dutch Gable). This is not a part of rustic design.

The pointed steeple on the west building and the hip-roofed cupola on the east building are not found in rustic design.

The cross-buck motif on the doors is not in the rustic vocabulary at the Grand Canyon.

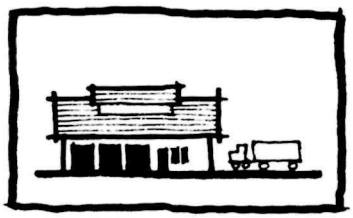
The green roofs, being so large and prominent when viewed from many locations around the South Rim Village and overlooks, would be better if they were naturally weathering shakes.



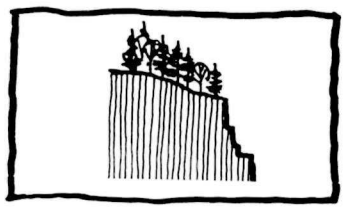
West building showing east facade.

UTILITARIAN BUILDINGS

WASTEWATER TREATMENT PLANT



UTILITARIAN BUILDINGS



SOUTH RIM

A complex of contemporary structures, lagoons, and spray ponds make up this sewage treatment plant which serves the South Rim. The plant is located in a dense stand of juniper, pinion, and ponderosa, far from visitor view off of Rowe Well Road.

Year Completed: 1988 - 1990

Size: A complex of approximately five acres with three buildings from 1,500 sf to 2,550 sf.

SUCCESSFUL FEATURES

SITE:

This facility is contained in and confined by a tall chain-link fence, which allows the surrounding vegetation to fully conceal the complex. The fact that it is so far from public view means that screening is a secondary issue. Landscaping with dry laid stone walls, boulders, native grasses, and evergreens was accomplished around the plant itself, allowing for a pleasant atmosphere. The odors associated with such a facility are not a problem because of the distance from visitor use and residential areas.

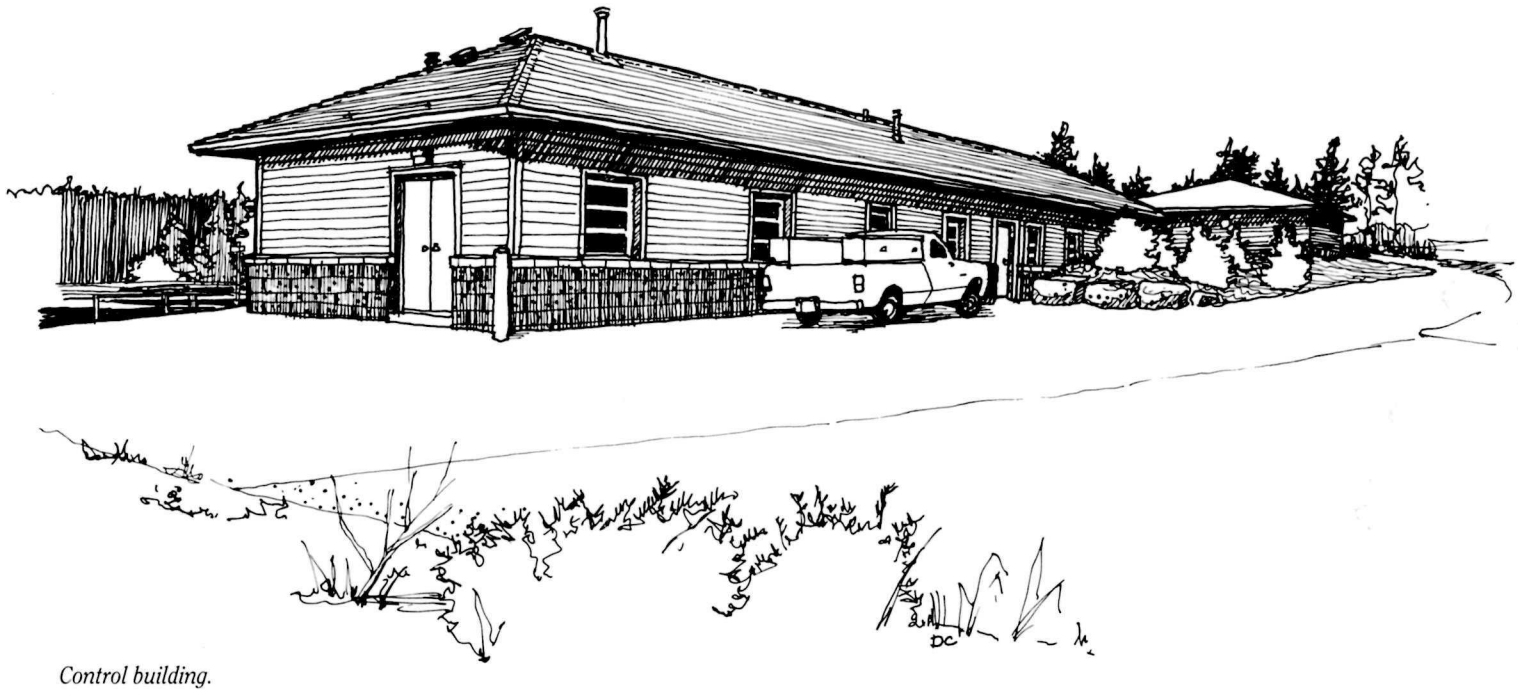
BUILDING:

The structures are simple, rectilinear forms. The buildings are small enough to comfortably accommodate pitched roofs.

Fiberglass shingles are an acceptable roofing material for utilitarian buildings on the South Rim.

The masonry base, which comes up to the window sills, forms a very effective wall base element. It provides weathering protection while reinforcing the horizontal emphasis of the buildings. The reddish-brown exposed aggregate split face block in running bond is very effective as a substitute for stone in this utilitarian use. (The same block is also used to good effect as the main wall material on the Pretreatment Building). A cast concrete cap on the wall base works well as horizontal trim.

The upper walls of 6" natural finished rough-sawn lap siding is effective.



Control building.

Trim work is well done with 1 x 4 wood.

Mechanical equipment is thoughtfully handled:

- Chimneys and roof vents are minimized, and are painted a dark gray.
- Vents and louvers are grouped together and incorporated into the facade.

The reddish-brown exposed aggregate split face block and the natural-finish cedar siding blend well with the natural surroundings.

UNSUCCESSFUL FEATURES

SITE:

Several related uses such as nursery, greenhouses, and composting are located at the site in addition to the primary function of wastewater treatment. It may improve the visual appearance and functional aspects of the operations if the diverse uses could be organized and articulated. Likewise, parking and vehicular circulation could be defined more clearly. Metal railings around ponds and tanks could have been painted a darker color to blend with surroundings.

BUILDING:

The hip roofs used in this complex are not common to rustic design. They could as easily have been gable roofs.

The heavy eave facia hides the exposed rafters.

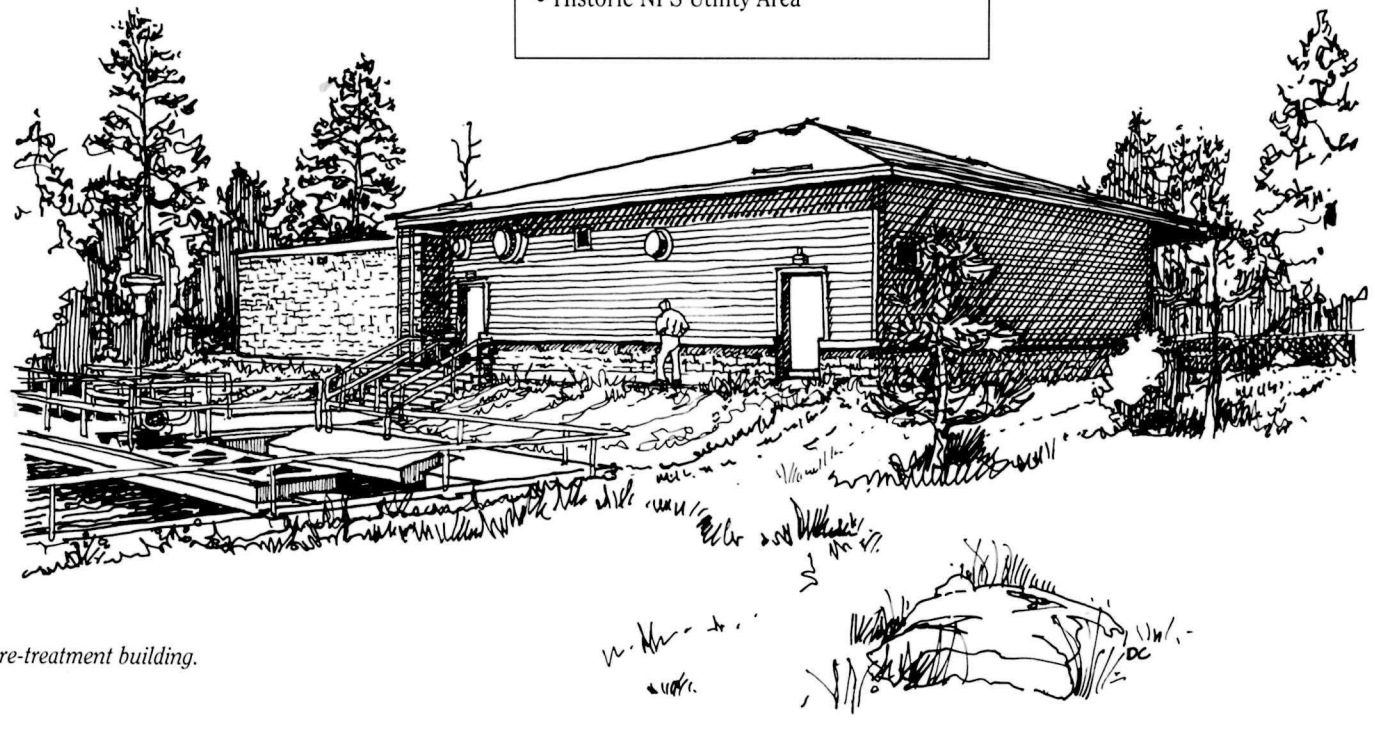
The gray-green roof should be darker to blend with surrounding trees.

Windows are strongly horizontal, both in the overall proportion, and in the use of horizontal louvers. The clear anodized aluminum window finish could have been dark bronze.

The wall bracket lights are a glare source, and could have been a high cutoff downlight fixtures.

OTHER NOTEWORTHY UTILITARIAN BUILDINGS ON THE SOUTH RIM:

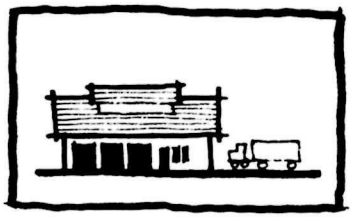
- Transformer Station at Bright Angel Lodge
- Original Blacksmith Shop
- Powerhouse
- Historic NPS Utility Area



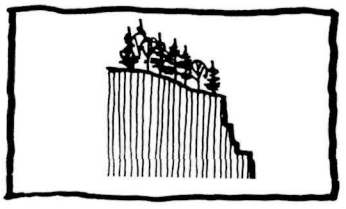
Pre-treatment building.

UTILITARIAN BUILDINGS

NPS WAREHOUSE



UTILITARIAN BUILDINGS



NORTH RIM

This historic, simple structure is one of several buildings arranged in a linear fashion on a street (two blocks facing one another) in the North Rim maintenance area. This facility is currently used for storage and office space.

Year Completed: 1934

Size: 1,100 sf

SUCCESSFUL FEATURES

SITE:

The site layout is simple and functional. The loading dock flanks the entry side of the structure where double and single doors lead into the building. The rear fence, constructed of vertical rustic logs, provides effective screening for the service yard.

BUILDING:

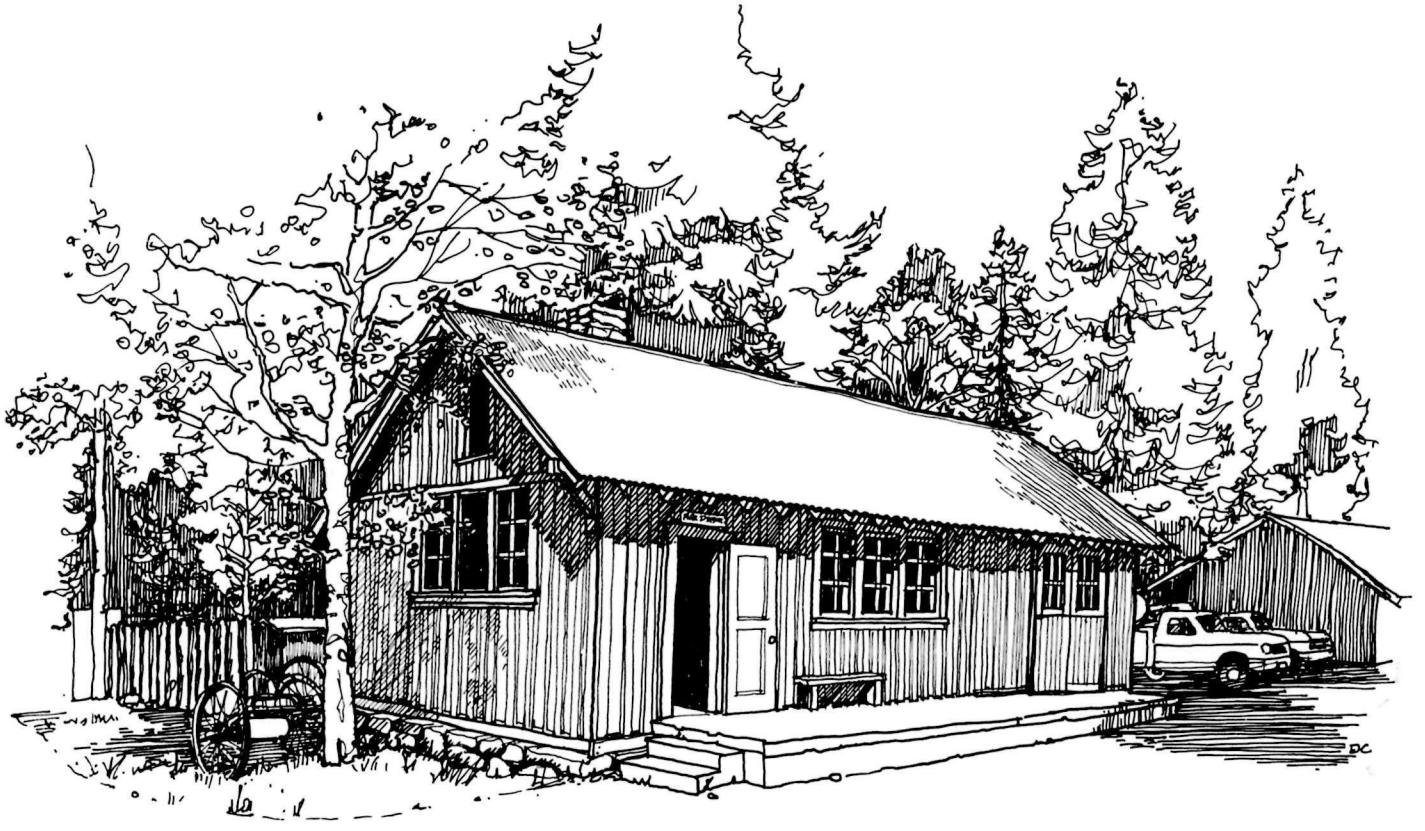
This historic structure is a very good example for small rustic utilitarian structures on the North Rim.

The simple rectangular massing and human scale of this structure is very appropriate within this complex of small maintenance structures.

The masonry building base of native limestone, laid in a horizontal random pattern, is a good example of a platform base to take up grade and provide weather protection for the wall.

The 9 in 12 gable roof of galvanized, corrugated metal is an excellent example of a rustic roof for the North Rim:

- Eave overhangs are an effective 18".
- The eave facia is minimal, allowing the rafter tails to be exposed.



NPS Warehouse, view from southwest.

- The rake eave is supported with diagonal brackets.

The grouping of three standard windows is an excellent example of how to provide a larger glazing area:

- The window module is a vertically proportional casement with divided lights, trimmed in 1 x 4 boards.
- Use of a 2" sloping sill is effective.

The side-rolling garage doors with vertical board paneling below and and a panel of divided lights above is a very good example for service doors.

The entry door is a good example of a simple, two-panel rustic door for utilitarian structures.

The stone chimney in the rear provides vertical counterpoint.

The attic window is an appropriate substitute for the traditional gable vent.

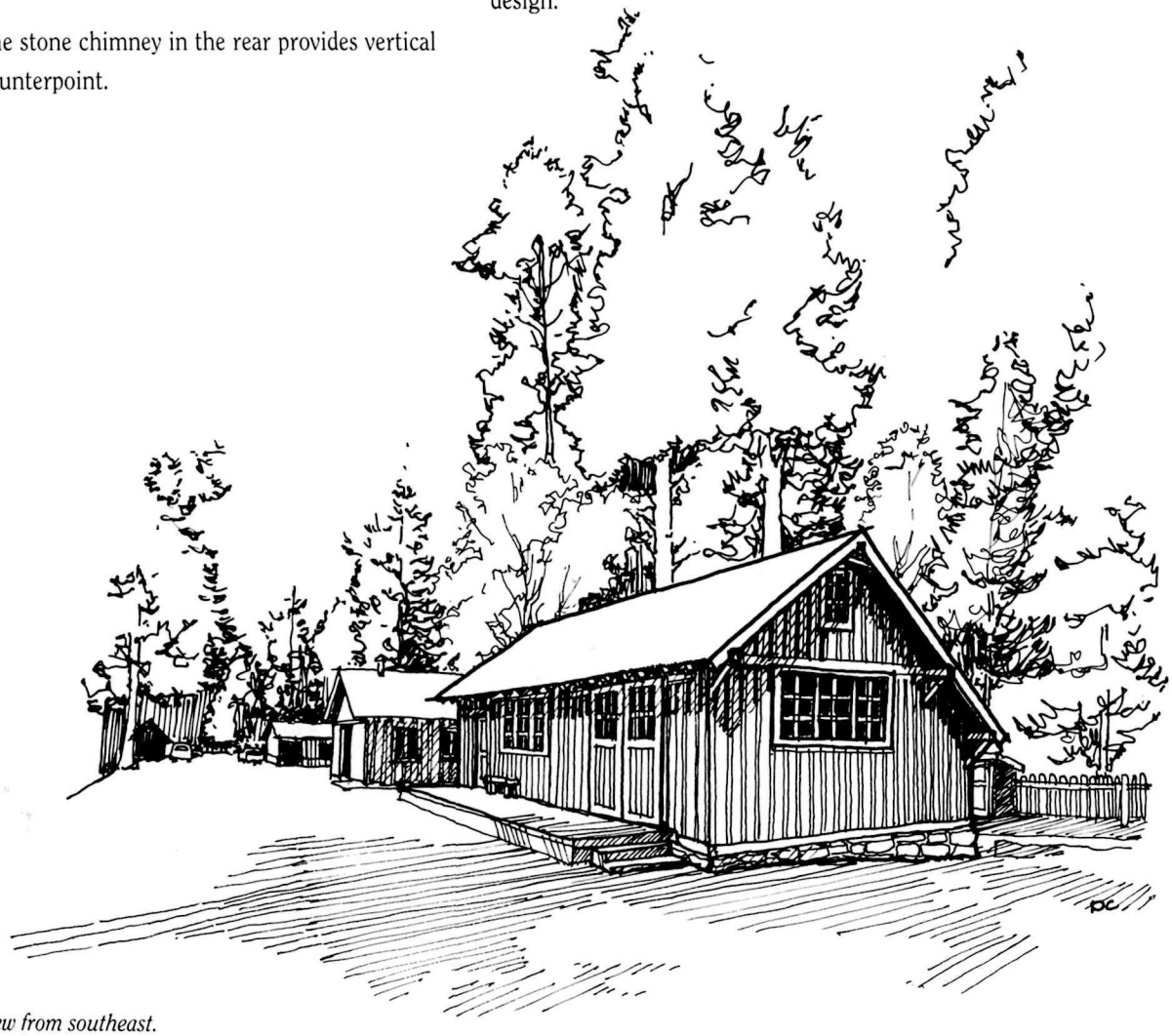
UNSUCCESSFUL FEATURES

SITE:

Outdoor storage is not confined and contained to one area. Parking and storage is left unchecked and has damaged surrounding vegetation. Loading dock is not wide enough for today's needs.

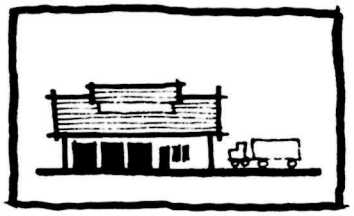
BUILDING:

The employment of horizontal lap siding on the lower wall would have given this structure a more desirable horizontal orientation of rustic design.

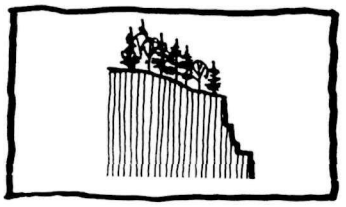


View from southeast.

NORTH RIM GENERATOR BUILDING



UTILITARIAN BUILDINGS



NORTH RIM

Located at the end of a loop drive next to the mule barn and the old generator building, this contemporary facility is the location of the emergency power generation for the North Rim facilities and the Roaring Springs pump.

Year Completed: 1990

Size: 2,200 sf

SUCCESSFUL FEATURES

SITE:

The loop drive provides the only access to the front door and service door of the building, while a concrete walkway circles the outside perimeter. The outdoor transformers and other equipment are set in an edged gravel yard. New plantings of densely spaced evergreens around the transformer yard will provide future screening from the main road. The orientation of the facility completes a circular layout of the mule barn and old generator building, screening the interior loop drive from the road.

BUILDING:

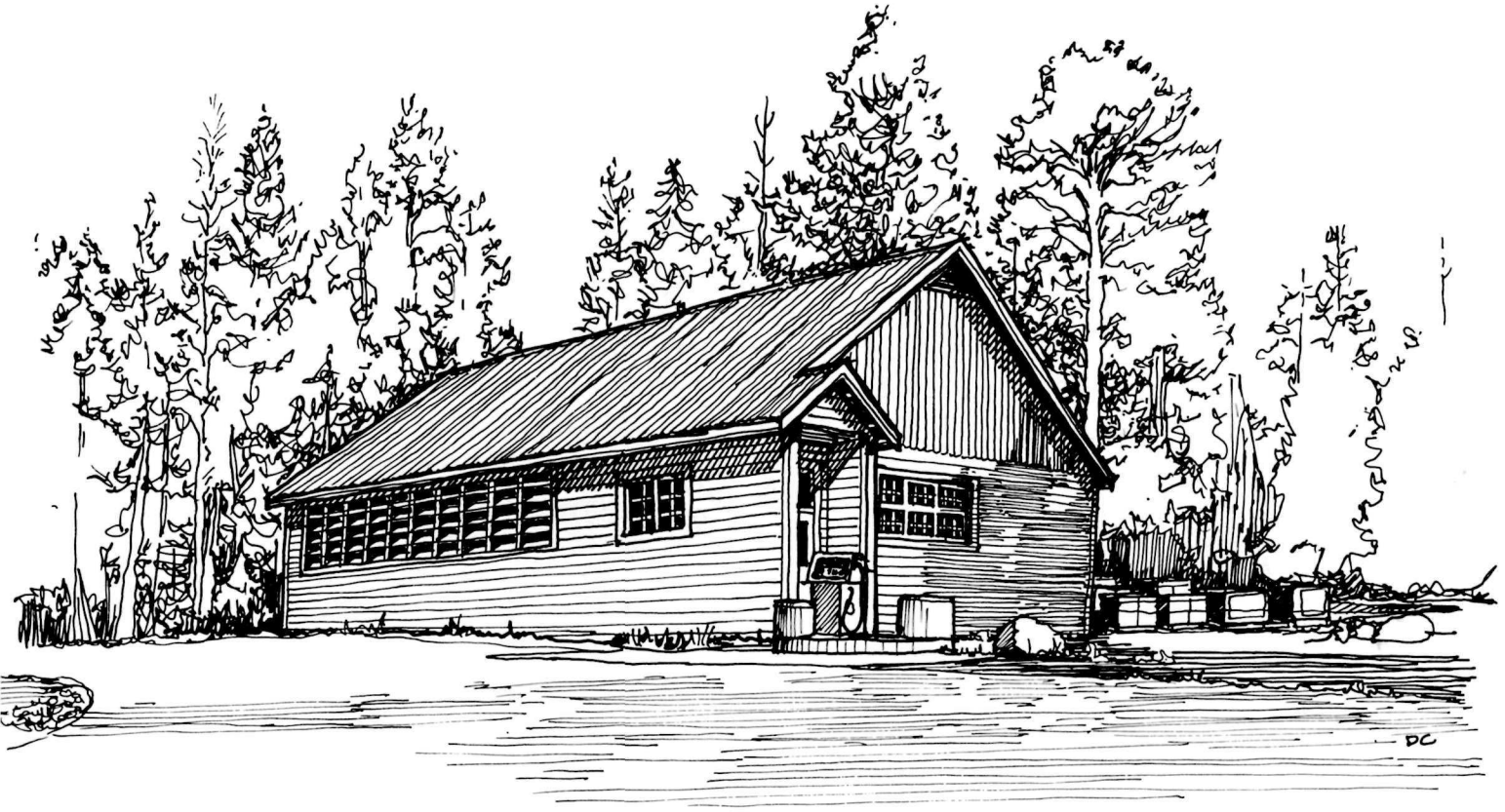
This structure is an excellent example of a contemporary rustic utilitarian building on the North Rim.

Massing is a simple rectilinear form with simple gable roof.

The gable roof pitch of 9 in 12 is good for the North Rim:

- The corrugated galvanized metal roof is common to the North Rim.
- Eave overhangs of about 16" are adequate.

The entry is small, but well defined and well expressed.



Generator building, front view from loop drive.

The main door is metal for maintenance and security reasons, but several things have been done to make it successful:

- It is trimmed in 1 x boards.
- The light in the upper panel gives it proportion and interest.
- The large glass transom above brings in extra light.

The overhead service door, though metal, has an effective horizontal panel pattern which closely matches the appearance of the wall siding.

The galvanized air louver panels have been made a part of the wall composition.

The triangular gable vent at the roof peak expresses the utilitarian nature of the structure.

The color of dark gray with dark green trim is an excellent choice to blend with the surrounding environment.

UNSUCCESSFUL FEATURES

SITE:

Snow has piled high at the back of the facility, causing problems with maintenance of the structure. The transformer yard faces the main road. The landscaping around the structure and transformer yard was intended to further screen the facility from the road. However, no provisions were made to protect these plants from deer browsing, and many have died.

BUILDING:

A minimal eave facia board would have allowed the exposed rafters to be expressed.

Lap board siding, rather than the shiplap siding, would have provided more horizontal shadow and texture.

The windows have a horizontal proportion. This could have been mitigated by expressing the vertical jamb between each of the grouped windows.

OTHER NOTEWORTHY UTILITARIAN BUILDINGS AT THE NORTH RIM:

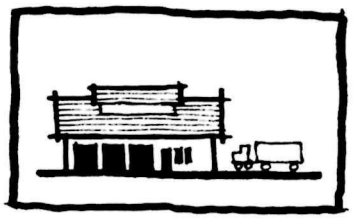
- Historic NPS Utility Area
- Water Treatment Plant



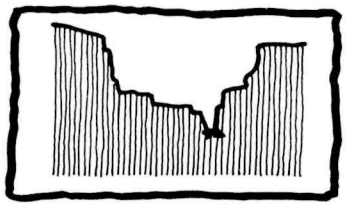
View of rear service doors.

UTILITARIAN BUILDINGS

PHANTOM RANCH MULE BARN



UTILITARIAN BUILDINGS



INNER CANYON

Set adjacent to the Colorado River at the base of a cliff, this historic facility is generally out of view of the visitors to Phantom Ranch. The structure is used as an overnight holding and staging area for the mules that bring visitors from the rim to Phantom Ranch.

Year Completed: 1935

Size: 1400 sf

SUCCESSFUL FEATURES

SITE:

The semi-circular shape of the building is extended through the rock foundation wall, which becomes a rock corral fence that continues in a circular fashion. This fenced corral then completes the full circle. A very simple stone water trough is set in the center of the corral as a concentric circle.

BUILDING:

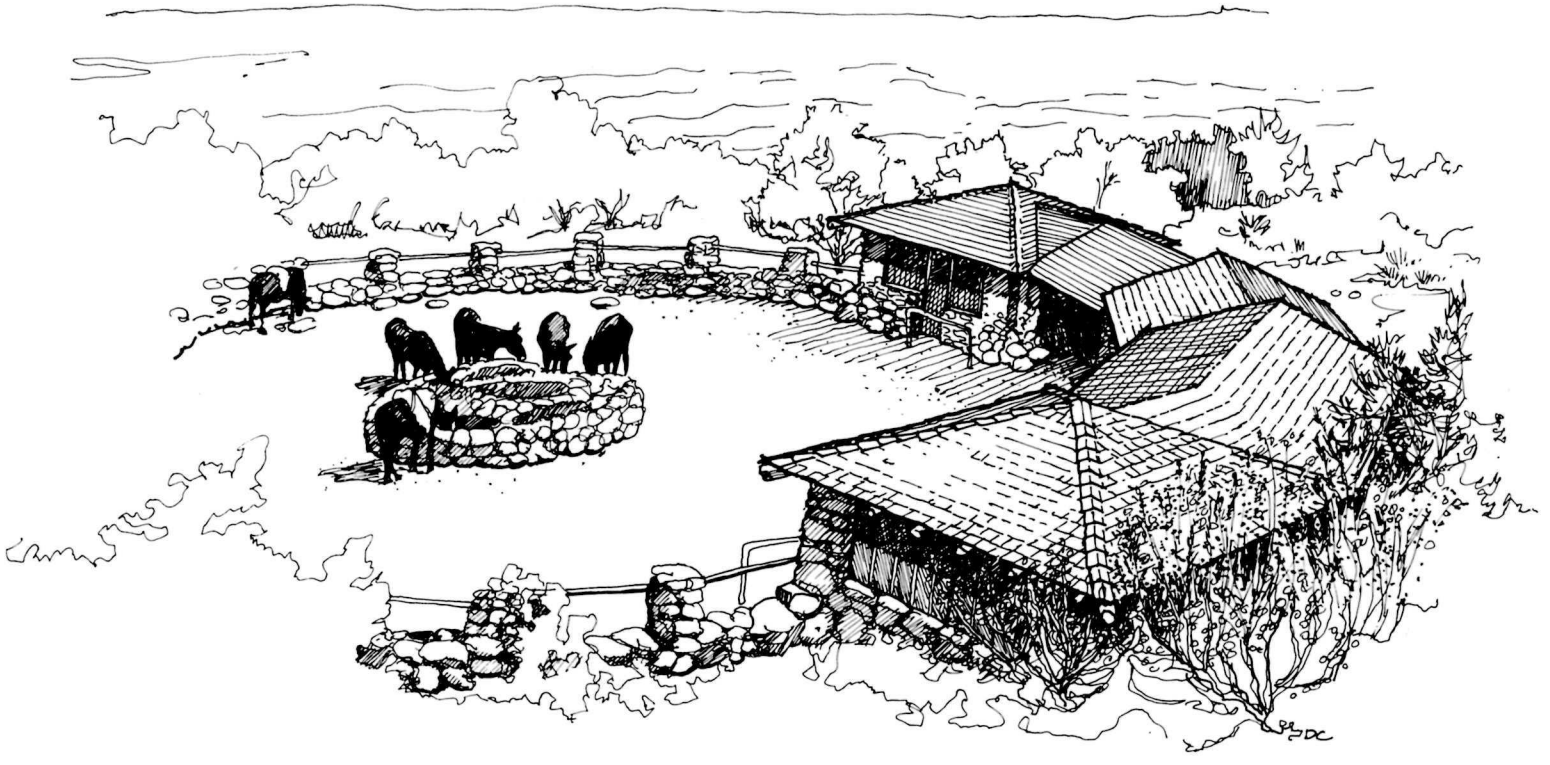
This structure is a very imaginative and sensitive expression of rustic design.

The building is set into the side of the hill. The telescoping roof forms step down the slope with the grade, so that the building merges with the natural setting.

Stonework appears to grow out of the river bed, with the lowest stone layers of round river boulders, and upper walls transitioning to smaller limestone work. Stone walls batter out at the base and form the fence of the circular corral.

Roofs have a shallow, 4 in 12 pitch which is appropriate for inner canyon shelter structures. Broad eaves create shadow and shade.

Rafters and beams are of large round logs, and are fully exposed. There is a minimal eave facia.



View of the curved barn and its circular corral as seen from the hill above. The Colorado River is seen beyond.

The natural materials of stone and wood, along with the naturally weathered cedar shake roof, are in harmony with the natural setting beside the river.

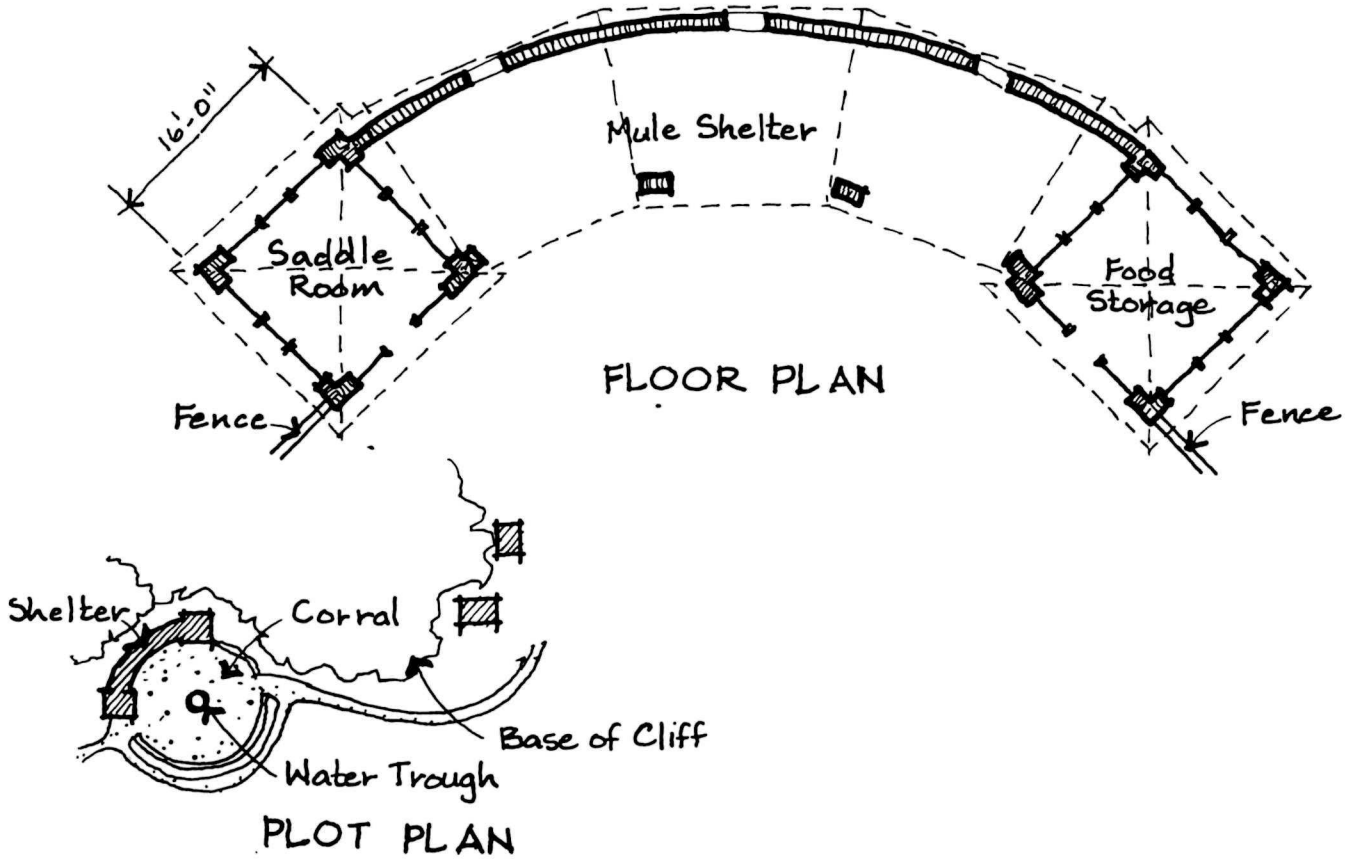
UNSUCCESSFUL FEATURES

SITE:

None.

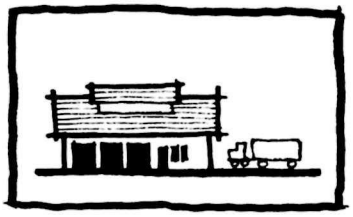
BUILDING:

Mules, over the years, have enjoyed eating the wooden parts of the structure which they can reach.

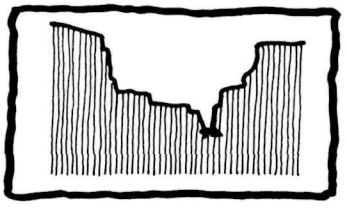


Plan views of the mule barn and corral.

INDIAN GARDENS MULE CORRAL



UTILITARIAN BUILDINGS



INNER CANYON

This contemporary facility, located beside the Bright Angel Trail on the Tonto Plateau, is used as a holding and staging area for the visitor-use mules.

Year Completed: 1989

Size: 400 sf enclosed

SUCCESSFUL FEATURES

SITE:

The corral structure is set in a shaded oasis of cottonwoods next to the main trail, where hikers like to stop and rest. Here the mule riders can take a break and interact with hikers.

BUILDING:

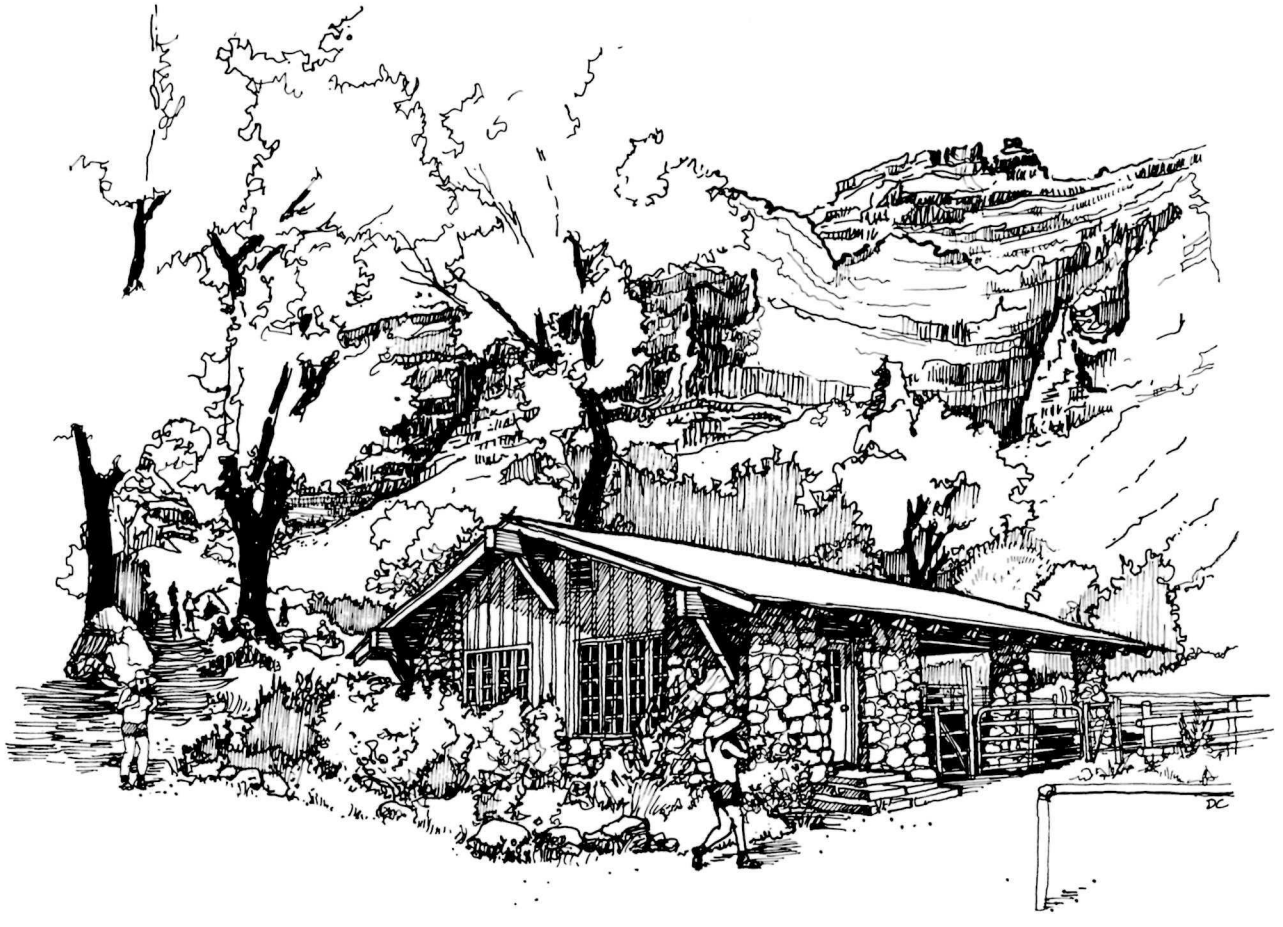
This contemporary structure is an exemplary rustic utilitarian building in the inner canyon.

The massing consists of a gable roof floating over a rectangular structure. About 2/3 of the structure is open shelter roof.

The gable roof has excellent rustic detail:

- There is a heavy barge board on the rake eave, and minimal facia on the low eave.
- The structure of heavy timber beams and rafters is fully exposed.
- Heavy timber brackets support the rake eave overhangs.
- Broad overhangs provide much needed shade.
- Brown fiberglass asphalt shingles are a good substitute for cedar shakes here in the canyon.

Walls are of stone, supporting the heavy timber roof structure.



Stonework uses local found stones, with many oversized boulders used primarily in the lower wall portions. The walls batter out at the base to transition with the ground.

The casement windows are vertically proportioned and have divided lights. These standard window units are grouped together to provide larger glazed areas.

The doors are good examples of rustic design, with the upper half panel glazed with divided lights.

Sheet metal armor on lower wood elements prevents mules from eating this structure.

This building blends well with the natural setting, relying on local stone, dark stained wood, and pale green trim which matches the sage and scrub growth.

UNSUCCESSFUL FEATURES

SITE:

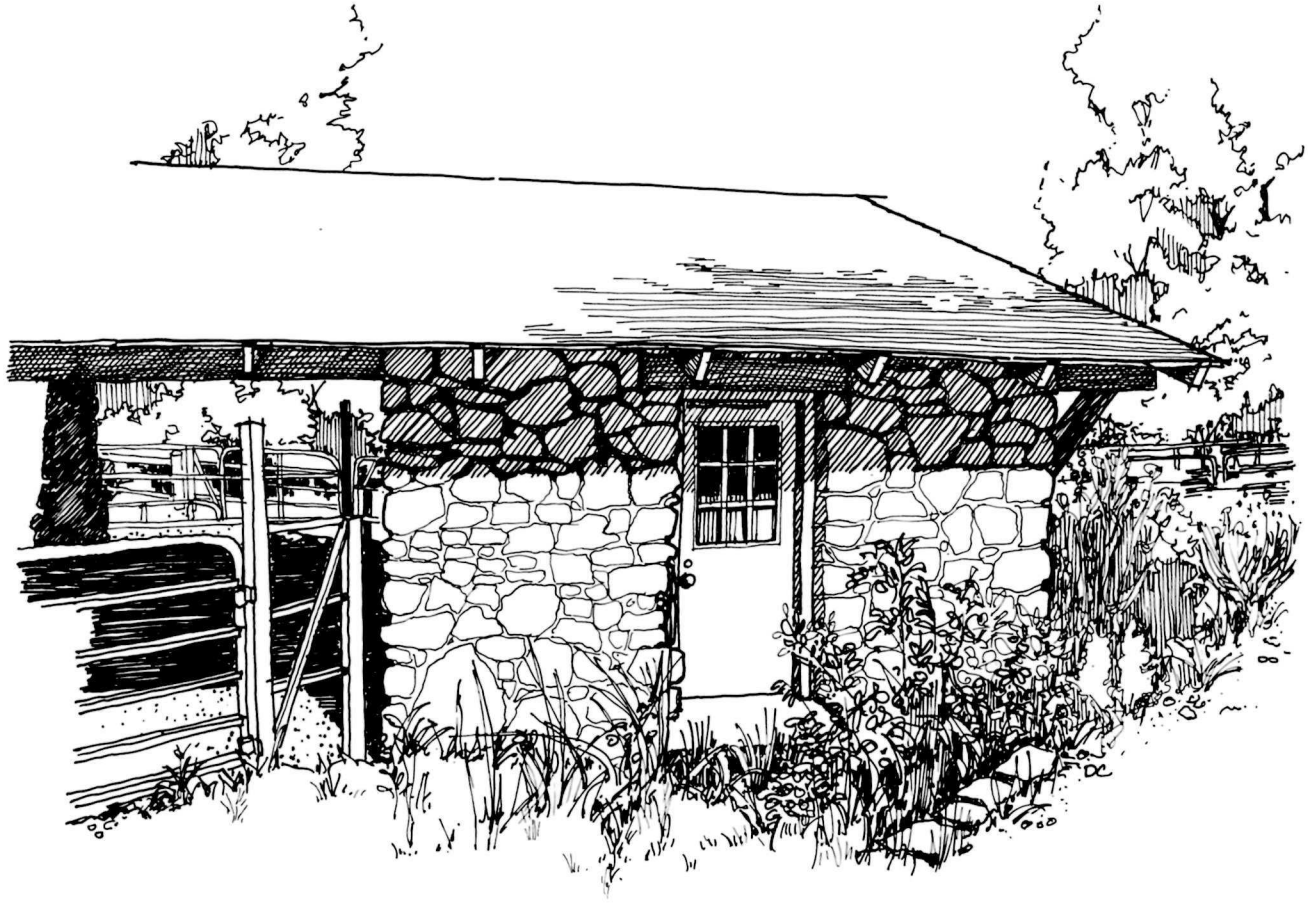
None.

BUILDING:

The roof shingles could have been heavier to create more shadow pattern and texture on this large surface which can be seen from the Rim far above.

OTHER NOTEWORTHY UTILITARIAN STRUCTURES IN THE INNER CANYON:

- Pumphouse at Indian Gardens
- Pumphouse at Roaring Springs
- Composting Toilets at Cottonwood and Indian Gardens
- Phantom Ranch Sewage Treatment Plant.



NOTES

APPENDIX



The National Park Service is mandated by the National Energy Conservation Policy Act of 1992 to reduce energy consumption by 20% by the year 2000. The current policy utilizes life cycle cost analysis to establish the most cost effective systems. A key factor in this analysis is that the effective life of a NPS structure built today will be far more than the standard assumption of a 25-year life period. For these reasons, alternative energy sources, in addition to energy efficient design and construction, are necessary considerations when planning or remodeling structures within the Park.

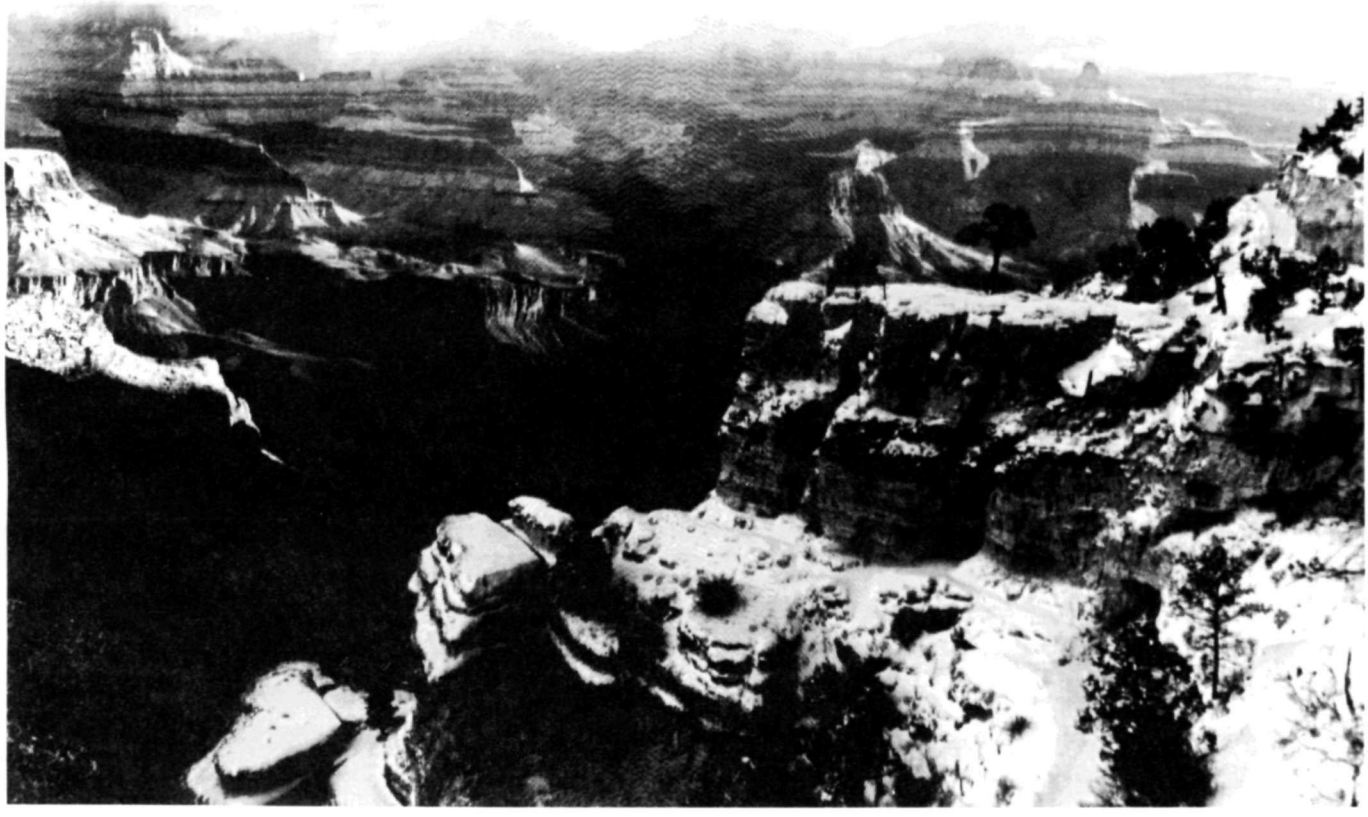
STATE REQUIREMENTS

The State of Arizona does not have an Energy Code. However, the recently published "Energy Policy in Arizona" has some specific recommendations, pp. 108 & 109.

Recommendation 1. *The State, in association with the federal government and private sector, should devote additional economic resources to further the state's solar and renewable research, demonstration, education, and technology transfer functions.*

Recommendation 3. *By 1993, the State should create financial incentives such as sales tax reductions and tax credits to expand the domestic industry and market for solar and renewable energy usage.*

Recommendation 4. *The State, in cooperation with the State's universities and the private sector, should invest in the development and implementation of end-use applications that are powered with solar and/or renewable energy, new solar powered communities, and central station solar power plants.*



Snow on the South Rim.

CLIMATIC DATA: GRAND CANYON NATIONAL PARK

	SOUTH RIM AND DESERT VIEW	PHANTOM RANCH	NORTH RIM
Latitude	36°N	36°N	36°N
Altitude	6800-7400 ft	2400 ft	8000-8800 ft
At Villages	6960 ft	2400 ft	8340 ft
Direct Solar Irradiation			
June 21	3130 Btu/ft^2		
January 21	2320 Btu/ft^2		
Average Temperature			
July Maximum	84°	106°	77°
July Minimum	54°	78°	46°
January Maximum	41°	56°	37°
January Minimum	18°	36°	16°
Prevailing Winds			
Spring	Strong from W/SW	Minimal/variable	Strong from W/SW
Summer	Light breeze from S/SW Gulf storms from SW	Minimal/variable	Light breeze from S/SW Gulf storms from SW
Winter	Prevailing Pacific/Arctic from NW	Minimal/variable	Prevailing Pacific/Arctic from NW
Rainy Season	Mid June-Mid Sep.	Mid June-Mid Sep.	Mid June-Mid Sep.
Annual Precipitation	14.5 inches	8.69 inches	22.78 inches
Annual Snowfall	65 inches	negligible	129 inches
Possible Sunshine			
June	84%		
January	77%		

PREVAILING WINDS

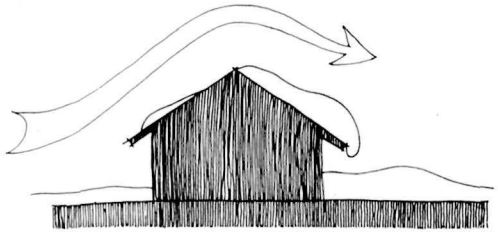
Prevailing summer winds come out of the west and southwest. These beneficial cooling breezes can be captured by opening up these desirable exposures. Plan window openings both on the east side and in roof clerestories to allow for cross-ventilation.

Prevailing winter winds come out of the northwest. It is desirable to mitigate these cold winds by limiting openings on the north and northwest sides and to discourage winter access to this exposure. Evergreens planted to the north and west can serve as a further windbreak.

SNOW

Snow is a significant design consideration in the Grand Canyon, especially on the North Rim where accumulations of up to 12 feet can occur. The following factors should be taken into consideration in the design process:

- Plan for prevailing winter winds from the northwest to cause lee side drifting. Potential problems are imbalanced roof loads and blocking of building openings.



- Correct positioning of dormers and secondary roof elements can divert snow from building entry and service areas.
- Snow and ice in the north side shadow area will remain on the ground for much of the winter, making this side less desirable for entries and walks.

SOLAR CONSIDERATIONS

In planning structures for the Grand Canyon, it is appropriate to consider both active and passive solar systems. It should be emphasized, however, that solar techniques are only an effective means of reducing energy expenditure if they are used in combination with, not substituted for, standard energy conservation techniques. Any energy gains generated by a passive system can be easily offset by the energy losses that will occur in a building of poor design and construction. Suggestions for improving energy conservation of the structure are included throughout this section. When combined, they will reduce the demand for supplemental energy sources. The inclusion of passive systems will allow the structure to actually provide for its own energy requirements. The result will be a truly "energy conscious" structure.

ACTIVE SOLAR

Much of Grand Canyon National Park is heavily forested with evergreens. This fact, combined with the desire not to cut trees, creates a situation which requires solar collectors to be placed on upper roof areas, or at remote locations. Due to their applications during all seasons (including the popular summer season) photovoltaics and solar domestic hot water are of interest in the arid, temperate climate of the Grand Canyon. Sketches show that the optimum pitch for a solar collector to achieve all-season solar exposure in this area is about 34°, or a roof pitch of about 8 in 12, which is a preferred roof pitch within the Park.

It should be kept in mind that extensive visible mechanical systems are not compatible with the prevalent rustic vocabulary. Collectors and other systems that are placed on a structure must be sensitively integrated. Collectors should be parallel with either the roof pitch or the walls.

PASSIVE SOLAR AND DAYLIGHTING

The Grand Canyon area is well suited for both passive solar and daylighting applications. Furthermore, many of these applications can be designed to work within the rustic and southwestern styles prevalent in the Park. Passive solar is most suited for the smaller scale structures scattered throughout the Park. These include residential and small institutional buildings.

- Passive solar heating systems are integral to the whole building design. Concepts for relating to system operation must be applied at the earliest stages of design decision making.
- Elements which are critical to a well-functioning design include:

  1. Proper location and size of glazing.

  2. The proper amount and location of thermal mass to absorb and store solar gain.

  3. Insulation of the envelope, including glazed areas.

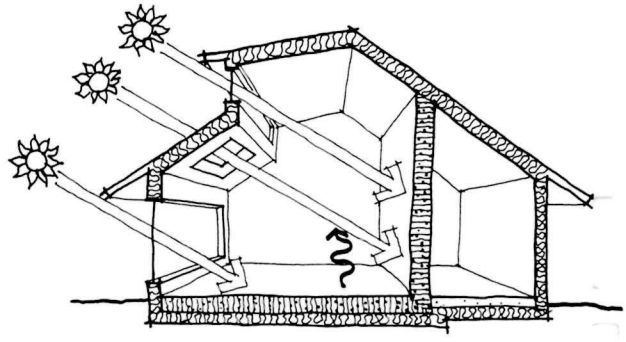
  4. Shading measures to obstruct solar gain in the summer.

  5. Ventilation and distribution measures to help provide comfort throughout the year.

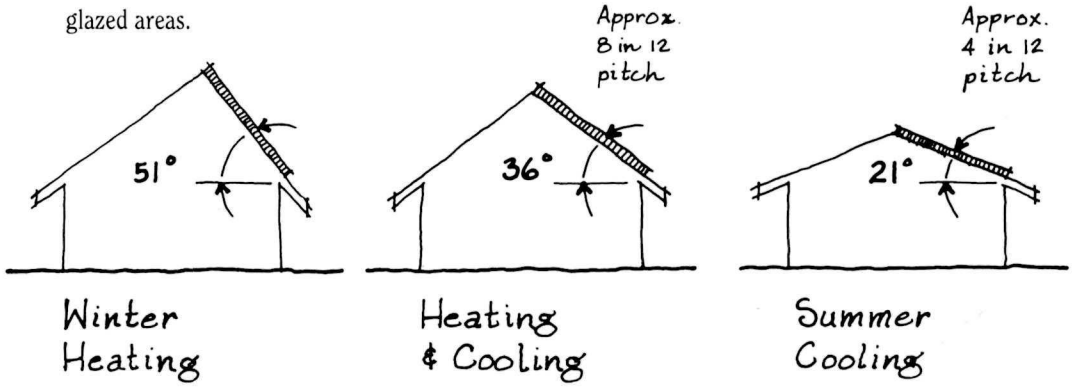
The sketches and dialogue which follow are intended to give some concepts and rules-of-thumb for passive solar design appropriate for Park structures. The primary passive solar system addressed in these guidelines is the Direct Gain type. The simplest and most common, the Direct Gain system can be incorporated without radically altering rustic vocabulary and materials. (For further information on solar applications, many detailed texts are available.)

1. SOLAR COLLECTOR/GLAZING:

For appropriate window design and configuration, see the section on Windows, p. 37.



Direct gain solar collectors: Solar Windows, Clerestory and Skylight.



Roof Pitches for optimum solar exposure.

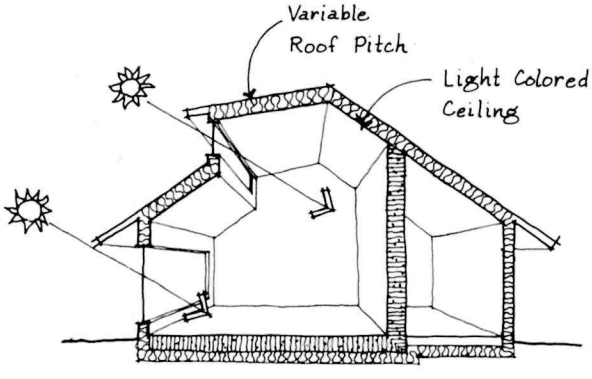
The three basic types of Direct Gain collectors are: solar windows, clerestories, and skylights.

Solar Windows

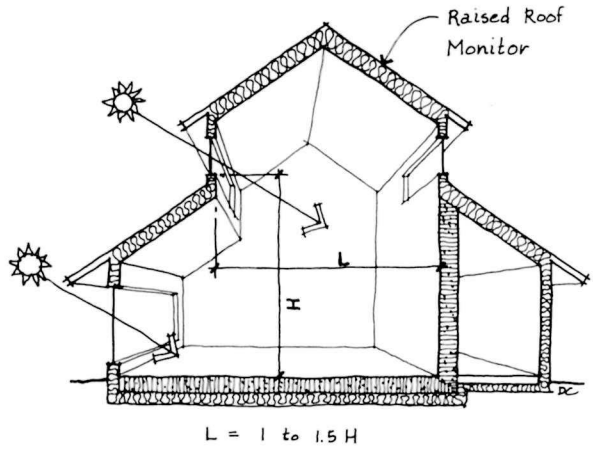
- The solar window, placed in the south-facing wall, can fit within the design parameters outlined in the section on Windows.
- Double glazing is recommended and low-E glazing should be investigated. All windows should be operable.
- The total amount of window area should be about 10% to as much as 20% of the total floor area of the building.
- 40% of the glazing should be oriented to the south.
- There should be minimal, operable glazing on the north (to promote ventilation and summer cooling).
- Rule of thumb: south solar glazing in the Grand Canyon area - .15 sf of glazing for each sf of floor area in the space.

Clerestory

- Not only can clerestories avoid problems of privacy and glare, they also permit light to penetrate deeper into the space to strike an interior thermal mass wall.



Clerestory: Eyebrow with Variable Pitch Roof.



Clerestory: Raised Roof Monitor.



Clerestory: Gable Dormer.

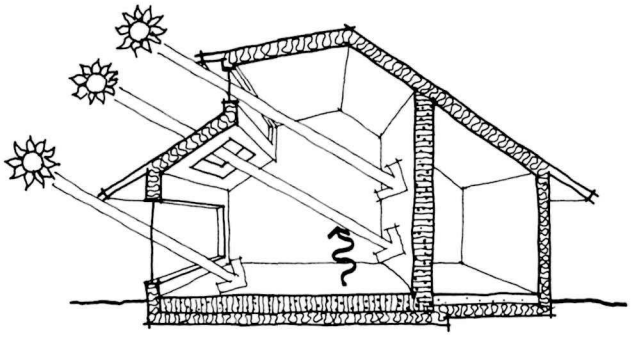
- In the typical evergreen-forested sites of the Grand Canyon, clerestories can receive unobstructed light when lower windows are in shade.
- The clerestory (as illustrated), using variable roof pitch eyebrows or raised roof monitors, is common in successful Grand Canyon structures.
- Location: Clerestories should be placed in front of the thermal mass walls at a distance of 1.0 to 1.5 times the height of the clerestory wall.

Skylight

- Unless there is both effective moveable insulation and summer shading, a skylight can be a net energy loser.

2. THERMAL STORAGE MASS:

As a general rule, if the south window area is greater than 8% of the total floor area, then thermal mass is needed to prevent overheating.



Thermal Mass : Wall or Floor.

Rule of thumb: There should be a minimum of 3 sf to 6 sf of thermal mass for every square foot of south-facing glazing. The more area of thermal mass, the less temperature fluctuation there will be in a daily cycle.

Happily, stone masonry (one of the most effective and durable thermal mass materials) is very appropriate within the Park. (See section on Elevations - Stone.)

Although the appropriate distributed mass required in an installation is variable, a thin, broad spread of materials is usually more effective than a concentration of materials in a small area. It is important to ensure that there is a balanced distribution of mass throughout a given space.

Due to the fact that storage mass is most effective when struck by direct sun, it should be placed so that it receives direct or diffuse sunlight for as many daytime hours as possible. If the storage mass relies only upon convected heat from the living area, it requires approximately four times the square footage of mass warmed by direct sunlight. In a design that allows for direct sunlight, storage mass placed in a vertical configuration is more effective than that placed in a horizontal configuration.

Rules of Thumb

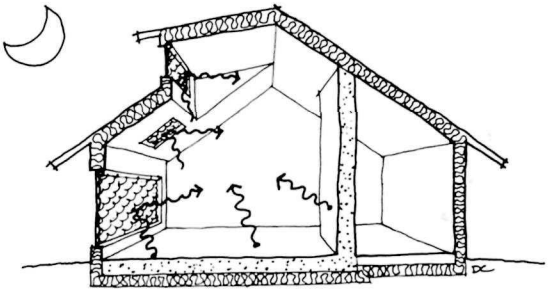
- **Floor Thickness:** Recommended thickness of storage floor material is 2" to 6" (generally 4").
- **Wall Thickness:** Storage wall thickness should be 2" to 4". Note: Thicknesses greater than 4" will increase performance, although not a great deal. At thicknesses greater than 8", performance can decrease.

Color and Finish:

- Masonry floors should be of a medium to dark color.
- Masonry walls may be of any color.
- Lightweight construction (little thermal mass) should be of a light color to reflect sunlight onto masonry surfaces.
- There should be no wall-to-wall carpeting over masonry floors.

3. INSULATION:

Fixed interior insulation R-values should meet or exceed applicable building code requirements.



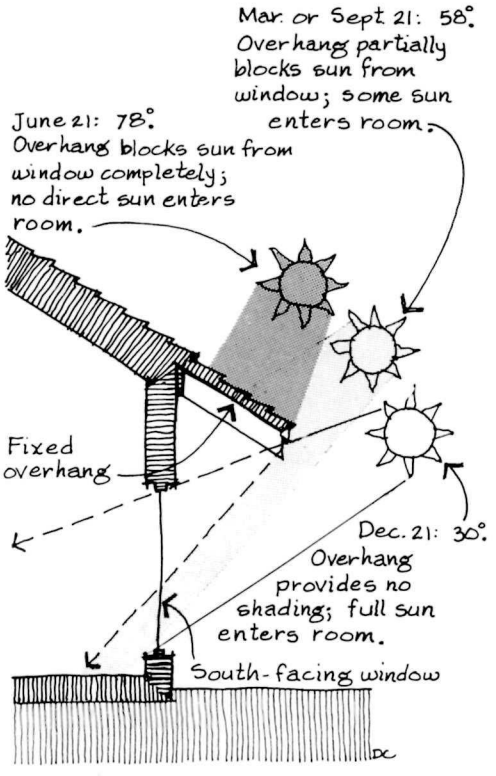
Moveable Insulation: On Direct Gain Windows, Clerestories and Skylights.

Insulation should be placed on the outside of any exterior wall which is used for Direct Gain Storage.

In order to significantly increase overall thermal performance, some form of moveable insulation over glazed areas should be provided for use during periods of heat loss.

Possible insulating devices over glazed areas include rigid panels, insulating shutters, and insulating drapes and shades. These devices may be hand or machine operated. In choosing an appropriate system, the willingness of the building occupant to become involved in day-to-day adjustments should be taken into consideration.

Moveable insulation on the inside of a structure is generally easier to operate and maintain, and does not interrupt the aesthetic rusticity of the building.



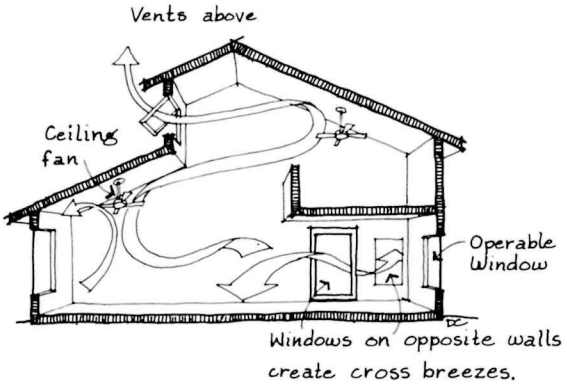
Shading: South Side Fixed Overhang.

4. SHADING:

Buildings with extensive south and west windows will severely overheat in the summer unless they are effectively shaded.

On the south side, a correctly-sized and located fixed overhang can allow for sun in the heating season while providing shading during the cooling season.

West exposure shading is best provided with internal shades, external trellis and vines, external adjustable shade screens, or tree plantings.



Ventilation: Windows on opposite walls create cross breezes.

5. VENTILATION:

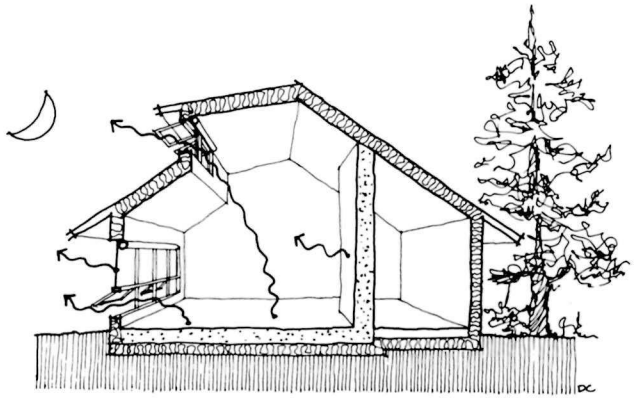
For health reasons, fresh air and proper ventilation is essential in the living space. Effective ventilation is necessary for summer cooling. Operable windows and vents, placed opposite each other and at different heights, capture natural breezes and improve air circulation and quality. Intake openings should be placed low on the windward wall, while larger, exhaust openings should be set high on the leeward wall. To capture cool intake air, windward openings should be well shaded by plants or shade structures.

Ceiling fans or a whole-house fan are an appropriate addition for those days which have no natural air movement. Centrally located fans

aid ventilation by drawing air into the attic. Internal air flow may be further increased by the addition of operable transom vents.

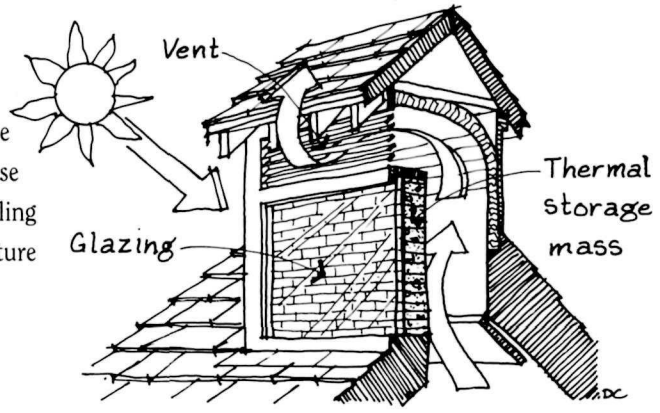
Radiant Cooling

- Passive solar systems that incorporate mass for thermal storage can often use this mass beneficially during the cooling season to lower the interior temperature of a house.



Ventilation/Radiant Cooling: Shaded by day, mass of building materials stored heat to sky at night; opening the glazing enhances heat transfer.

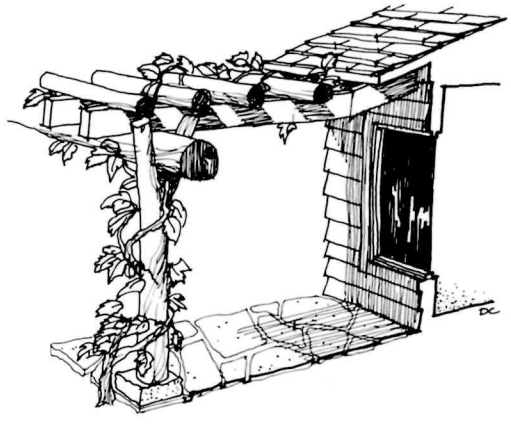
- Designed solely for the purpose of ventilation, passive solar thermal chimneys are being incorporated into buildings with increasing frequency. The enclosed space of the chimney, set high in the house, heats up, drawing a steady stream of cooler air in from the lower windows or vents. Because of to the thermal mass incorporated in the chimney, the system continues to work through the night.



Solar Chimney: Air heated in chimney escapes through vent, inducing cooling air flow in building below.



Shading: Tree on west side.



Shading: Trellis and vine on west side.

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NOTES





As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS D-293 September 1994

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