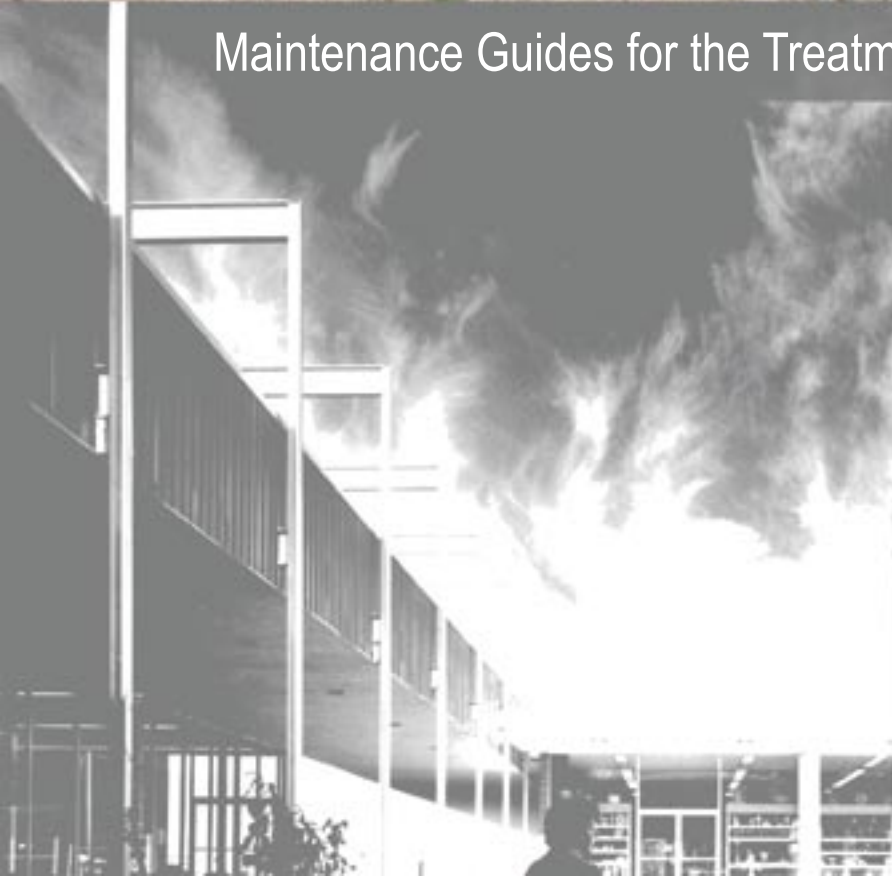




Maintenance Guides for the Treatment of Historic Properties

Petrified Forest National Park



Maintenance Guides for the Treatment of Historic Properties Petrified Forest National Park

Andrew Gorski and Michael Lovato

June 2005

National Park Service
Desert Southwest Cooperative Ecosystem Studies Unit (DSCESU)

and

The University of Arizona
Preservation Studies
College of Architecture and Landscape Architecture (CALA)

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Introduction

Petrified Forest National Monument was established in 1906 in recognition of its outstanding natural and prehistoric resources. Redesignated a National Park in 1962, Petrified Forest continues to serve as a premier location for conducting scientific inquiry and research, while inspiring visitors with its natural wonders and cultural artifacts.

Originally an isolated outpost with limited access, Petrified Forest National Park (PEFO) has become a heavily visited destination situated along a major interstate highway. With increased visitation came several significant periods of development, the most recent in the early 1960s, that brought new visitor, educational and residential facilities to the park.

Like the park’s natural and prehistoric cultural resources, these buildings, structures and designed landscapes are expressions unique to Petrified Forest National Park. Reflecting the different planning and design principles, environmental factors and economic conditions that have been influential in the development of Petrified Forest National Park, these buildings and landscapes have recently been recognized as historic and worthy of preservation.

With the significance of the historic resources at Petrified Forest National Park established, a comprehensive management plan has been implemented to help protect and preserve these resources. One of the primary elements to this historic resource management plan is an effective maintenance program that considers the historic importance of the resource. Envisioned to assist maintenance staff with understanding the park’s historic resources, basic preservation principles and appropriate maintenance techniques, the maintenance guides will be used in a variety of contexts to help preserve these important historic resources for the future.



Petrified Forest National Park map showing visitor centers and locations of turnouts along the park road. PEFO Official Map and Guide

Statement of Significance

Petrified Forest National Park

Petrified Forest National Park preserves, protects and interprets a globally significant example of a Triassic ecosystem, and a continuum of human use in a high desert / short grass prairie. It preserves wilderness values for re-creation, solitude, vistas, natural quiet, and night skies. It provides outstanding opportunities for scientific research and education.

Objectives

Objectives of the Guides

- ① To assist park personnel with determining appropriate maintenance and preservation treatments.
- ② To facilitate compliance undertakings between PEFO and the State Historic Preservation Office (SHPO).
- ③ To support the on-going efforts of PEFO in understanding and valuing its historic resources.
- ④ To be a dynamic tool and resource for park staff.
- ⑤ To improve the visual quality of the park.

References

Visual Quality of Built Environments in the National Parks, National Park Service: 1993.

Summary

As a comprehensive document identifying both strategic long-term planning issues and offering preservation treatments, the maintenance guides are an integral component of the park's overall comprehensive management plan for preserving its historic buildings and landscapes. In preparing this document, the research team tried to anticipate the numerous uses park staff would have for the Maintenance Guides. While the purposes identified below reveal a few of the objectives for developing the maintenance guidelines, more uses will most certainly be identified as the document is utilized by park staff.

① **To assist park personnel with determining appropriate maintenance and preservation treatments.** The guides focus primarily on the appropriate maintenance practices for the wide variety of historic resources in the park. The maintenance guides provide a broad overview of the buildings and their historic features while illustrating the appropriate and inappropriate techniques for preserving their historic characteristics.

② **To facilitate compliance undertakings between PEFO and the State Historic Preservation Office:** The document is structured to expedite compliance with the Section 106 review process required of the park before undertaking changes to historic resources. The document consolidates design guidelines and summarizes treatment approaches consistent with those outlined by the State Historic Preservation Office.

③ **To support the ongoing efforts by PEFO in understanding and valuing its historic resources.**

In recent years there has been an increased appreciation of National Park Service buildings and facilities for the contribution they have made to the stewardship of our natural and cultural resources. The maintenance guides build upon existing scholarship that has determined that both the Rainbow Forest Historic Landscape District and Painted Desert Community Complex are eligible for inclusion on the National Register of Historic Places (NRHP), by providing a synopsis on the history and architectural character of each resource.

④ **To be a dynamic tool and resource for park staff.** Just as the buildings at PEFO have adapted over time to changing park needs, natural decay and the social activity of the residents, the maintenance guides are designed to be a flexible document that can assume future changes. As additional management directives and preservation treatments become necessary, the document should be modified to reflect such changes.

⑤ **To improve the visual quality of the park:**

In a 1993 report entitled Visual Quality of Built Environments in National Parks, overall maintenance quality was identified as being the single most important element in the visual quality of the park (pg 13). Visitors often expect the visual quality of the park's built environment to be equal to that of its natural surroundings. Strategies have been included in the maintenance guides that could be used throughout the park to create a more consistent visual landscape.

Research in the National Park Service

The Cultural Resource Management Guidelines, NPS-28, used by resource managers throughout the Park Service stipulates that: *Research for identification, evaluation, documentation, and full understanding and interpretation of cultural resources is essential to informed decision-making for park planning and operations, including maintenance and visitor services (NPS-28, introduction).*

Research is integral to the on-going planning and stewardship responsibilities of the park's resource management and maintenance teams. The maintenance guides project is a research based initiative consistent with the goals of the National Park Service to have a full understanding of their historic resources. Used in conjunction with other planning and stewardship initiatives already completed or underway, the maintenance guides will assist Petrified Forest with developing a long-term plan for the management of its cultural resources.



Effective cultural resource management requires a multifaceted approach that includes research, planning and stewardship. *Source: NPS-28*

The maintenance guides are an outgrowth of several research and planning projects undertaken previously by the National Park Service. Of primary importance are determination of eligibility and nomination forms for both the Rainbow Forest Historic Designed Landscape District and The Painted Desert Community Complex Historic District to the National Register of Historic Places (NRHP). While both districts have been deemed

eligible for inclusion on the NRHP, they both currently have significant non-contributing buildings that require sensitive changes before they can be reevaluated for the NRHP. The maintenance guides are a key component in the management of these non-contributing resources by providing recommendations for addressing the concerns identified in the NRHP nomination forms.

Research Design

The maintenance guides were prepared by a team of graduate students studying architecture and historic preservation at the University of Arizona in Tucson. The project was completed under the direction of a faculty advisor and with the support of the National Park Service's Cooperative Ecosystem Studies Unit (CESU).

The research plan utilized for this project follows a model adopted for a wide range of projects by professionals working in the preservation field. Consisting of three main components: 1) on-site documentation and archival research, 2) evaluation and assessment of the resource and 3) the definition of a preservation strategy, the research model provided a framework for collecting information, examining the data, and making recommendations on the historic resources. This preservation and maintenance strategies proposed in this document are a synthesis of the existing data, our understanding of the preservation goals of the project and the technical realities of working on historic buildings that have been modified over time.

The Preservation Planning Process

- Documentation and Research
- Evaluation and Assessment
- Define a Preservation Strategy

References

NPS-28 Cultural Resource Management Guideline: www.cr.nps.gov/history/online_books/nps28/28contents.htm

Design Guidelines for the Downtown Overlay District. City of Durango, Colorado: 2004.

By combining an understanding of the history of the building, its present condition, and the need for action, one can then develop a preservation approach.

City of Durango Design Guidelines

An Overview of the Maintenance Guides

Typical Page Layouts and Organization of the Document

Summary

The information contained in the maintenance guides will be used by resource managers and maintenance staff for a variety of operatives related to the stewardship of the park's historic structures and landscapes. The organization of the document is based on an understanding of how park staff, particularly the maintenance workers, complete their work on a day to day basis. Illustrated with photographs, sketches and drawings, the document provides maintenance personnel a straightforward and easy to understand guide to the resources, their historic features and best practices for their maintenance. The document begins with a broad overview of general preservation principles and the design ideas behind the development of the Rainbow Forest and Painted Desert areas. Following these general introductory pages, the document contains pages for each historic resource, identifying design strategies and maintenance concerns specific to each. Stand alone cut sheets, designed for use in the field, provide guidance on preferred maintenance practices for each building material, system, or landscape element. The flexible nature of the maintenance guides should provide the park with a preservation tool that can be updated to accommodate changing priorities and new information.

Design Goals

Lists suggested design changes for the resource. More detailed information is provided in the design strategy and illustrated design goals. The symbol attached to each design goal identifies the criteria for each change.

Historic preservation
Refers to the historic characteristics of the building and the ability of the building to convey these characteristics. This priority is most often applied to architectural features that were insensitively removed, changed or need to be restored or retain the integrity of the resource.

Overall feeling and experience
Refers to changes that should be made solely to improve the experience of residents and visitors to PEFO.

Maintenance
Addresses the continuing maintenance concerns that demand significant time from maintenance, with the hope that the scope of these problems can be reduced with more permanent fixes.

Sustainability
Acknowledges that the construction, operation and maintenance of a building consumes a significant amount of resources and suggests strategies for reducing the impact of buildings on the environment.

Health
Highlights areas where health or safety risks may exist. Specialized training or equipment may be necessary to complete the task safely.

Quick Reference Sidebar

The grey sidebars introduce the user to the most important information found in that section of the document. Here, the user will find definitions, lists to related resources, including internet resources and links to other parts of the Maintenance Guidelines.

The Resource Name:

Gives the name and building number of the historic resource.

Building Background:

Provides a overview of the building's history, including date of construction, dates of major additions and modifications and any other information relevant to understanding the buildings evolution over time.

Painted Desert 220-222 Two Car Ports

Design Goals

- ① remove east facades
- ② remove wood paneling and replace with stucco or plaster
- ③ replace flashing with more appropriate flashing
- ④ replace obtrusive outdoor lighting
- ⑤ replace roof and scuppers
- ⑥ relocate ladder storage
- ⑦ add vertical flashing on unit PD222
- ⑧ lower impact of exterior conduit

Building Background

The two car ports were designed by Neutra and Alexander in 1961. Construction was carried out by the Rasmussen Construction Company and also completed in 1961. PD222 is the north most car port, PD221 the middle carport and PD221 the south most carport. Various alterations have been made to all the two car ports at unknown dates since their construction (figure 1). Frame partition walls have been added to all units. The east facade of PD220 has been completely framed in, obscuring the roof cantilever and support beam. The south port of PD221 has been framed in. PD222 retains the highest level of historic integrity as the east facade remains open and the cantilever un-obscured.

Design Strategy

The most important design feature of the two car ports is the cantilevered roofs and the posts and beams that the roof rests on. The eloquent way the roof is supported by and extends itself over the beam is the central point of drama in the original design. Since construction the structural clarity of the buildings has been obscured by the addition of partition walls and the framing of the east facades. Therefore, the cantilevers and posts and beams should be un-concealed in all two car ports. Framed partitions should be either removed or shortened to reveal their non-structural function. Of all the two car ports, PD222 retains the highest level of historic integrity. It should serve as a model for changes made to the others.

All wood paneling on the north facades should be either plastered or stuccoed and painted. Any accents, such as windows, doors or trim should be removed or repainted to match the color of the north wall.

Flashing should be not more than two inches in height painted to match the fascia, so as to blend instead of

serve as an accent.

Exterior lighting on the east walls of units PD221 and PD222 is obtrusive and should be replaced with lighting similar to that of PD220

The current foam roof should be replaced with a single-ply membrane roof. Roof drainage should be handled in a manner similar to that of other PD buildings with single-ply membrane roofs. Scuppers simple and durable.

Ladder storage and ladder storage hardware should be removed from units PD220 and PD222, repairing holes created in block from removal.

Flashing on the west wall of unit PD222 should be detailed similarly to that of PD 221, with the flashing continuing vertically down the wall.

Exterior conduit should either be moved to a less obtrusive location or painted to blend better with the block.



figure 1 - two car port as it looked when built

Maintenance References

- Stucco
- CMU-1
- Roofing
- Infill fenestration

Maintenance References

Lists the suggested maintenance practices necessary for completing the work outlined in the design goals as well as any cyclical maintenance necessary for the preservation of the resource. Individual pages for each maintenance item are found at the end of the document.

Design Strategy:

The design strategy includes a more detailed analysis of each design goal listed. The design strategy should be used along with the illustrated design goals found on subsequent pages to understand where changes should occur and how the changes should be accomplished.

Typical Page Layout for the Maintenance Cutsheets

CMU-1
In-Kind Replacement of Concrete Masonry Units

Inspection




Figure 1: Cracks in this wall are typical of those caused by the significant heaving and settlement of soils throughout the Painted Desert Complex. Damage to this wall is so severe that this wall cannot be repaired in place and should be reconstructed. (photo by author)

Evaluation




Figure 2: Footing and reinforcing should be adequate to support CMU. Verify footing depth and reinforcing with a structural engineer before starting new walls. (photo by author)

Inspection:

- Cracks and separations that indicate excessive differential settlement in the soil
- Excessive moisture at the base of the wall
- Loose or missing mortar

Evaluation:

- Can the repair be accomplished by repairing the existing block?
- or
- Does the entire section of wall need replacing?
- Is the footing and reinforcing appropriate for the wall?

Execution:

- Is replacement block similar in size, color and texture to the block being replaced?
- Is mortar the same color and hardness as existing?
- Are horizontal mortar joints tooled to match original?
- Does the vertical reinforcing align through the block?
- Is wall capped to prevent moisture from entering?

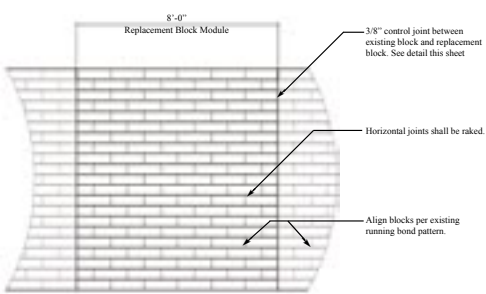
CMU-1 1

Inspection and Evaluation

When performing routine inspections of different building elements and assemblies, the inspection section directs the user to the most critical preventative maintenance concerns, identifying potential problem areas and those items requiring more detailed inspection. The evaluation section is where the level of maintenance required is determined. In evaluating the current condition of the resource, maintenance staff can establish priorities for the work needing to be completed.

Front

CMU-1
In-Kind Replacement of Concrete Masonry Units



8'-0" Replacement Block Module

3/8" control joint between existing block and replacement block. See detail this sheet

Horizontal joints shall be raked.

Align blocks per existing running bond pattern.

Execution




Figure 4: Inappropriate repair. Replacement block is randomly "toothed" into existing wall. Color and texture of the new block is emphasized by random replacement pattern. A more distinct separation, including a control joint, should exist between new block and the historic block. (photo by author)

In-Kind Replacement of Exterior CMU Walls

General Notes:

1. Replacement block shall be as approved by AZSHPO and verified by PEFO Historic Preservation Specialist. Replacement block shall be: Coral Lowboy (8 x 4 x 16) concrete blocks from Utility Block Company in Albuquerque.
2. Replace damaged walls in 8'-0" sections, separated from adjacent construction by 3/8" control joints.
3. Sealant at control joints shall match color of mortar.
4. Mortar joints shall be 3/8" thick. Horizontal joints, both interior and exterior, shall be raked 1/4" deep and vertical joints shall be finished by tooling to a slightly concave surface, with mortar bonded to the edge of the blocks. Verify mortar mix with structural engineer.
5. Wall shall be capped with 1" sloped concrete cap.
6. A structural engineer shall be consulted to verify location and size of footings rebar, grouted cells and bond beams.

Performed neoprene control joint full height of wall w/ sealant closure on both sides of joint.

Reinforce cores both sides of joint w/ continuous #5.

Discontinue all horizontal joints and reinforcement at control joints.

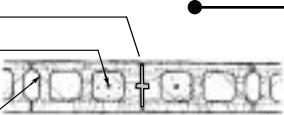


Figure 5: CMU Control Joint Detail. Provide control joints adjacent to existing construction and at a maximum of 8'-0" o.c. along walls.

CMU-1 2

Execution

On the back of each sheet are directions for completing the maintenance, repair and / or replacement of the material or building element. Historic drawings, sketches, photographs, notes and specifications may be included to provide detail on the work involved. More descriptive than technical, the execution section is designed to support maintenance staff's extensive knowledge of the different building trades and their many years of experience with maintaining the park's buildings and landscapes.

Back

Summary

The double-sided cutsheets describe the key preventative maintenance concerns and preservation treatments for individual building materials, building systems and landscape elements in the park. The cutsheets can be used for a variety of park maintenance tasks, from the routine inspection of buildings to more detailed explanations on how to repair and replace specific building elements. The cutsheets do not include instructions for tasks that may require special skills and equipment or that would require an excessive investment of the maintenance staff's time. The park will continue to utilize the Denver Service Center and / or Regional Office Staff to coordinate the production and execution of contract documents for these more intensive projects.

Individual cutsheets can be taken into the field to provide workers with a hands-on tool for completing maintenance tasks. When generating work orders, the cutsheets can provide a basic template for the scope of the work and what materials are necessary for completing this work.

To promote inquiry and interest in the maintenance of historic structures, the cutsheets often include questions that ask workers to probe more deeply into the materials and structures they are inspecting and maintaining.

The Role of Maintenance Staff

Objectives

- Value the Input of Maintenance Staff
- Develop a Maintenance Management System

Summary

Preservation relies on the valuable contributions of a dedicated park staff to successfully carry-out the objectives outlined in this document. Maintenance workers are, more often than not, the most knowledgeable people concerning a park's buildings and their performance. Engaged actively in the day to day operations of the park, maintenance workers become the best repository of information and knowledge concerning the buildings. Often, this valuable knowledge goes unrecorded and may be easily forgotten when training the future generations of park employees. Cultivating a maintenance system that values and institutionalizes this tremendous bank of knowledge will be valuable to both the maintenance staff and to the long-term management of the historic resources at Petrified Forest National Park.

Value the Input of Maintenance Staff

With an extensive knowledge of the repair / maintenance history of the buildings at the park, maintenance staff are the best qualified to determine both the day to day operations and long-term planning of park resources. At Petrified Forest National Park, a remarkable record of continuous service over several decades, including between 25 and 40+ years for several individuals, is an asset that few parks can match. The tremendous bank of knowledge owned by maintenance staff should be used to continually improve the practices being used to maintain the park's historic structures. With the ability to understand complex technical problems and devise creative solutions, maintenance staff possess expertise that extend well beyond general maintenance.

Develop a Maintenance Management System

Developing and implementing a maintenance management system provides the primary base of knowledge necessary

for managing the park's historic resources. Maintenance staff should have at their disposal information concerning the building's construction, previous maintenance practices and management guidelines for the historic resources under their care. The maintenance guides should compliment the other management systems already in place or being developed.

Moving Forward

The following suggestions may prove beneficial to maintenance staff and to the management and preservation of resources in the park:

- Create a schedule of resources requiring periodic inspection and cyclical maintenance.
- Document changes made to all resources, even if they are not yet considered historic Include before and after photographs.
- Utilize facilities management and computer aided design (CAD) software. Keep digital drawings updated as changes are made.
- Continually evaluate maintenance practices and make changes as necessary.
- Provide trainings to all staff that introduce new products, knowledge and treatments.

Understanding Historic Resources

Preservation Principles

Summary

This chapter provides an introduction to the terms, definitions and theories that support the practice of historic preservation. A basic understanding of historic preservation provides the user of this document with the context and rationale for many of the recommendations presented. Furthermore, it is hoped that by having a basic working knowledge of preservation terminology and practice, maintenance workers will be better able to resolve issues and situations encountered in the field that are not fully addressed in the maintenance guides.

Context

The Antiquities Act of 1906 established America's unique natural areas and culturally significant historic sites as places to be protected. President Teddy Roosevelt's proclamation provided the impetus for the establishment of the first National Parks and Monuments, including Petrified Forest National Monument. Administrative policies and guidelines created during this time, along with the subsequent formation of the National Park Service in 1916, provided the foundation on which the broader preservation movement was later established in the United States.

The practice of preservation was greatly expanded in 1966 with the adoption of the National Historic Preservation Act (NHPA). Under the NHPA, a number of important programs were formed that have fundamentally shaped the practice of preservation in the United States. The creation of the National Register of Historic Places (NRHP), helped create an ever-expanding list of prehistoric and historic properties deemed worthy of preservation for the contributions they make to our knowledge of America's history. The significance, or meaning attributed to the property, is constructed by evaluating the ability of a building, district or landscape to tell its history when weighed against a set of established criteria. In other words, the NRHP is a list

of those properties that are capable of telling a story about America that is considered worthy of preserving for future generations.

More specifically, properties listed on the NRHP must meet criteria establishing age, association and integrity standards. To qualify for inclusion on the NRHP, a property must be 50 years old or older. Reaching the 50 year threshold is considered important because it implies that a property has made a lasting contribution to the history of a place. Increasingly, however, exceptions are being made to the "fifty year rule" as the need to preserve buildings from the recent past has grown in the face of redevelopment and land-use policies that encourage demolition over reuse. Although the Painted Desert Community Complex at Petrified Forest, built in the early 1960s, is not yet 50 years old, it was recently determined eligible for placement on the NRHP to counteract the forces pushing for its demolition.

Evaluating a property for its *association*, the most subjective of the three criteria, includes considering what it is about the property that gives it significance. A property can be evaluated for its association within four general areas: a) an event or pattern of history, b) a person, c) distinctive architectural characteristics or for being completed by a master architect or builder and d) the ability to yield information. More specifics on how the buildings at Petrified Forest National Park satisfy the association criteria can be found in the character-defining features section of this document.

Integrity is the ability of a property to convey its significance. Dependent upon having a good understanding of the character-defining features and evaluated after the resource's significance is established, integrity is the criteria that validates the property's identity.

Online Resources

The National Park Service has developed a number of online resources and training materials pertaining to historic preservation. Throughout the Maintenance Guidelines, links to online resources have been provided when available. Having access to online resources is particularly valuable because they can often provide a more detailed and complete understanding of a preservation issue than can be covered in the Maintenance Guidelines.

A good place to start online is at:

<http://www.cr.nps.gov/toolsfor.htm#bui>

where the National Park Service has provided links to a number of excellent resources on understanding and preserving historic resources.

Preservation Principles

Integrity at the Painted Desert Community Complex

This section is meant to convey the importance of understanding the concept of integrity when evaluating resources. A more thorough discussion of integrity issues at the Painted Desert Community Complex is recorded in the National Register of Historic Places Nomination. While all aspects of integrity are maintained, “Unfortunately, some aspects of integrity of individual buildings, sites, and structures have been compromised as a result of their physical condition and insensitive changes” (NRHP-Sec. 7, pg.2). The following list provides a brief summary of the integrity concern for each of the categories used to evaluate integrity, as listed on the PDCC Nomination Form. (from NRHP-Sec.7, pgs. 2-6) Similar information exists for the Rainbow Forest Historic District and can be found in the NRHP Nomination Form for the District.

■ Location

High degree- original site, no buildings have been moved or relocated, with exception of original entrance station that was demolished in 83/84.

■ Design

High degree of integrity- maintains original structural systems, massing, arrangement of spaces and historical associations. Compromised by introduction of pitched roofs over the original low sloped roofs, altered fenestration and window openings, reorientation of select buildings, insensitive additions and alterations and a loss of landscape features.

■ Setting

Topography and surrounding vegetation remains unchanged. Inter-relationship between buildings and landscape remains unchanged. Original vegetation and landscape plan has been lost due to inadequate watering and neglect.

■ Materials

Majority of character defining materials remain- some erosion has occurred due to the application of unsympathetic materials and because the historic plantings are all but gone.

■ Workmanship

Workmanship is based on the use of the character defining materials and application standards, standardized construction assemblies and techniques, standardized building types and functionality. Examples are seen in the simplicity of design, clean lines, application of materials and standardized block laying. Loss of integrity is from buildings’ poor condition and loss of original landscape plantings. Poor workmanship was a problem from the beginning, resulting in several noted problems that surfaced during and shortly after construction, some of which continue to plague the complex today. Integrity of workmanship was compromised as a result of using low-bid contractors and less than adequate architectural direction on behalf of Neutra and Alexander.

■ Association and Feeling

A high level of the feeling and association of Mission 66 is preserved in the character defining features that are preserved. There has been some erosion of feeling as a result of loss of original vegetation that created a “desert oasis” experience.



Painted Desert Admin. / Visitor Center shortly after opening in 1963. PEFO Photo Archive #18421



Painted Desert Admin. / Visitor Center as viewed from the west in 2004. Photo by author

Painted Desert Administration / Visitor Center

The above example illustrates how integrity has been lost at the Painted Desert Admin. /Visitor Center. By adding a roof over the “spider legs’ on the north terrace, the character of the building has been changed significantly, thereby causing an erosion in the areas of design, materials, and feeling.

Summary

The Secretary of the Interior's Standards for the Treatment of Historic Properties "are intended to provide guidance to historic building owners and building managers, preservation consultants, architects, contractors and project reviewers prior to treatment." There are four primary treatments outlined in the standards: preservation, rehabilitation, restoration and reconstruction. This section is intended to give brief overview of each treatment. A more detailed explanation of each standard and how it should be performed is available on-line.

Definitions

Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate with a preservation project.

When the property's distinctive materials, features, and spaces are essentially intact and thus convey the historic significance without extensive repair or replacement; when depiction at a particular time period is not appropriate; and when a continuing or new use does not require additions or extensive alterations, Preservation may be considered as a treatment.

Rehabilitation or adaptive use: The act or process of making possible a compatible use for a property through

repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

When repair and replacement of deteriorated features are necessary; when alterations or additions to the property planned for a new or continued use; and when its depiction at a particular time is not appropriate, rehabilitation may be considered as a treatment.

Restoration: The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Reconstruction: The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Principles

- Preservation
- Rehabilitation
- Restoration
- Reconstruction

References

Secretary of the Interior's Standards:
www2.cr.nps.gov/tps/secstan1.htm

Applying the Secretary of the Interior's Standards

at Petrified Forest National Park

Summary

Determining when and how to use each of the Secretary of the Interior's Standards can be a complicated process. Often, the use of only one of the Secretary's Standards, especially in a place that has experienced many changes like PEFO, is unreasonable. Rather, resource managers and designers should follow the intent of the Standards, with an understanding that the Standards are only a guide.

French archaeologist, A.N. Didron, stated: "It is better to preserve than to restore, and better to restore than to reconstruct". Using this credo as a general rule of thumb should provide some insight into the appropriate treatment. The following list may serve as a list of "best practices" for the historic buildings and landscape elements in the park.

Rainbow Forest

- The overall treatment for the Rainbow Forest Historic District is preservation.
- Any changes to buildings should follow the standards for rehabilitation, paying particular attention to character defining features.
- Preserving the condition of materials should be a maintenance priority. Structures and features constructed of native sandstone are prone to deterioration from weathering, especially water.
- Restoration back to the period of significance may be appropriate for certain conditions. For example, replacing the existing aluminum windows with more historically accurate casements would help to return integrity to the buildings at Rainbow Forest.

Painted Desert

- The overall treatment for the Painted Desert Community Complex is preservation.
- Any changes to buildings should follow the standards for rehabilitation, paying particular attention to character defining features.
- New construction shall be distinguishable from the original historic structures. This includes the use of different materials and finishes for site features, including any screen walls that are added.
- Certain character defining features may never be restored for functional, economic or maintenance issues.

Park Road Landscape Elements

- A strict interpretation of the Secretary's Standards is not required for those elements located along the park road unless the resource is being managed as a historic resource
- It is probable that certain elements of the park road landscape will be changed. Any changes should maintain the character-defining features of the park road landscape, as described in this document.
- Any changes to turnouts and parking areas should be sensitive to the existing context and preserve elements of the existing built landscape that help create a cohesive visitor experience.

"It is better to preserve than to restore, and better to restore than to reconstruct".

A.N. Didron

Summary

While the maintenance guides cover the majority of conditions encountered at PEFO, there will most likely be conditions not accounted for in this document that will require a more detailed evaluation by maintenance staff.

A complete investigation of a resource and its current condition can help to better define the scope of work, decreasing the chances of finding surprises once construction begins. Encountering unforeseen circumstances once construction begins often leads to unexpected costs and lead to decisions that are inconsistent with the overall management plan for the resource. This section highlights the research, documentation and inspection process necessary to the pre-planning stage of any preservation project.

Compiling Historical Documentation

Often there is a wealth of historical documents, building specifications and photographs that “serve as the basis for the visual inspection that will confirm, refute, or augment the recorded information” (Swanke Hayden Connell, p. 37). Petrified Forest maintains excellent resources on their classified structures, including extensive drawing files, a database of historical photos, and a dedicated maintenance staff with extensive knowledge of the park’s historic resources. Collecting the documented history of the building provides a basic understanding of the design intent and construction system used in the building. Additionally, any documentation that traces the changes in the building since construction is valuable to understanding the current condition of the resource.

Complete A Field Survey of Existing Conditions

The field survey of existing conditions includes a walk-through of the structure and site using noninvasive techniques to evaluate and document the existing conditions of individual building elements or systems. Used in concert with the historical documentation collected, the field survey helps to determine the resource’s existing condition. During this investigation, a more accurate scope of work can be determined based on a more complete understanding of the most appropriate preservation treatment for the work to be completed. Documentation in the form of field sketches and photographs are commonly used to provide an understanding of the existing conditions.

Perform More Detailed Investigations of Materials and Assemblies, When Necessary

When a visual inspection cannot establish the condition of a building element or assembly, specialized tools and techniques may be required to locate and determine deterioration or damage. Preservation consultants with the ability to test existing materials and assemblies using noninvasive techniques such as thermography and impulse radar should be utilized before more invasive investigations are attempted. Often, materials can be sensitively tested on-site or in a laboratory with little or no damage to the resource. When invasive techniques are necessary, it is best to limit the test area to those away from public view.

Key Points

Pre-planning Includes:

- ① Compiling Historical Documentation
- ② Complete a Field Survey of Existing Conditions
- ③ Perform More Detailed Investigations of Materials and Assemblies, when Necessary.

References

Historic Preservation: Project Planning and Estimating. Swanke Hayden Connell Architects. Kingston, MA, R.S. Means Company, Inc. 2000. ISBN 0-87629-573-1

Sustainability

Definitions

Sustainability:

Meeting the resource needs of today without sacrificing the needs of future generations.

Priorities

- Conserving Resources
- Healthy Indoor Environments
- Life-Cycle Maintenance

References

Guiding Principles of Sustainable Design- National Park Service, Denver Service Center, 1994.
www.nps.gov/dsc/d_publications/d_1_gpsd.htm

National Park Service Envirofacts:
www.nps.gov/renew/envirofact.htm

United States Green Building Council (US-GBC) www.usgbc.com?

Summary

Increasingly, sustainable practices are being incorporated into preservation projects. Sustainability is often defined as meeting the resource needs of today without sacrificing the needs of future generations. Sustainability acknowledges that natural systems around the globe are stressed from over consumption, pollution and environmental degradation. The benefits of aligning historic preservation and sustainable design are numerous, including increased building efficiency, healthier indoor environments, improved durability and lower maintenance costs. A maintenance plan that incorporates sustainable practices can greatly benefit the park's historic resources, its visitors and employees and our planet.

Background

Petrified Forest National Park is located in a high desert environment, typified by harsh sun and wind, low rainfall and a lack of natural vegetation. While the planning of both the Rainbow Forest and Painted Desert Community was sensitive to the natural conditions, increasingly there is a need for the buildings to perform more efficiently to address the growing scarcity of natural resources and to enhance their livability and useful life. The National Park Service publication, *Guiding Principles of Sustainable Design* provides a great introduction to a wide range of sustainable design principles and practices. The list included below should be considered a jumping off point for including sustainable strategies in historic buildings. Strategies other than those listed may be appropriate and should be included in the preservation of historic properties.

Conserving Resources

- Install energy efficient appliances and lighting. Use motion detectors to reduce the time lights are left on.
- Use sustainably produced materials that incorporate recycled materials into their manufacturing process and that can be easily recycled.
- Install low flow fixtures in bathrooms and kitchens.
- Consider installing cisterns to harvest water for irrigation, especially at the Painted Desert Community Complex, where expansive soils retain water and have caused structural damage to buildings.
- Reuse or recycle used building materials.

Healthy Indoor Environments

- Use low VOC paints and floor coverings that don't off-gas. Consider products made from all natural materials, such as linoleum and jute.
- Install operable windows to allow natural ventilation.
- Use cleaning products that won't damage the environment and are healthy for residents and visitors

Life-Cycle Maintenance

- Install interior finishes that are durable and that will last for many years. Initial cost should be weighed against the life expectancy of the product.
- Install systems and finishes that require a minimum of maintenance and upkeep.

Character Defining Features

Introduction

Summary

Identifying character defining features is an important component of the preservation and stewardship of historic resources. It is the character defining features, including the overall shape of the building, its materials, craftsmanship, decorative detail and interior spaces, that provide us with the best understanding of a building.

Failure to preserve the character defining features, including historic materials, of a building can irreversibly damage any opportunity for the building to obtain historical significance.

Identifying Character Defining Features

A couple points to keep in mind when identifying character defining features are:

- Would the overall appearance of the building be changed noticeably if the feature were changed or removed?
- The character defining features should be considered holistically, as the importance of a character defining feature is only as great as the overall integrity of the building. For example, at the Painted Desert Community Complex, even though many of the roof cantilevers have been retained, the exterior walls supporting the cantilevers have been changed from having areas of large glass expanses to solid partitions, reducing the impact of the cantilever.

A Three Step Process

The National Park Service recommends a three step process for identifying character defining features. The process recommends starting at the largest scale of the building, at the site level, moving next to exterior construction details, before looking ultimately at interior features.

① Identify the Overall Visual Aspects

When identifying the overall visual aspects of a building or complex of buildings, it is important to consider the setting, shape, roof and roof features, projections, recesses, openings and materials. Visual characteristics, such as texture, color, and any hierarchy to the exterior features may also be important at the overall scale.



View towards Painted Desert Community Complex from the southeast showing the overall orientation and scale of buildings at the site scale. *PEFO Photo Archive*



Rainbow Forest #52A-C viewed from the east. Note the texture of the rough faced stone used to construct walls and the smaller projections used to break up the building mass. *PEFO Photo Archive #15678*

Definitions

Character Defining Features:

The distinguishing elements of a building, including the materials, predominant physical features and interior spaces that contribute to its overall visual quality.

Identifying Character Defining Features

- ① Identify the Overall Visual Aspects
- ② Identify the Visual Character at Close Range
- ③ Identify the Visual Character of Interior Spaces, Features and Finishes

References

NPS- Preservation Briefs #17

Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character.

<http://www2.cr.nps.gov/tps/briefs/brief17.htm>

Walk Through Historic Buildings

<http://www.cr.nps.gov/hps/tps/walkthrough/index.htm>

Identifying Character Defining Features

② Identify the Visual Character at Close Range:

Analyzing the building at arm's length reveals construction details, the quality of craftsmanship, and insight into the characteristics of the materials used, including surface color and texture. At this level of detail it will be possible to see how different materials are combined to create the form and texture seen at the largest scale.



Painted Desert Residential Unit 208. At this scale, it is possible to see how materials come together, like the aluminum windows and roof overhang and the contrast between the smooth stucco walls and brown concrete blocks. *Photo by author*

③ Identify the Visual Character of Interior Spaces, Features and Finishes:

The way that interior space is divided and the relationship between spaces is an important feature. With the advent of modernism, spatial organization became more fluid with a desire for less interior partitions and more connection between interior and exterior space. Looking at interior finish details, such as window and door frames and casings and floor and wall finishes are also important character defining features at the smallest level of detail.



Painted Desert Community Complex detail at interior door jamb. This detail shows the how interior door jamb's are recessed from the drywall surface of interior walls. It also shows Neutra's attention to how a frame is constructed and how his use of materials created a very light and natural feeling on the interior. *Photo by author*

Definitions

Shape:

The primary means by which we recognize and identify the form of an object. Seen as a line that separates a form from its background.

Color:

The hue, intensity and tonal value of a form's surface; color is the attribute that most clearly distinguishes a form from its environment. It also affects the visual weight of a form.

Texture:

The surface characteristics of a form; texture affects both the tactile and light-reflective qualities of a form's surfaces.

From: Ching, pgs. 50-51

Rainbow Forest Historic District

Character Defining Features

Background

The “Rainbow Forest Historic District”*, noted for its petrified wood specimens, is located at the southern end of Petrified Forest National Park. Sited above Jim Camp Wash, Rainbow Forest Historic District served as park headquarters from the 1930s until the completion of visitor services at the Painted Desert Community Complex in the early 1960s. Today, important visitor amenities, including the Rainbow Forest Museum and Lodge attract large numbers of visitors to this unique area of the park.

Rainbow Forest Historic District maintains many of the historic features and spatial patterns associated with its development. The development patterns utilized at Petrified Forest National Park during the 1930s are consistent with planning principles being used throughout the National Park Service during this time period. At Petrified Forest, these principles include:

- Central plazas defined by buildings
- Buildings that harmonize with natural features

Additionally, the buildings at Rainbow Forest feature attributes derived from the cultural and building traditions of the region, including:

- The use of native dressed sandstone
- Building forms reminiscent of Puebloan structures

Finally, the district is notable for several small-scale features and landscape elements, including:

- Historic wrought iron fencing
- Sandstone walls and curbs

An expanded discussion of the character defining features at the Rainbow Forest Historic District is available in the Cultural Landscape Inventory for the Rainbow Forest Complex completed in 1999.

The following pages illustrate the major character defining features of the Rainbow Forest Historic District.



The central plaza was originally oriented axially to bring prominence and a sense of importance to the Rainbow Forest Museum (RF Museum shown in background of 1934 photo above) Although the parking and vehicular layout of the plaza has changed over time, the plaza maintains its presence and many of its historic features. *PEFO Photo Archive*

Character Defining Features

- Early Park Service Planning Principles
- Rustic Design and Construction

Definitions

Historic Designed Landscape: “A landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles, or an amateur gardener working in a recognized style or tradition. The landscape may be associated with a significant person(s), trend, or event in landscape architecture; or illustrate an important development in the theory and practice of landscape architecture. Aesthetic values play a significant role in designed landscapes. Examples include parks, campuses, and estates.”

References

NPS-Preservation Briefs #3 Protecting Cultural Landscapes
<http://www2.cr.nps.gov/tps/briefs/brief36.htm>

*In 2001, Rainbow Forest was officially listed on the NRHP as the “Rainbow Forest Historic Designed Landscape”. Because the park is currently managing the area as a “Historic District” and is pursuing nomination of the area as the “Rainbow Forest Historic District,” the area will be referred to as a “Historic District” in this document.

Early Park Service Planning Principles

Central Plaza Defined by Buildings



Photo by author

Buildings Harmonize with Natural Features



Photo by author



PEFO Photo Archive

Buildings placed in natural topography



Photo by author

Central Plaza in Residential Area



PEFO Photo Archive

Rainbow Forest Historic District

Rustic Design and Construction and Small Scale Features and Landscape Elements



The regularly shaped sandstones and solid stone lintels were used to create a rustic design aesthetic throughout the Rainbow Forest Historic District. Windows were steel casements, recessed from the surface of the wall, creating deep shadow lines reminiscent of Puebloan structures. *PEFO Photo Archive #15750*



Construction photo of Rainbow Forest buildings showing sandstone masonry construction. *PEFO Photo Archive #15867*

Summary

Rustic Design and Construction includes the use of native sandstone, dressed to a roughly rectangular shape, and placed randomly in box like structures showing influences of Ancestral Puebloan structures found throughout the region. Stone lintels were used in the earliest buildings to span openings, while later construction includes poured-in-place concrete lintels.

Small scale features, including wrought-iron fencing and sandstone curbing carry the rustic design aesthetic to landscape elements and help to integrate the buildings into the landscape.



Small-scale landscape elements, such as the historic wrought iron fencing shown above, helps separate the public from the private areas while maintaining the visual connection through the landscape. *PEFO Photo Archive #15693*



This photo from 1963 shows the small scale features, like sandstone curbing and how it harmonizes with the prominent RF Museum. The almost total absence of vegetation, especially at the entrance to the RF museum, should be noted. *PEFO Photo Archive #15728*

Painted Desert Community Complex Historic District (PDCCHD)

Character Defining Features

Background

The PDCCHD was designed by Richard Neutra and Robert Alexander. Neutra was a prominent architect in the early to mid twentieth century, known as America's leading designer in the Modern style. His architecture relied on proportion and massing to achieve beauty instead of decoration. He was also a strong proponent for the use of modern materials and construction methods. His architecture is known for its use of modern technology to allow for a more direct relationship between exterior and the interior. The Painted Desert Community Complex Historic District was listed on the National Register of Historic Places (NRIS #05000248) on April 15, 2005.

Siting and Building Layout

The character of the PDCCHD is defined at the largest scale by its layout on the site, manifested in its unique way of handling place-making in extremely barren and windswept environment. Instead of residences that sit alone on a lot, the residences are arranged in rows where all windows were originally focused on an interior courtyard. This allowed for the resident to create their own private oasis inside their house, whereas had their house sat in the middle of a lot, they would have had the daunting landscaping task of trying to mediate the vast nothingness right outside their door. This focus towards the interior courtyard allowed for the house to be exposed to a flexible exterior space, while still affording a great deal of privacy to residents sharing three walls with their neighbors. The tightly sited row housing also minimizing the amount of natural landscape that had to be disturbed. The siting of the public areas also works much in the same way. In the original plans, visitors entered the central plaza before entering either the curio shop, restaurant, or visitors center. By using fully glazed facades facing the plaza, the spaces of the public buildings are visually connected to the plaza and to each other.

Also the PDCCHD's character is defined at a large scale by the division of public and private spaces. Public and private spaces are mediated by the use of differing plazas throughout the complex. The most public space being the Central Plaza, where visitor and park staff mingle freely. The more public administration and customer service areas of the park are located at the south of the complex, while the more private residential areas are located towards the north of the complex. The two zones are separated by a large "natural" plaza that is graded to maximize visual privacy between the two areas. The two areas are connected along the east by a row of connected buildings and covered walkway. The functions of these buildings also become more private as you move north; from the community building, which was used primarily by park staff, but occasionally by visitors, to the school building which served the community's resident children. The residences were designed in blocks that create wind-protected plazas serving all the surrounding residences, to the most private plaza, inside the residences that can serve as each residents personal oasis.

Building Form

The buildings of the PDCCHD are long and low. Their extended horizontal massing suggests the great expanses of surrounding landscape, where views seem to go on for eternity. Focus is brought to important areas by the convergence of these long horizontal lines, such as the area where the Fred Harvey Building and the Visitors Center Building come together. No mistake as to where to go is made by the visitor entering the complex, because literally, all lines point to the same place. Low slope roofs, originally free from mechanical equipment, and cantilevered overhangs help to accentuate this affect on many facades, while providing shade to the walkways and adjacent buildings. The cantilevers were unsupported

Character Defining Features

- ① Siting in response to wind-swept conditions and a desire to preserve undisturbed land
- ② The use of plazas and courtyards to define public and private space
- ③ Covered walkways
- ④ Long, low building mass
- ⑤ Low slope roofs
- ⑥ Cantilevered overhangs
- ⑦ Aluminum frame windows and hardware
- ⑧ The use of technology to mediate interior and exterior space.
- ⑨ Brown CMU
- ⑩ Plaster/stucco
- ⑪ Structural steel "spider legs"

Definitions

Modern architecture: "Modern Architecture arises from an accurate analysis of the needs of modern society and represents the logical solution of the problem of shelter achieved by the direct application of means to an end; it expresses the spirit of the machine age; it is the architecture of industrial living. It is based on a study of scientific resources and the exploitation of new materials." John Summerson Heavenly Mansions, p. 196, 1963

originally in order to create a “floating” effect that also helped to suggest the extension of the buildings across the timeless landscape.

Covered walkways are used to provide shade in the areas where one is transitional between the more public spaces to the more private spaces.

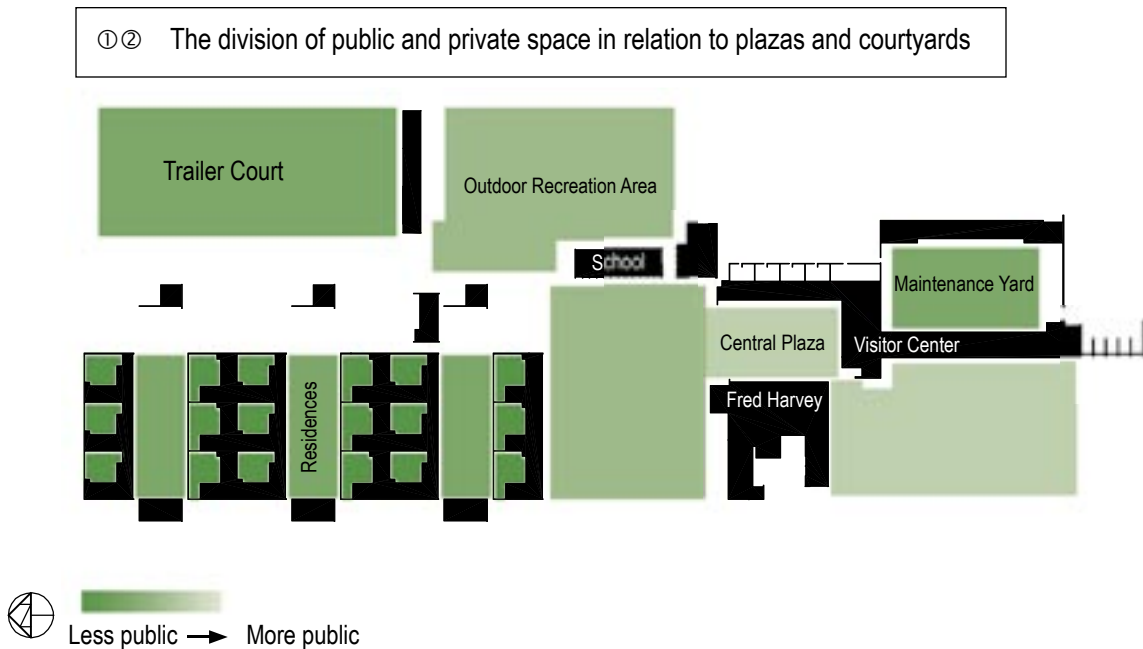
Originally most windows were configured in one of three ways. One configuration was strips that ran the entire length of the facade, as in the second story of the apartment building, or the school building. The next configuration is glazing that encompasses the entire wall, as in the original Fred Harvey Building, or in the Visitors Center. In private areas of high traffic, as in the south facades of the residence blocks, eyebrow windows were used to provide light while maintaining privacy. The only south facade where this configuration still remains is that of residence Block A.

Another important character defining feature of the PDCCHD is the use of then-modern technology to blend the line between interior and exterior spaces. This is still visible in residence 208, where the original sliding glass wall still functions, or in the community building where an electric roll-top door is used to open up the entire west facade of the building. The blending of interior and exterior space is also achieved by the use of glazing on the entire facades of the original Fred Harvey Building and Visitors Center.

Materials

The most identifiable material used in the PDCCHD is the brown, pumice aggregate, 8” x 4” x 16” concrete masonry unit that comprises most of the walls. Plaster was used as a finish in several areas, including the interior

of the community building, and the strip on the south facades of the residences that contained the eyebrow windows. Also prevalent is the use of many different forms of aluminum frame fenestration, either storefront or sliding sash windows or doors. Lastly, steel is used to form the structure and define the terraces of the Visitor Center and Administration Building or as pipe columns that support the covered walkways.



PDCCHD Character Defining Features Illustrated

⑥ Cantilevered overhangs shade strip windows and help suggest a continuation of the building

④ Long low building mass

⑦ Strips of aluminum sliding sash windows



Apartment Building east facade c.1963 PEFO Photo Archives photo by Stitt

⑤ Low slope roofs accentuate horizontality



③ Covered walkways provide a shaded transition between visitor areas and more private residential areas

Covered Walkway and School Building looking south-east 2004 Photo by author



Residences Block A south facade 2004 *Photo by author*

⑩ These structural steel “spider legs” were once a major architectural feature

⑩ Plaster is used to accentuate the horizontal facade

⑨ This brown, pumice aggregate, 8” x 4” x 16” concrete masonry unit is the basic building block for the entire PDCCHD



Visitor Center and Fred Harvey Building 1963 *PEFO Photo Archives photo by Beinlich*

⑨ The sliding glass wall that still remains in residence PD 208 is one of the best examples of how new building technologies were used to help blur the barrier between “inside and outside”



Residence 208 sliding wall 2004 *Photo by author*

Park Road Landscape

Character Defining Features

Summary

This section illustrates the character defining features* of the park road landscape and the associated landscape features located along the twenty-eight mile road that connects the south and north entrances to the park. Most of the park road and related features are not considered historic resources. Nevertheless, maintaining and preserving the earlier features of the park road is extremely important in the overall management of the park. Because visitors experience much of the park's natural and culturally significant features while driving and stopping along the road at its numerous overlooks, interpretive sites and trailheads, the park is committed to improving upon the positive attributes of these important features.

The park is currently making minor changes to many of the landscape features in the park. Some of these changes include the modification of landscape walls, trails and barricades, as well as, the development of new pullouts and interpretive signage. Hopefully, such improvements will decrease the labor and cost of maintaining these features, while improving the visitor experience.

Natural Landscape is Dominant

The natural landscape is the prevailing matrix along the park road. The built environment is overshadowed by the immense scale and visual dominance of the natural environment. Distant views of large scale geologic formations are present throughout the park. Natural vegetation consists of low shrubby plants and grasses, except in riparian areas where a larger diversity of species exists.



Uninterrupted vistas abound in the park. *Photo by author*



Natural vegetation is sparse and limited, consisting mostly of low ground cover and grasses. The roadside vegetation pictured above benefits from the additional runoff generated by the impervious surface of the road. *Photo by author*

Character Defining Features*

- Natural Landscape is Dominant
- Integration of the Built Environment with the Natural Landscape
- Use of Materials Reflective of the Period of Development
- Inconsistency in the Treatment of Individual Features has Created an Ununified Whole **

*Because most of the elements and structures located along the park road are not considered historic, the "character-defining features" listed in this section are not binding but meant to illustrate those current features that should be maintained or built upon when working in these areas. For those elements of the park road that are historic, including those around PDI, separate management and maintenance guidelines may apply and should be consulted as necessary.

**Inconsistency is listed as a character defining feature because it currently contributes to a visitor experience that is somewhat disjointed. While a completely consistent and unified landscape is not possible and not necessary, cohesiveness between the various overlooks and pullouts is desirable. The focus of the landscape guidelines for the park road is to suggest treatments that will begin to unify some of the design and maintenance treatments utilized along the road.

Park Road Landscape

Integration of the Built Environment with the Natural Landscape

Summary

The design and construction of landscape features has largely been done sensitively to compliment, rather than, detract from the power and beauty of the park's natural setting. This has been achieved through the sensitive placement and scale of elements in the landscape that blend into the natural topography. When the construction of major structures was necessary, they were sited away from major viewsheds or included transparent areas allowing views through to the landscape beyond.



Puerco pumphouse is placed away from major viewsheds.
Photo by author



The Puerco checking station (now used as a comfort station) had a glazed central area which allowed views through to the landscape beyond. *PEFO Photo Archive*

An emphasis on horizontal lines, which mimic the natural physical formations seen in the park's landscape, help to integrate small scale features with their larger environment. The use of low, landscape walls, generally under 24" in height, compliment the natural landscape in color and texture. Additionally, the transition from mostly man-made elements at the road surface to the natural stone surface of the landscape walls helps to integrate the designed with the natural landscape.

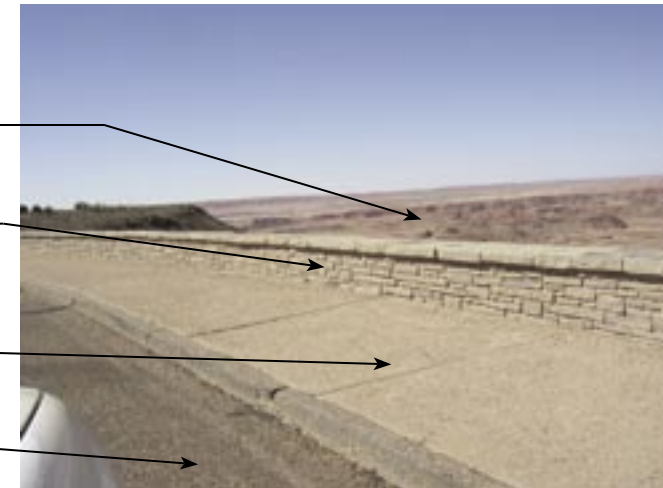
Definitions

Landscape Features:

Elements constructed by the Park Service to assist with visitation to the park, including: entry stations, comfort stations, landscape walls and walks, trails and interpretive signage.

Transition from man-made to the natural
Most man-made
Most natural

natural landscape beyond
natural stone landscape wall
Exposed aggregate walk
Asphalt parking lot



The design of landscape elements, such as this low wall, reinforces the distant views available along the park road. The transition from man-made materials, such as asphalt paving, to more natural materials, like the stone walls, helps to ease the effect of man-made elements on the park's natural landscape. *Photo by author*

Park Road Landscape

Use of Materials Reflective of the Period of Development



Stonework was used for the curbs and landscape walls at early park landscape features, such as the area around Puerco Pueblo, shown above. *Photo by author*



Exposed aggregate concrete and poured in place concrete were used during the construction of landscape features built in conjunction with the development of the Painted Desert Community Complex. Pictured above is the entrance sign located at the north end of the park. *Photo by author*



This construction photo from Tiponi Point shows stone being used as a veneer over a concrete wall. This construction system is still widely used throughout the park and is appropriate for new construction. *PEFO Photo Archive*



The color and texture of materials used in landscape elements is an important characteristic and should be considered when introducing new materials. The earthy clay hue and coarse pebble finish of the entry sign at the north end of park results in a unique design element that should be maintained. *Photo by Author*

Summary

A variety of materials have been used in the construction of landscape features along the park road. These different materials, and related construction techniques, helps to distinguish early landscape features from those constructed later in the park's development. In the construction of new landscape elements and the renovation of several existing areas, an understanding of the existing palette of materials and how they can be used is critical to improving the overall visual quality of the park road landscape. Early overlooks and transportation features were constructed with the rustic stone and more natural building materials utilized throughout the Rainbow Forest Historic District. Likewise, landscape features constructed in conjunction with the Painted Desert Community Complex showcase materials associated with modernism, including poured-in-place concrete and concrete with an exposed aggregate finish.

Incorporating new materials into the existing palette of materials, should compliment the features of the materials already used in the park. The texture, color, scale and massing of existing elements should be considered carefully when introducing new materials into the park landscape. More specifics on material choices is located in the design guidelines for landscape features located in this document.

Park Road Landscape

Inconsistency Creates an Ununified Whole

Summary

The park road landscape currently fluctuates between a landscape of carefully conceived and crafted elements to a hodgepodge of landscape elements with little overall clarity. The overall visual experience of the park road landscape would benefit from guidelines that suggest solutions to bring these disparate elements together in more harmonious ways.

Recognizing and responding to the different elements of the park road landscape presents several design challenges. The photos provided in this section illustrate some of the existing and potential problem areas encountered while touring the park road and associated transportation features. Through identifying some of the design issues that currently plague the park road landscape, it is hoped that current and future changes to this landscape will be more successful at creating a quality visual experience. The design guidelines contained later in this document provide suggestions for addressing some of the inconsistencies identified in this section.



The entrance to the Long Logs trail head reveals the challenge of modifying existing landscape elements. The addition of unadorned concrete walls contrasts sharply with the older stone piers that remain from the entrance to a vehicular road since abandoned. While the use of concrete in this situation is not an unworkable solution, it does illustrate the need for more careful consideration of its visual qualities and how they react with more rustic materials. *Photo by author*



Underdeveloped pullouts, such as this one located adjacent to The Tepees will require a careful design solution that responds to other features along the road. *Photo by author*



Landscape features built in recent years often overwhelm the natural landscape and lack the natural aesthetic of earlier features. In responding to current transportation regulations that require wider lanes, the Jim Camp Wash Bridge completed in 2002, became a more significant element in the landscape. Also, of note, is the use of monolithic concrete walls that lack the texture and color of earlier features found in the adjacent Rainbow Forest Historic District. *Photo by author*



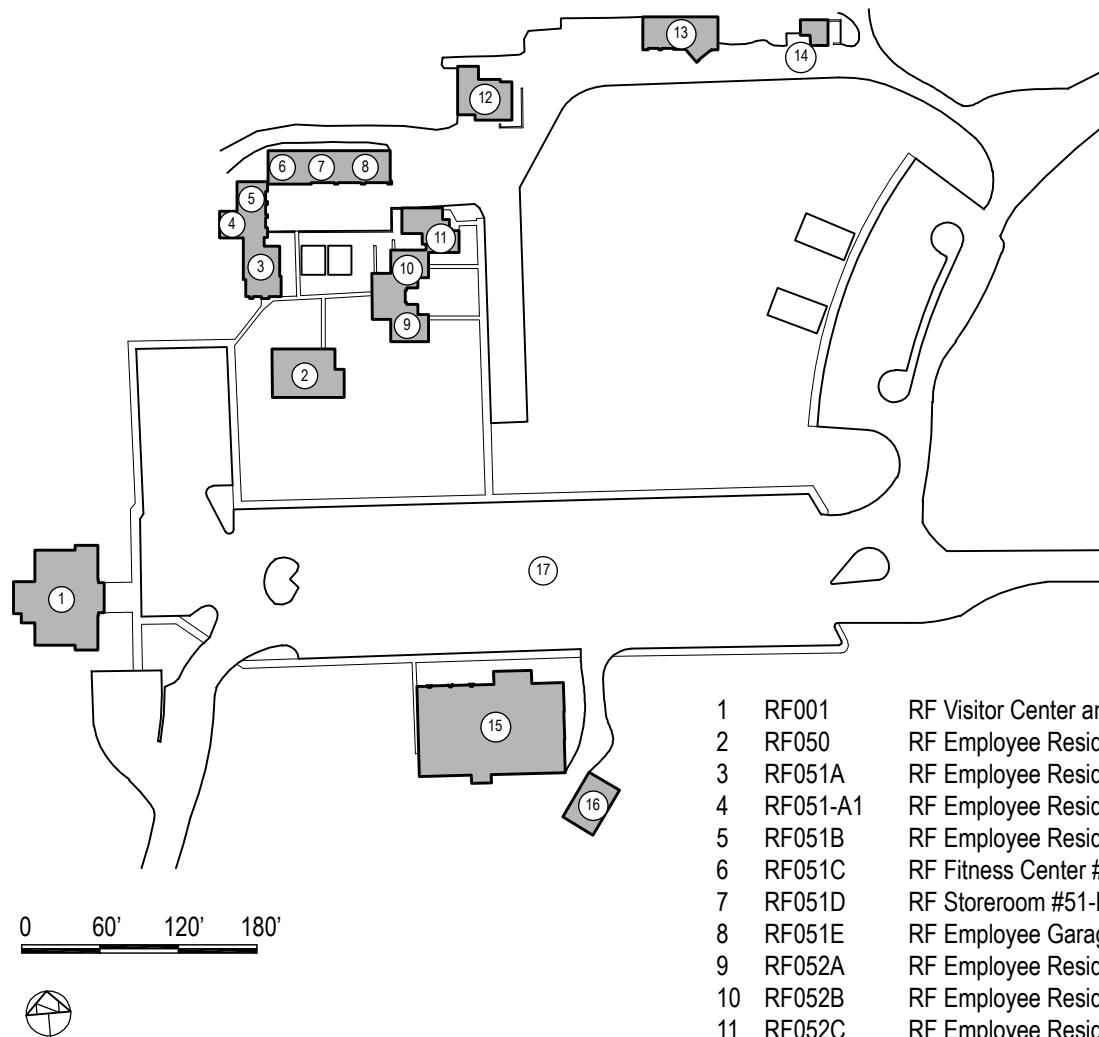
Rio Puerco Parking Area, 2004. This photo shows the wide variety of materials and objects found at many viewpoints. A more integrated design could vastly improve the visual qualities of these areas in the park. *Photo by author*

Rainbow Forest Historic District

Introduction

In this Section

- ① Design Guidelines for Classified Structures and Landscape Elements in the Rainbow Forest Historic District
- ② Links to Suggested Maintenance and Preservation Treatments



- | | | |
|----|------------|------------------------------|
| 1 | RF001 | RF Visitor Center and Museum |
| 2 | RF050 | RF Employee Residence #50 |
| 3 | RF051A | RF Employee Residence #51-A |
| 4 | RF051-A1 | RF Employee Residence #51-A1 |
| 5 | RF051B | RF Employee Residence #51-B |
| 6 | RF051C | RF Fitness Center #51-C |
| 7 | RF051D | RF Storeroom #51-D |
| 8 | RF051E | RF Employee Garage #51-E |
| 9 | RF052A | RF Employee Residence #52-A |
| 10 | RF052B | RF Employee Residence #52-B |
| 11 | RF052C | RF Employee Residence #52-C |
| 12 | RF053 | RF Employee Residence #53 |
| 13 | RF100 | RF Warehouse and Shop #100 |
| 14 | RF101 | RF Gas and Oil Building #101 |
| 15 | RF150 | RF Lodge |
| 16 | RF151 | RF Cabins |
| 17 | RF010 & 66 | RF Plaza and Features |

Site Plan

Rainbow Forest Visitor Center and Museum

RF001

Design Goals

- ① Provide New Accessible Entrance ☺
- ② Provide New Auditorium Space ☺
- ③ Redesign Solarium Glazing ☺
- ④ Improve Exterior Lighting ☺

Maintenance References

Concrete Walks / Sandstone Curbs

Doors (RF)

Drainage

Electrical Retrofit

Roofing

Sandstone Masonry (Cleaning)

Sandstone Masonry (Repair)

Window Replacement (RF)

Building Background

The Rainbow Forest Visitor Center and Museum is a focal point of the Rainbow Forest Historic District for its placement along the major axis of the main plaza. The original structure, consisting of two rectangular blocks surrounding a central lobby, was constructed in 1931 of random sized grey stone masonry with concrete lintels. Bathrooms blocks were added to the west of the two side wings shortly after the museum was completed. A significant addition consisting of concrete block with stucco was added to the rear of the building in 1958, doubling the size of the museum. The original steel casement windows may have been replaced with wood windows during this later period of construction. The Rainbow Forest Visitor Center and Museum maintains its integrity despite the additions that have greatly enlarged the building. The 1958 addition respects the prominence of the east elevation by being nearly unobtrusive from the central plaza. The Museum is a contributing building in the Rainbow Forest Historic District.

Design Strategy

There is a need to construct an accessible entrance from the parking lot to the main entrance on the east side of the building to accommodate all visitors. Currently, visitors needing assistance enter via the rear of the building, a violation of the intent behind the Americans with Disabilities Act (ADA). A new accessible entrance should be respectful of the features of the existing main entrance, especially its symmetry, prolonged approach and integration with the natural environment. The adjacent parking area to the east of the entry will probably need to be removed or altered to accommodate the new accessible entry.

There are several rehabilitation projects being proposed for the interior of the Visitor Center and Museum that will reconfigure how visitors proceed through the space. The current plan calls for the extension of interpretive

exhibits into the most southeasterly room of the original masonry structure, the space previously occupied by Law Enforcement. Concurrently, a new auditorium space, to host a park orientation film, is being proposed for the south wing of the 1958 addition. Code stipulations that govern the number of exits and the width of doors and paths will be one of the primary determinants of the new layout. Maintaining the buildings overall spatial unity should be the priority of these new uses.

The solarium provides spectacular views out to the petrified wood specimens located along the Giant Logs Trail. However, there is the desire to improve the openness and orientation of the solarium by providing more glazing to the outside. Protecting the museum collections from solar radiation and light is the critical factor in how this space is redesigned and appropriate measures must be taken to insure compliance.

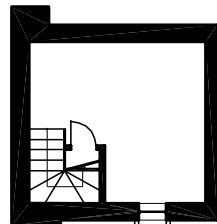
There are also a number of features of the building that need to be removed or restored to return the building to its period of significance. Besides replacing the non-historic windows and doors with new casement windows, the removal of non-historic landscaping, including the arborvitae in front of the museum would improve the historic character of the building and surrounding landscape. Repairing the existing exterior accent lighting should also be included, especially if a new accessible entrance is constructed.



Looking East towards the Rainbow Forest Museum, 1931. PEFO Photo Archive #20825

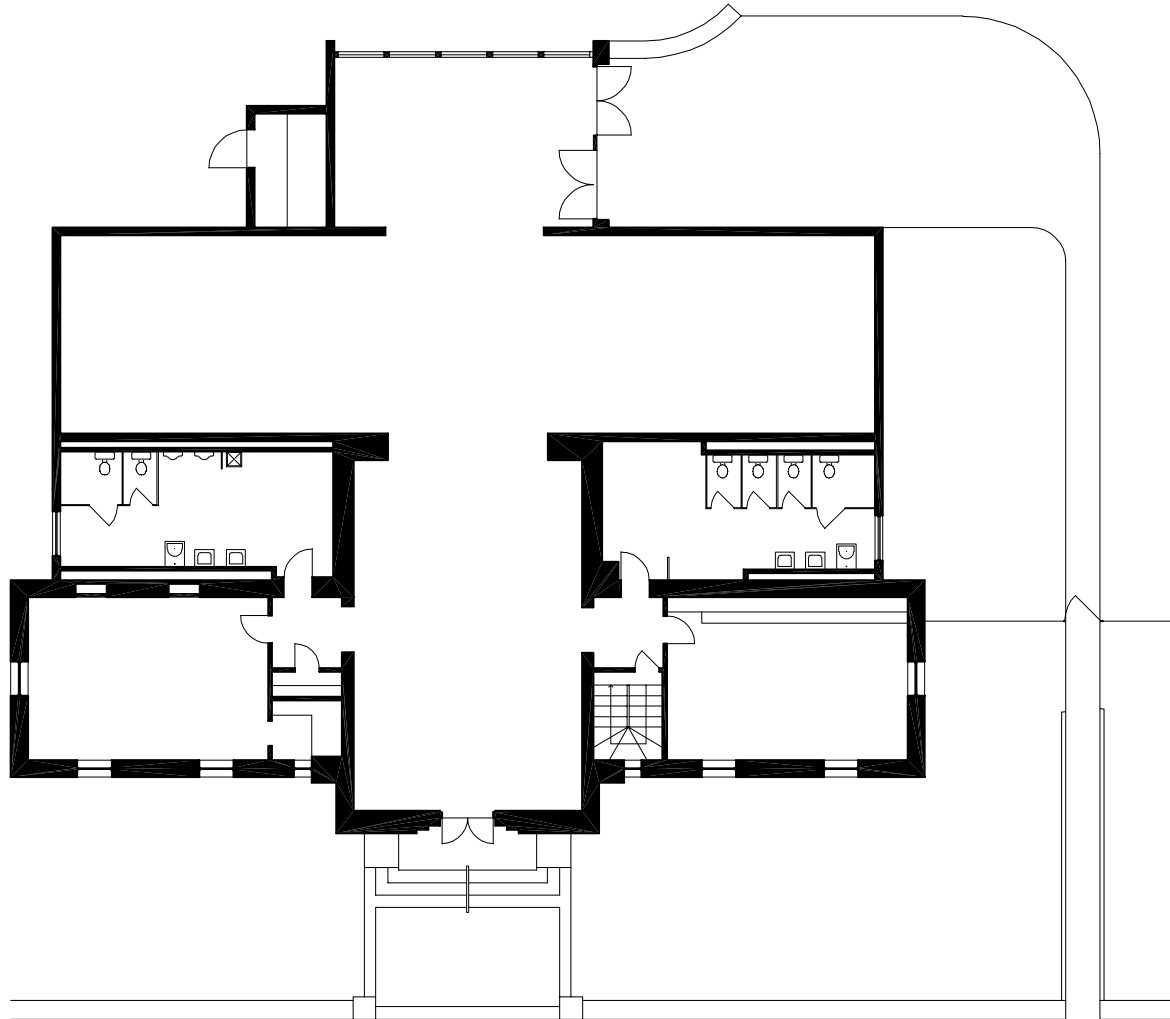
Rainbow Forest Visitor Center / Museum

Floor / Site Plan



0 2 4 8
Scale

Basement Floor Plan



First Floor Plan

0 2 4 8



① **Provide Accessible Entrance**

A new accessible entry is needed for RF Museum. Besides providing an accessible entry, this space could provide benches and interpretive material to inform the visitor of the historic aspects of the Rainbow Forest Historic District.

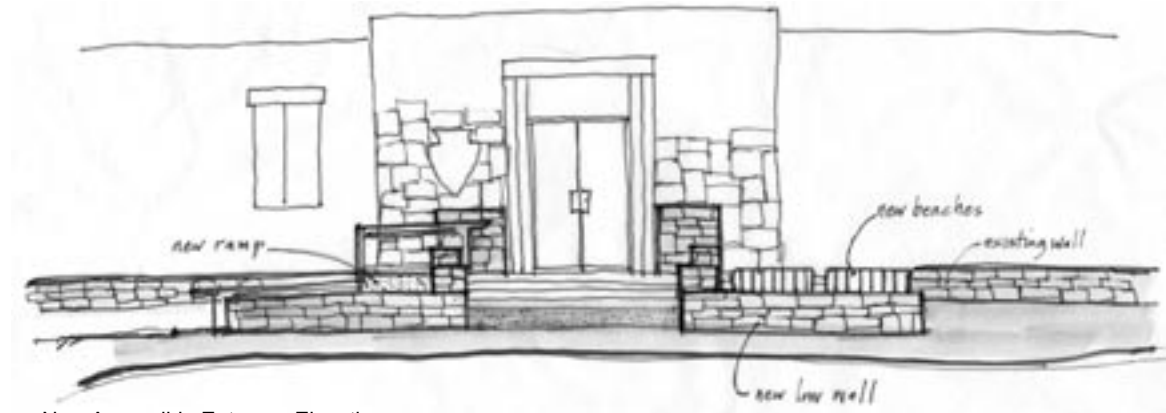
- The entrance to RF Museum is aligned axially with the parking area. The new entry should maintain this relationship.
- The front entrance is nearly symmetrical and balanced. Symmetry to the new entry is desirable but not absolutely required, so long as the new entry maintains a sense of balance.
- If possible, historic landscape walls and curbs should be maintained in place. New walls should match existing walls in color, texture and pattern.

For more information see Preservation Brief #32: Making Historic Properties Accessible available on-line at:

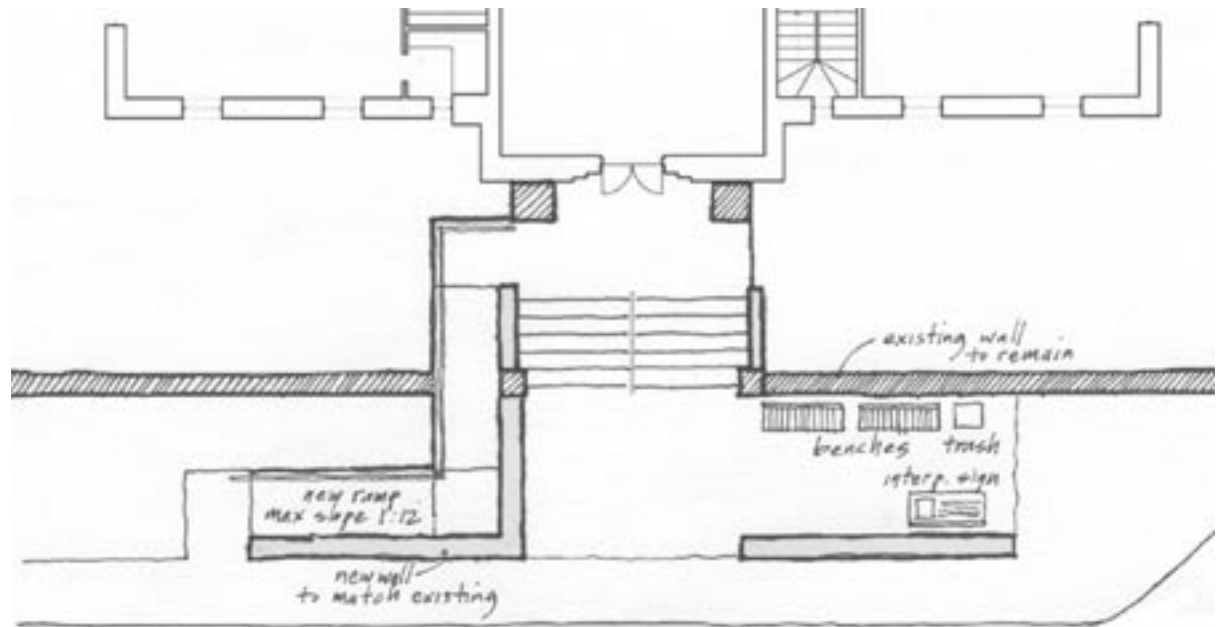
<http://www.cr.nps.gov/hps/tps/briefs/brief32.htm>



East Elevation of Rainbow Forest Museum, 2004.
Photo by author



New Accessible Entrance Elevation



New Accessible Entrance Plan





Note: The plan presented above is one possible solution. Specific plans should be reviewed by the SHPO to insure compliance and design compatibility.

0 2 4 8

Rainbow Forest Plaza and Features and Connecting Walls and Fencing

RF010 and RF066

Design Goals

- ① Remove Non-historic “Cemetery”
Fencing 
- ② Remove obtrusive site lighting 
- ③ Repair Damaged Site Walls, Curbs
and Walks 
- ④ Appropriate Materials for Future
Proposed Comfort Station 

Maintenance References

Concrete Walks / Sandstone Curbs
Drainage

Background

The Rainbow Forest Plaza and Feature (RF010) and Connecting Walls and Fencing (RF066) refer to both the large scale planning principles, and smaller scale details that unify the Rainbow Forest Historic District. The parking plaza was built in 1931 and is aligned axially with the Rainbow Forest Museum. This central plaza figures prominently in the overall planning and layout of the Historic District, directing visitors towards the Museum. Although the plaza and associated features have undergone minor alterations, the basic alignment and many of the CCC constructed sandstone curbs remain intact and should be preserved. Low stone retaining walls extending from the Museum and through the residential area helps to tie the units together and mitigate the changes in elevation between areas. The wrought iron fencing projecting from the Rainbow Forest Museum and surrounding landscape is historic and was installed to discourage visitors from removing petrified wood. In the 1960s a “cemetery” looking fence was installed between the central plaza and residential areas. The cemetery type fencing is considered non-contributing and should be removed.

Design Strategy

Many of the walls, especially along the residential plaza are damaged and need to be restored.

As a new bathroom is considered for the Rainbow Forest Historic District, it is important to consider the placement, scale, materials and detailing of this structure. See Design Guidelines for New Construction located at the end of this chapter.



Construction of site walls near Rainbow Forest Headquarters, early 1930s. PEFO Photo Archive #15588



Historic wrought iron fencing with Unit #51-A in background.
PEFO Photo Archive #15693

① Remove non-historic cemetery fencing

② Remove obtrusive site lighting



Non-historic cemetery fencing and obtrusive lighting should be removed. Photo by author



Repair or rebuild historic site walls
Photo by author

③ Repair rubble stone walls near existing picnic area



Repair concrete walks and sandstone curbs
Photo by author

③ Repair Damaged Curbs and Walks. Historic curbing should be maintained and new concrete walks shall align with the top of curb.

Rainbow Forest Employee Residence #50

RF050

Design Goals

- ① Restore Interior Finishes  
- ② New Site Walls  
- ③ Replace Roofing   

Maintenance References

- Concrete Walks / Sandstone Curbs
- Doors (RF)
- Drainage
- Electrical Retrofit
- Finish Recommendations (RF)
- Roofing
- Sandstone Masonry (Cleaning)
- Sandstone Masonry (Repair)
- Window Replacement (RF)

Building Background

Employee Forest Residence #50 was constructed in 1943 as the last residence constructed at Rainbow Forest. Construction was begun in 1942 by the CCC and finished in 1943 by NPS personnel. This change in personnel may account for the slight differences in Residence #50 from the other Rainbow Forest Residences such as its more uniform stonework, low hip roof with deep overhangs, large windows and overall less rustic appearance. Because its date of construction falls outside of the 1929-1942 period of significance, and its detailing differs significantly from the more rustic appearance of the surrounding structures, Residence #50 is considered non-contributing to the Rainbow Forest Historic District. PEFO plans for this building to eventually be included in the historic district. Employee Residence #50 has been well maintained and the recommended management treatment is preservation.

Design Strategy

This single-family residence is in excellent condition and has served as a park residence to the same family for the past 16 years. Changes to the building's exterior features should be limited to addressing the integrity considerations identified by the SHPO, including the removal and replacement of the existing foam roofing system and the replacement of non-historic windows. The construction of low site walls to provide additional security and visual privacy to the residence has been approved by the SHPO and should follow the general guidelines outlined in this document. Most of the interior finishes are original and are in excellent condition. Care should be taken in addressing any necessary changes to interior surfaces and fixtures.

As mentioned above, Employee Residence #50 is in excellent condition and with the exception of its non-historic windows and roofing, has maintained its integrity. The character defining features of the interior, including

the handsome stone fireplace and wood floors appear to be largely intact. The wall to wall carpeting in the living room and brick fireplace hearth have been added.

On the exterior, replacing the foam roofing with a system appropriate for the low sloped roof would greatly enhance the visual appearance of the building. Using a single-ply membrane would be an appropriate solution. However, because the roof is not hidden behind a parapet, as are most of the other roofs at Rainbow Forest, it is more critical here to select a membrane color that blends with the natural surroundings. Additionally, replacing the sliding windows with historic looking casements would strengthen the appearance of the building.

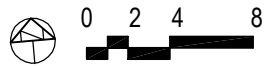
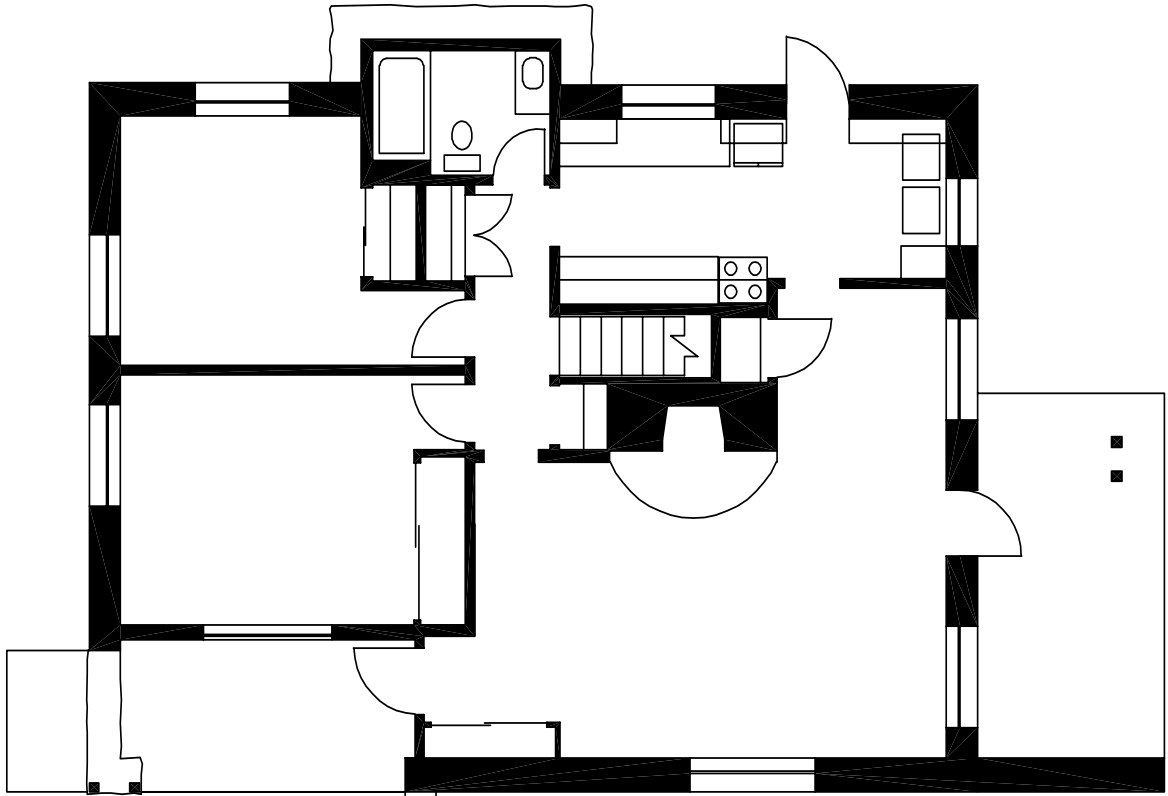
The construction of exterior screen walls should blend with the natural topography, be of a uniform style and provide the minimum screening necessary to grant privacy to the residents. Special consideration should be given to maintaining both near and distant views from the exterior patios. Walling the buildings off from each other and from the greater district, would greatly alter the planning and feelings associated with this early historic park landscape.



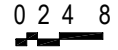
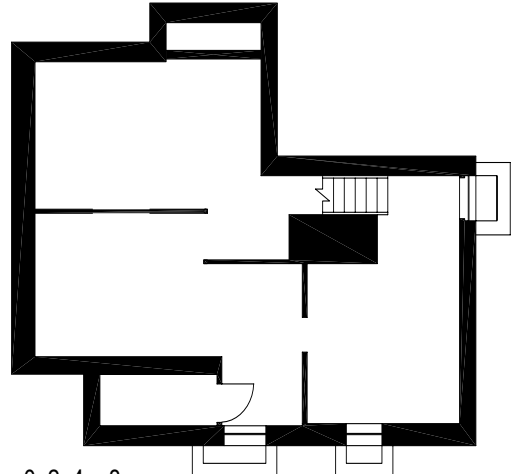
Photo of Rainbow Forest Employee Residence #50 from 1949.
PEFO Photo Archive #15691

Rainbow Forest Employee Residence #50

Floor Plans



First Floor Plan



Basement Floor Plan



Employee Residence #50 has many of its original historic furnishings intact, including wood flooring and an unpainted sandstone masonry fireplace. The brick hearth and carpet have been added.
Photo by author.

Rainbow Forest Employee Residences #51-A and #51-A1

RF051A and RF051A1

Design Goals

- ① Restore Interior Finishes 
- ② Replace Windows 
- ③ Replace Roofing 
- ④ New Site Walls 

Maintenance References

Concrete Walks / Sandstone Curbs
Doors (RF)
Drainage
Electrical Retrofit
Finish Recommendations (RF)
Roofing
Sandstone Masonry (Cleaning)
Sandstone Masonry (Repair)
Window Replacement (RF)

Building Background

Employee Forest Residence #51-A was constructed in 1931 as the superintendent's house. Indicative of the early buildings constructed at Rainbow Forest, Employee Residence #51-A, exhibits coursed, native stone masonry, stone sills and concrete lintels while fitting gently into the natural topography of its surroundings. A large stone chimney defines the main entry at the south of the residence. Originally, an attached wood pole ramada, removed at an undisclosed time, covered the western exterior wall. In 1940, Unit #51-A1 was added as a guest house to the two bedroom, one bath main residence. Today, unit #51-A1 serves as a small efficiency apartment for park employees. Although there have been moderate modifications to their historic exterior appearance, both units are contributing to the Rainbow Forest Historic District. Preservation / adaptive use is the management treatment identified in the 2003 GMP.

Design Strategy

Changes to the building's exterior features should be limited to addressing the integrity considerations identified by the SHPO, including the removal and replacement of the existing foam roofing system and the replacement of non-historic windows. Additionally, spalling to the sandstone along the east wall of Unit #51-A caused by water damage from a chronic leak, should be repaired. The construction of low site walls to provide additional security and visual privacy to the residence has been approved by the SHPO and should follow the general guidelines outlined in this document. Many of the interior finishes have been altered and should be restored.

While little documentation of the original interior exists for Unit #51-A, it appears that many of the finishes have been altered or changed. Paint on the stone fireplace should be removed carefully so as not to damage the masonry surface.

The kitchen cabinets and counter tops should be replaced with a more durable and historically compatible style. The interior finishes at unit 51-A1 are in good condition and there is currently no need to make any changes.

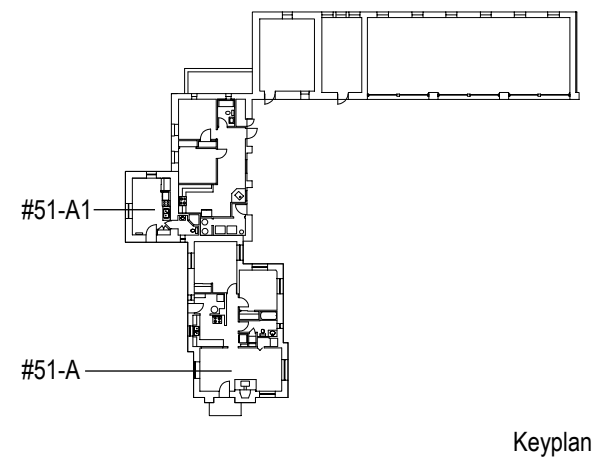
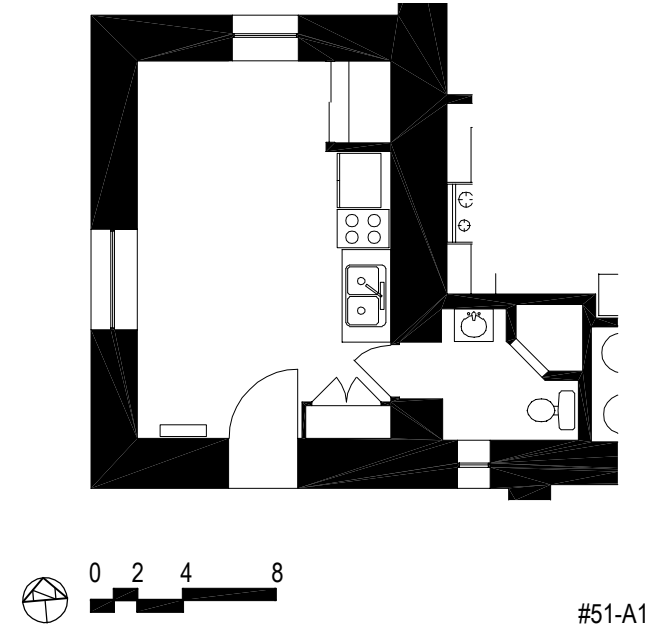
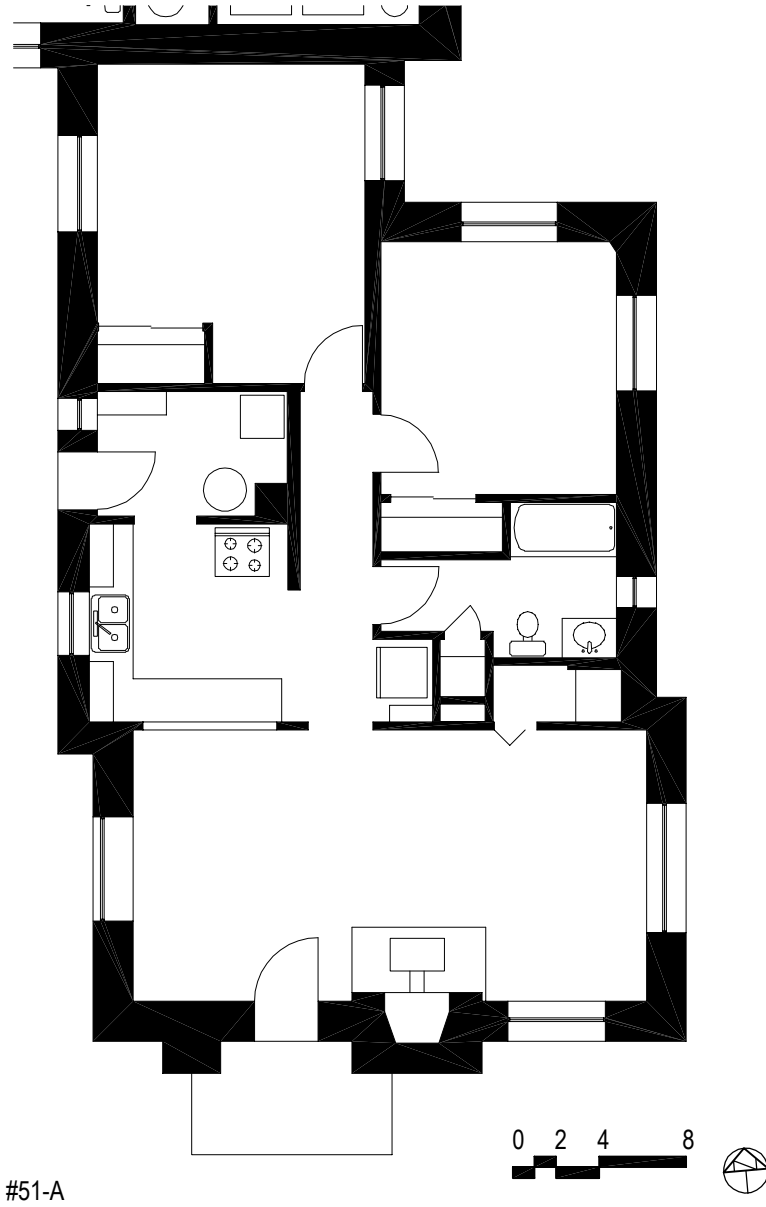
Foam roofing should be removed and replaced with a single ply membrane system. Remove foam roofing from masonry parapets only after consulting with an experienced conservator. Care should be taken in selecting a membrane color that blends with the natural landscape of the district. Additionally, replacing the single pane, metal, sliding windows with historic looking insulated casements would strengthen the appearance of the building.

The construction of exterior screen walls should blend with the natural topography, be of a uniform style and provide the minimum screening necessary to grant privacy to the residents. Special consideration should be given to maintaining both near and distant views from the exterior patios. Walling the buildings off from each other and from the greater district, would greatly alter the planning and feelings associated with this early historic park landscape.



Rainbow Forest Employee Residence #51A with attached wood pole ramada. Photo date 1949. PEFO Photo Archive #15693

















Rainbow Forest Employee Residences #51-A and #51-A1 Floor Plans



RF Employee Residence #51-B, Fitness Center #51-C, Storeroom #51-D & Employee Garage #51-E

RF051B, RF051C, RF051D and RF051E

Design Goals

- ① Provide More Sympathetic Infill at #51-B  
- ② Provide More Sympathetic Infill at #51-E  
- ③ Replace Windows  
- ④ Replace Roofing   
- ⑤ Remove Conduit and Communications Devices.  
- ⑥ Repair Damaged Masonry   
- ⑦ Remove Items From Around Buildings  

Maintenance References

Concrete Walks / Sandstone Curbs
Doors (RF)
Drainage
Electrical Retrofit
Finish Recommendations (RF)
Roofing
Sandstone Masonry (Cleaning)
Sandstone Masonry (Repair)
Steel Windows (RF)
Window Replacement (RF)

Building Background

Rainbow Forest Employee Residence #51-B, Fitness Center #51-C, Storeroom #51-D and Employee Garage #51-E define the northern edge of the residential plaza within the Rainbow Forest Historic District. Serving a variety of uses since their construction, the use of the buildings in this area will likely continue to change to meet the needs of the park. Employee Residence #51-B was originally constructed as a three bay garage in 1931 before being converted to a seasonal residence in the early 1990s. Building #51-C, currently the fitness room, was constructed in 1935 and has previously served as a coal room, fire cache and store room. Unit #51-D, constructed in 1942 along with Unit #52-E, was originally a maintenance shop. Unit #52-D is currently a store room while Unit #52-E continues to be used for vehicles and storage for residents. The structures are mostly flat roofed, besides #51-E that has a finely crafted barrel vault, and constructed of coursed masonry, similar to Units #51-A and #51-A1. Many of the original steel casement windows have been replaced with non-historic sliders and the infill at the garage bays is incompatible with the original design. Inappropriate exterior alterations should be corrected. These units are eligible for inclusion in the Rainbow Forest Historic District. The recommended treatment for this block is preservation / adaptive use.

Design Strategy

Restoring and / or replacing exterior openings, especially the three bay opening at Unit #51-B, is the priority design item. The window / door infill installed in the early 1990's to convert Unit #51-B to a seasonal residence is incompatible with the proportions and solid / void relationship of the historic garage doors. The three bays should read as simple recessed openings, with an emphasis on the strong shadows created by the thick masonry walls. An investigation of design possibilities should be conducted to match a more historic exterior treatment with the needs for natural light

and access into the seasonal residence. While the garage doors at Unit #51-E maintain the solid / void relationship at the exterior of the building, they could also be replaced with units that are more historic in character.

Non-historic windows should be replaced with more authentic looking double glazed casement units. A number of the original steel windows still exist at buildings #51-C, #51-D and #51-E and maintenance should be performed on these windows to keep them in good condition.

Separation of the masonry between buildings is a concern and a consistent treatment should be developed to protect these separations from moisture.

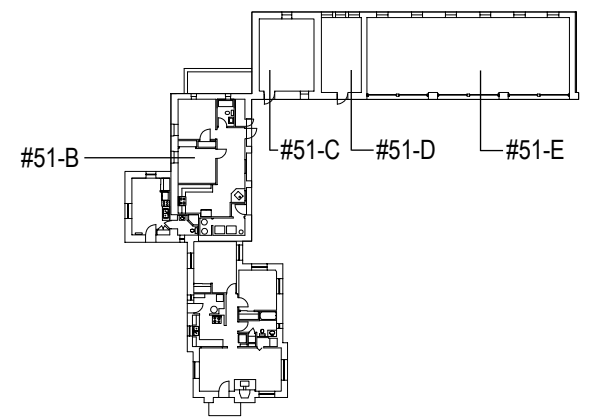
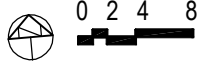
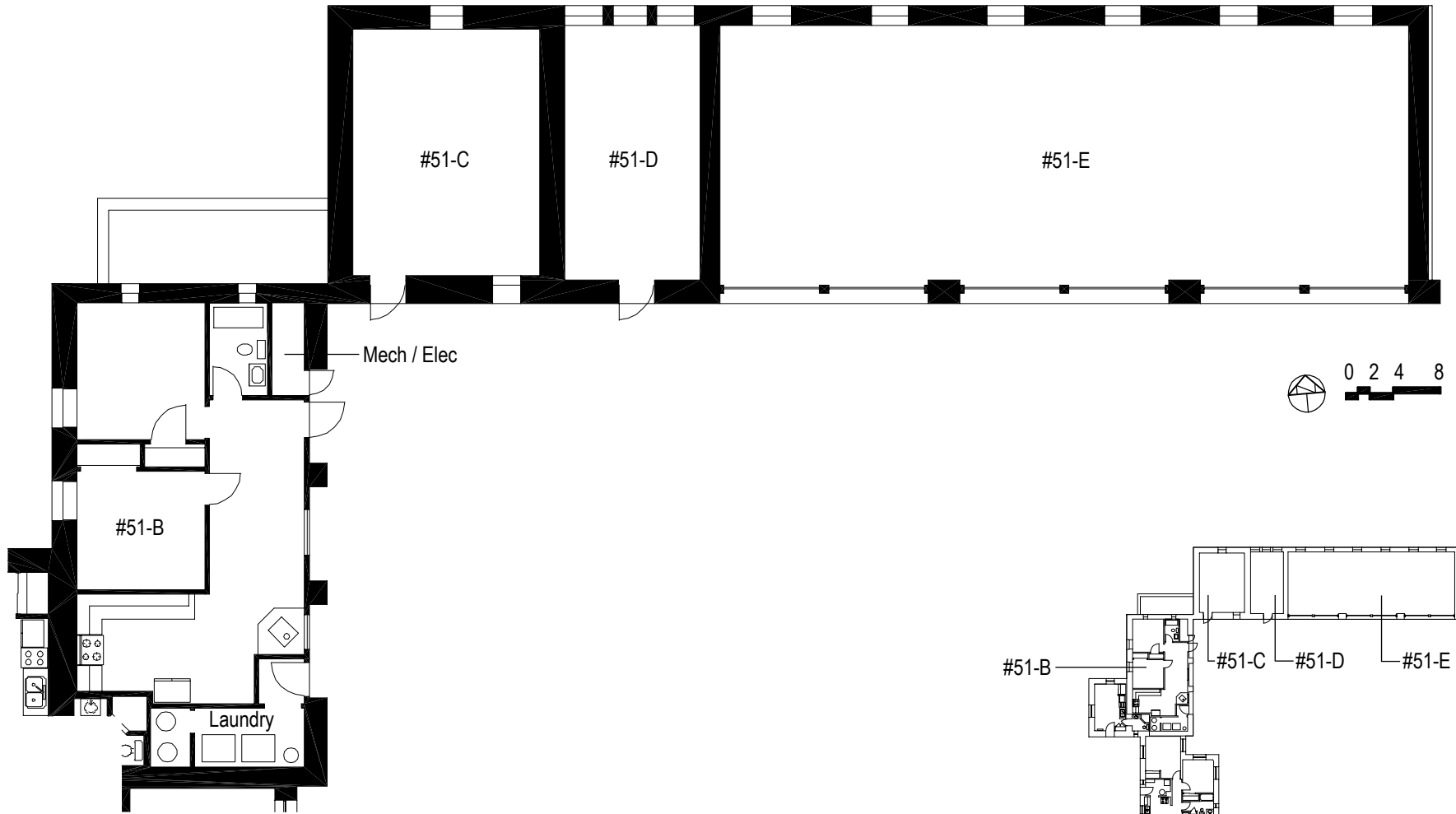
Foam roofing should be removed and replaced with a single ply membrane system. Remove foam roofing from masonry parapets only after consulting with an experienced conservator.

Exterior pole lighting should be removed from Unit #51-E. Any extraneous conduit, communications equipment or surface wiring should also be removed.



Deep recesses and strong shadow lines are important design features at Rainbow Forest. PEFO Photo Archive #15697

RF Employee Residence #51-B, Fitness Center #51-C, Storeroom #51-D and Employee Garage #51-E Floor Plan



Keyplan

① **Provide More Sympathetic Infill at #51-B**

When infilling garage door openings, the following priorities should be followed:

- Don't over emphasize the infill. Infill material should be simple and reflect the proportions of the openings.
- Use materials that are compatible with the historic material being replaced. Wood doors and windows are an appropriate choice at RF.

For more information on new infill at historic garage door openings see: Interpreting the Secretary of the Interior's Standards for Rehabilitation at:

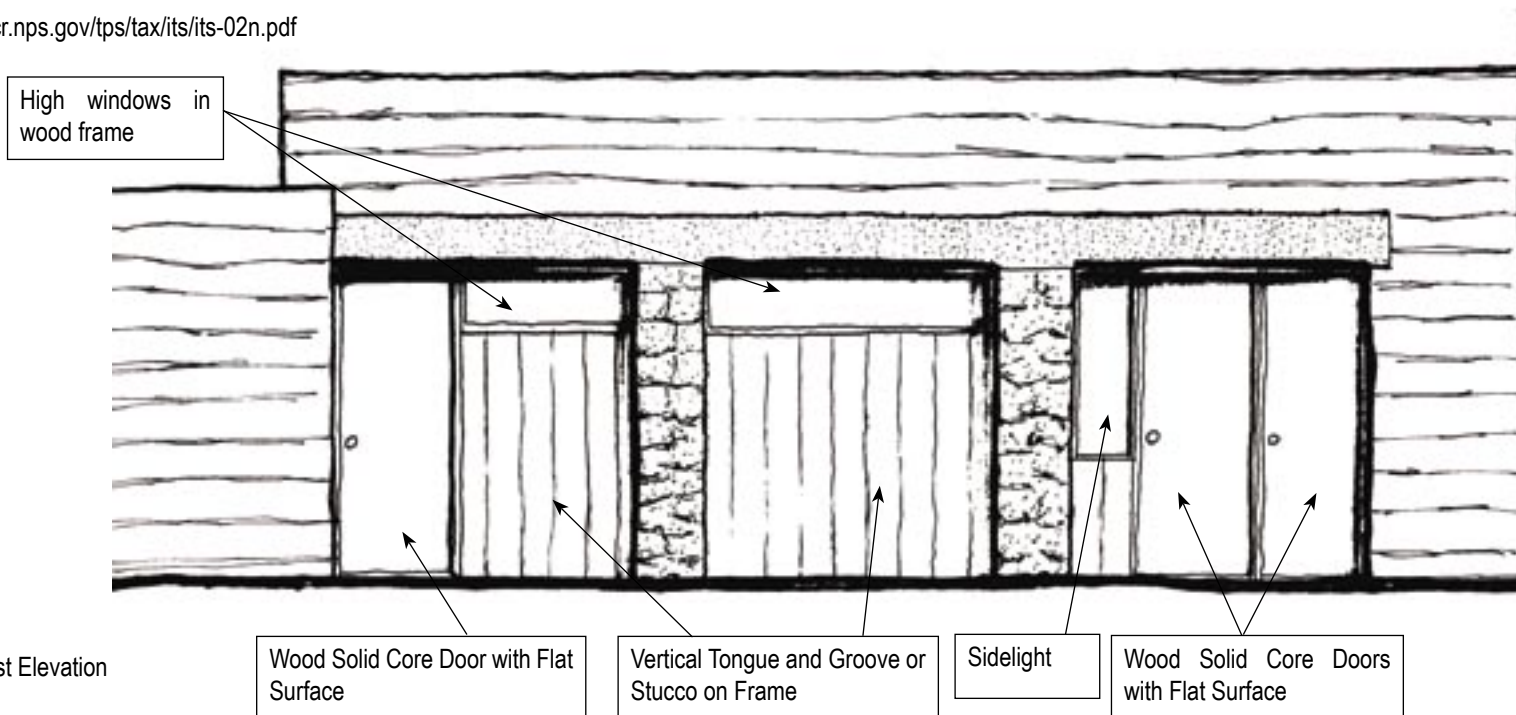
<http://www2.cr.nps.gov/tps/tax/its/its-02n.pdf>



East Elevation of Rainbow Forest Garage, 51B from 1949. PEFO Photo Archive #15695



East Elevation of Rainbow Forest Seasonal Employee Residence #51B taken in July, 2004. Note the irregular arrangement of windows and doors that distract from the simplicity of the three original bays. Photo by author





South Elevation of Rainbow Forest Garage, 51E from 1949.
PEFO Photo Archive #15701



These doors with their western red cedar exterior would be a good choice for infill at RF #51-E.
Source: Red Lake Custom Doors

④ Repair masonry at separation in parapet.

③ Remove conduit and communications devices.

① Provide more historic looking garage doors.



⑤ Remove Items From Around Buildings.

Existing South Elevation

Rainbow Forest Employee Residences #52-A, #52-B and #52-C

RF052A, RF052B, RF052C

Design Goals

- ① Redesign Exterior of 1957 Additions  
- ② Replace Windows  
- ③ Replace Roofing   
- ④ Update / Restore Interior Finishes  
- ⑤ New Site Walls  

Maintenance References

Concrete Walks / Sandstone Curbs
Doors (RF)
Drainage
Electrical Retrofit
Finish Recommendations (RF)
Roofing
Sandstone Masonry (Cleaning)
Sandstone Masonry (Repair)
Steel Windows (RF)
Window Replacement (RF)

Building Background

Rainbow Forest Employee Residences #52-A, #52-B and #52-C define the eastern edge of the residential plaza at Rainbow Forest. Units #52-A and #52-B were constructed in 1931 with #52-C being added a year later in 1932. The units have parapets raised above flat roofs and exhibit the rustic style of coursed native stone masonry, stone sills and concrete lintels found throughout Rainbow Forest. Historic photographs indicate that a wood pole ramada originally covered the western exposure of the buildings. The original steel casement windows have been replaced with aluminum sliding windows. In 1957, a one room bedroom addition, constructed of concrete block with a single pitch roof, was added to the west side of each unit. These units are eligible for inclusion in the Rainbow Forest Historic District but any unsympathetic alterations should be corrected. The recommended management treatment is preservation.

Design Strategy

The three small residential units that create the eastern edge of the residential plaza at Rainbow Forest are important to the park's management goal of having more employees reside within the park. While Unit #52-A has been well maintained and continues to serve as a year round residence for permanent park employees, Units #52-B and #52-C have been underutilized during the last decade. Updating and restoring their interior finishes would provide two dwellings suitable for long-term residents. Interior finishes should follow suggestions offered in this document. Sandstone masonry surfaces at fireplaces and at the interior of the 1957 additions that have been painted, should be restored sensitively after consultation with a conservator.

One of the most obtrusive alterations to take place at Rainbow Forest was the additions added to the original masonry dwellings. The additions, composed of deep

overhangs, large openings and smooth stucco surfaces, are incompatible with the original masonry structures of more rustic design. Removing the additions is unlikely due to the limited square footage of the original footprint. It is, however, possible to adjust the massing and detailing of the additions to be sympathetic with the original structures.

The construction of exterior screen walls should blend with the natural topography, be of a uniform style and provide the minimum screening necessary to grant privacy to the residents. Special consideration should be given to maintaining both near and distant views from the exterior patios. Walling the buildings off from each other and from the greater district, would greatly alter the planning and feelings associated with this early historic park landscape.

Foam roofing should be removed and replaced with a single ply membrane system. Remove foam roofing from masonry parapets only after consulting with an experienced conservator.

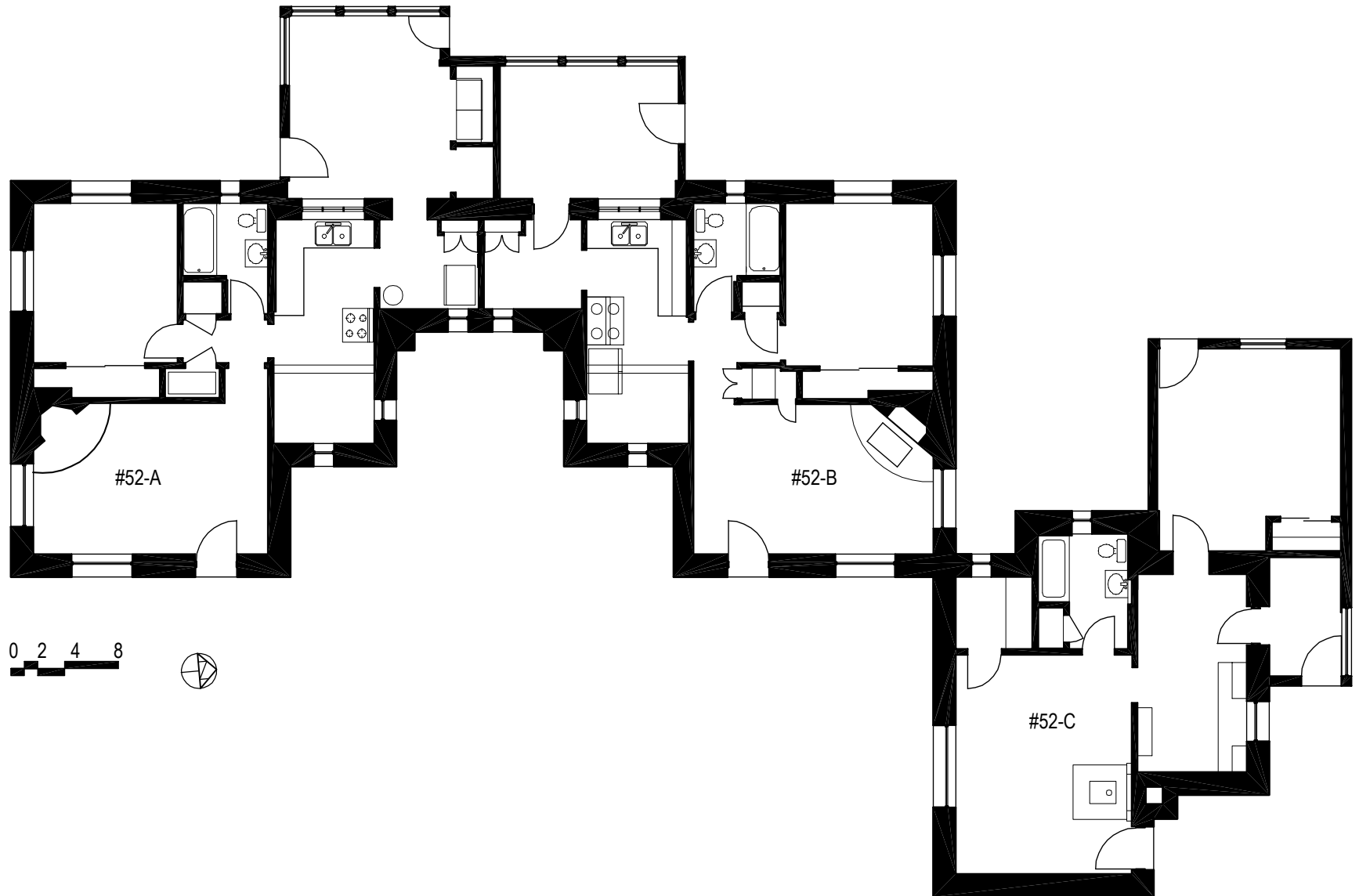
Non-historic windows should be replaced with more authentic looking double glazed casement units.



East Elevation of RF Employee Residences 52A, 52B and 52C. Photo date 1938. PEFO Photo Archive #15678

Rainbow Forest Employee Residences #52-A, #52-B and #52-C

Floor Plan



① **Redesign Exterior of 1957 Additions**

Design considerations for the rehabilitation for the 1957 additions should follow the following objectives:

- The visual obtrusiveness of the additions should be muted. Roof overhangs should be eliminated, and wall opening should be reduced in size to be more in harmony with the original masonry buildings.
- Exterior materials should be simplified. More historic windows and a smooth surface would help the overall feeling of the additions. Because more site walls with a smooth stucco finish are planned for the residential area, using stucco is one possible solution.

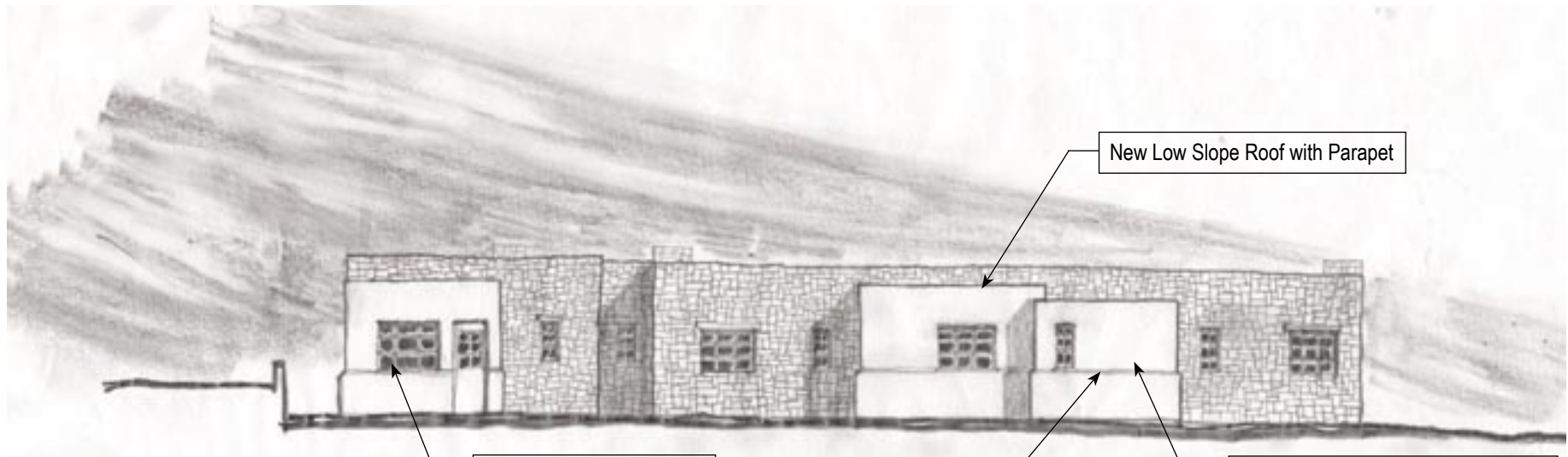
Large, horizontal windows are incompatible in scale and proportion to the original masonry window openings.

Remove foam roofing from masonry parapets

Roof overhangs are inappropriate at Rainbow Forest



Partial Existing West Elevation



Possible Exterior Rehabilitation

Recess window frames to give depth to wall

Retain existing stone popout

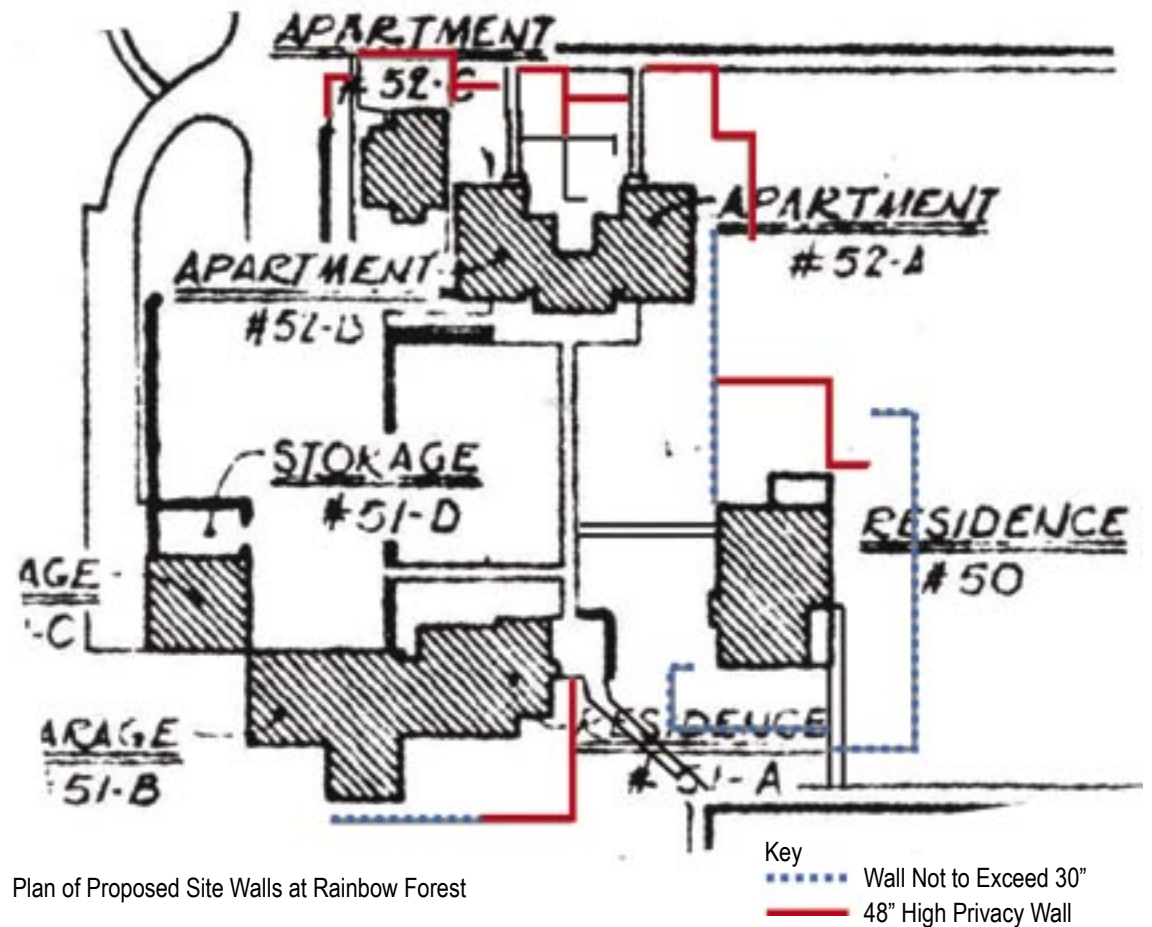
New stucco finish over existing masonry / frame construction



Ramada on the rear of Rainbow Forest Employee Residences 52A and 52B. Photo date 1949. PEFO Photo Archive #15678



Rainbow Forest Employee Residences 52A and 52B. East Elevation, 1950s. PEFO Photo Archive



Plan of Proposed Site Walls at Rainbow Forest

⑤ **New Site Walls**

Additional site walls within the Rainbow Forest Historic District, especially in the residential areas, are needed to discourage visitors from entering these more private areas of the community and to provide the residents with additional privacy. Concerns over the visual intrusiveness may be mitigated by the following practices that are distinguished by linetype in the above sketch.

- Walls constructed solely to discourage residents from entering the residential area should be no more than 30" in height. This should help to maintain views through the property and help to break up the walls.
- Walls constructed to provide the resident's with visual privacy shall be no more than 48" in height and shall be stepped to follow the natural topography.

Rainbow Forest Employee Residence #53

RF053

Design Goals

- ① Redesign Exterior of Concrete Block Addition  
- ② Replace Gable Roof with Flat Roof  
- ③ Preserve Interior Finishes  
- ④ Replace Windows  
- ⑤ Repair Site Walls and Related Features  

Maintenance References

Concrete Walks / Sandstone Curbs
Doors (RF)
Drainage
Electrical Retrofit
Roofing
Sandstone Masonry (Cleaning)
Sandstone Masonry (Repair)
Window Replacement (RF)

Building Background

Rainbow Forest Employee Residence #53 has undergone significant alterations since its construction in 1938 by the CCC. Originally a small masonry dwelling with parapets, similar to other structures constructed during the 1930s, Unit #53 received a low-slope gable roof and entry porch in 1955. By 1961, a two bedroom concrete block addition had been added to the west side of the unit. In 2004, the interior was rehabilitated to serve as the office for Law Enforcement. Employee Residence #53 is considered a contributing element to the Rainbow Forest Historic District. The recommended treatment is rehabilitation.

Design Strategy

Similar to the other additions added in the 1950s and 60s, the two bedroom addition attached to Unit #53 is constructed of concrete block and stucco and exhibits a more modern aesthetic than the rustic design style that is characteristic of the architecture at Rainbow Forest. Additionally, the sloped gable roof and side porch added in 1955 is a significant departure from the original design. Restoring the flat roof on the original masonry building would help bring Unit #53 more in line with the historic character of the district. Reducing the roof on the concrete block addition, in addition to reworking the exterior openings could also improve the look of the dwelling.

Non-historic windows should be replaced with more authentic looking double glazed casement units.

Interior changes have been made to accommodate the needs for office space. HVAC and electrical systems were updated in 2004 to accompany this change in use. The interior spatial arrangement should remain unchanged to accommodate the possibility that the park would return this unit to housing. Historic wood floors may remain below

the current subflooring and should remain in place for possible restoration in the future.

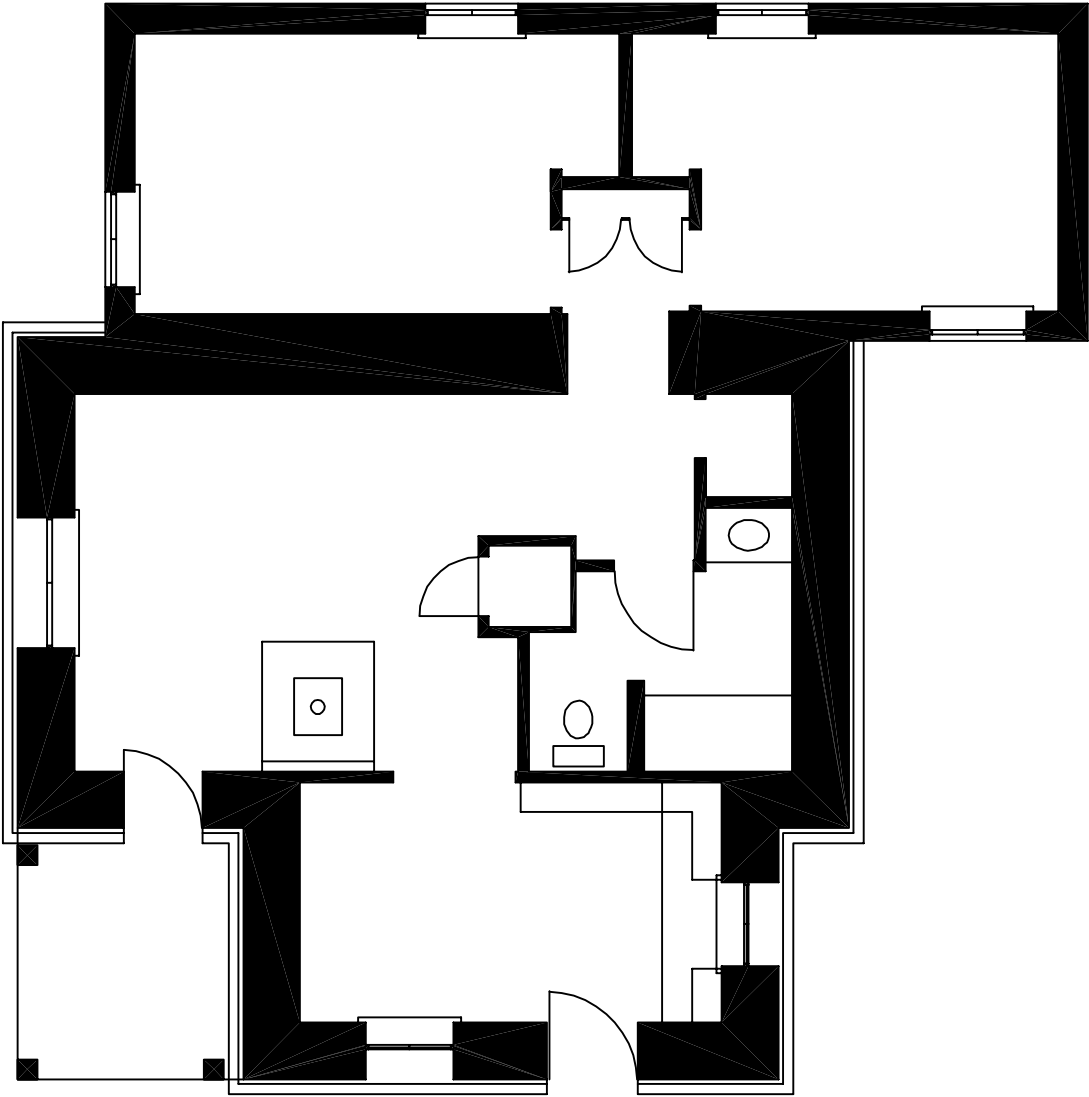
Site walls surrounding the patio along the east elevation should be repaired and properly maintained.



Rainbow Forest Employee Residence #53 looking southeast, 1963. PEFO Photo Archive #23740.11

Rainbow Forest Employee Residence #53





Floor Plan



Rainbow Forest Warehouse and Shop #100

RF100

Design Goals

- ① Stabilize Structure 
- ② Remove V-Shaped Addition 
- ③ Restore South Facade 
- ④ Replace Roofing 

Maintenance References

- Drainage
- Electrical Retrofit
- Roofing
- Sandstone Masonry (Cleaning)
- Sandstone Masonry (Repair)
- Steel Windows (RF)
- Window Replacement (RF)

Building Background

Rainbow Forest Warehouse and Shop #100 was likely constructed by the CCC around 1937. Built as a warehouse and shop, the interior was improved in the 1950s and 1960s. In 1992, the v-shaped addition was added to the south elevation to accommodate the park's fire truck. The management plan calls for preservation / adaptive use. This building is eligible for inclusion in the Rainbow Forest Historic District.

Design Strategy

Building #100 has suffered structural damage as a result of the major changes undertaken by the v-shaped addition in 1992. In particular, a large crack has developed in the southeast corner of the parapet, possibly from the removal and replacement of masonry piers with steel columns. Stabilizing and repairing damage to the masonry should be completed in conjunction with removing the v-shaped addition and restoring the south elevation.

Because the south elevation and structural system has been so radically altered, it will be a challenge to restore the openings to their historic design. The masonry piers between bays should be rebuilt with sandstone that matches the original stone in appearance, including size, color and texture. Because of the difficulty in matching any new construction to the original, there are a number of other design solutions that could be incorporated to unify the south elevation, including the use of stucco to cover over the piers. Restoring the elevation to include 5 uniform openings with recessed doors should be the priority.

A number of the original steel windows still exist at building #100 and maintenance should be performed on these windows to keep them in good condition. Included in this periodic maintenance should be the removal of any

sand that has encroached on the exterior surface of the window.

Foam roofing should be removed and replaced with a single ply membrane system. Remove foam roofing from masonry parapets only after consulting with an experienced conservator.



Rainbow Forest Warehouse and Shop with V-Shaped addition, 2004. *Photo by author*



Rainbow Forest Warehouse and Shop in 1949. *PEFO Photo Archive #15718*

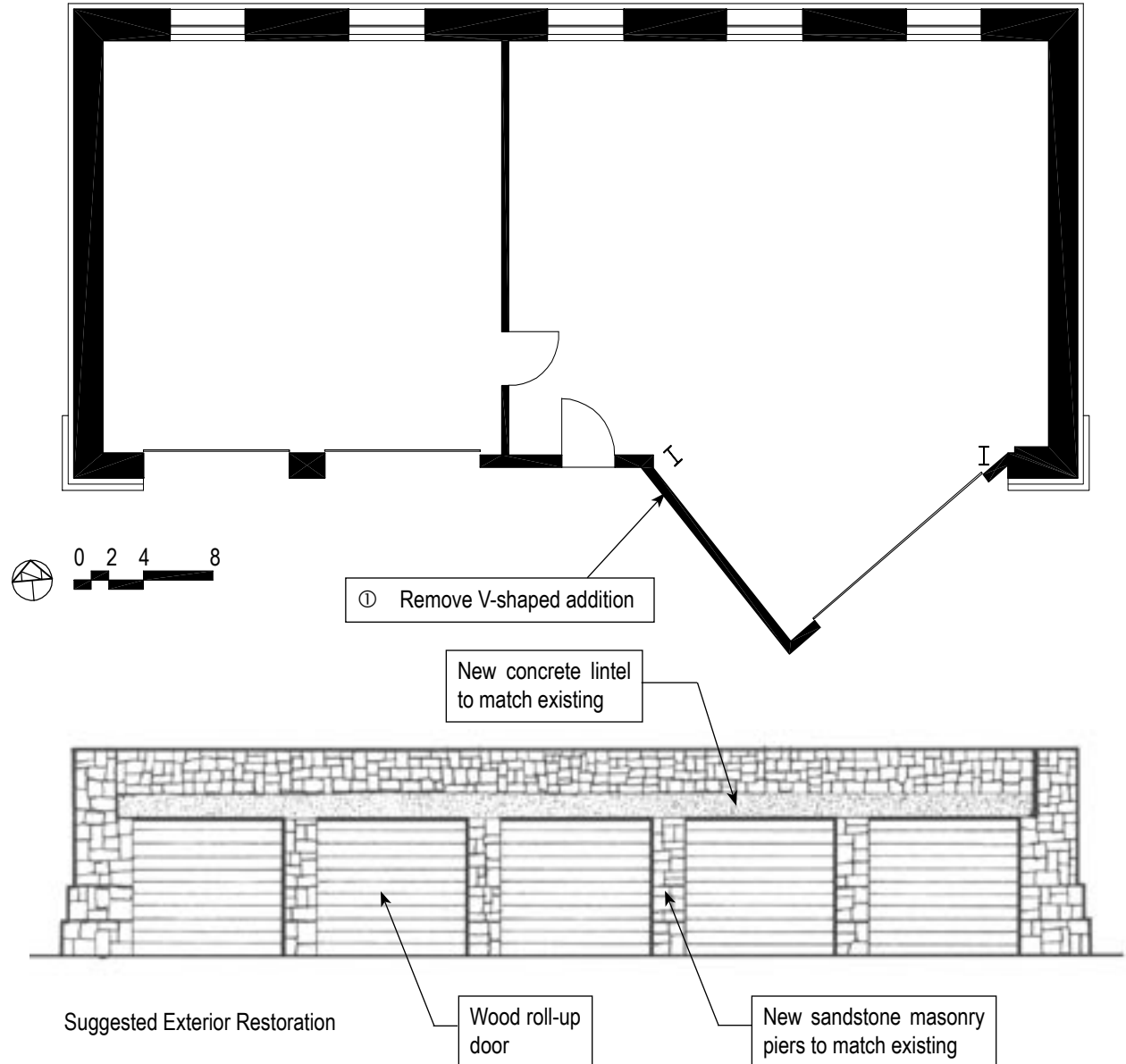
Rainbow Forest Warehouse and Shop #100

Existing Floor Plan and Suggested Exterior Restoration

③ Restore South Facade

Removing the V-shaped addition and restoring the south facade to its historic appearance should be a priority treatment for both the building and for the overall appearance of the historic district. Restoration should comply with the following criteria:







- Sandstone masonry piers and a concrete lintel should be returned to the entire facade. Color and texture of new sandstone should match the color of the remaining sandstone masonry.
- Roll-up garage doors should be simple in design. Wood cladding is suggested to return the exterior to a more rustic appearance.



Rainbow Forest Gas and Oil Building #101

RF101

Design Goals

- ① Excavate Exterior Storage Yard 
- ② Remove Conduit and Meter 
- ③ Replace Roofing  
- ④ Repair Masonry  

Maintenance References

Drainage

Electrical Retrofit

Roofing

Sandstone Masonry (Cleaning)

Sandstone Masonry (Repair)

Steel Windows (RF)

Window Replacement (RF)

Building Background

Rainbow Forest Gas and Oil Building #101 was constructed in 1937 and served as a gas and oil house before being converted to a storeroom. There is a small storage yard with retaining walls attached to the east side of the structure. Gas pumps originally fronted this building. RF101 remains in excellent condition with good integrity. The recommended management treatment is preservation. The building is eligible for inclusion in the Rainbow Forest Historic District.

Design Strategy

The Rainbow Forest Gas and Oil Building remains an excellent example of the rustic design principles utilized throughout the early development of Rainbow Forest. Original steel casement windows remain intact and in good condition. Besides masonry repairs that do not match well, the structure remains sound and in good condition.

The storage yard to the east of the building created by low masonry walls has been filled with drifting and blowing sand. The sand should be carefully excavated from this space and the masonry walls repaired, as required.

Removal of any unnecessary electrical equipment, including the meter, would improve the visual appearance of this historic resource. Repair any openings in the sandstone masonry created by the removal of equipment.

Foam roofing should be removed and replaced with a single ply membrane system. Remove foam roofing from masonry parapets only after consulting with an experienced conservator.

Repointing and repairing of mortar or masonry should correct obtrusive repairs performed in the past.

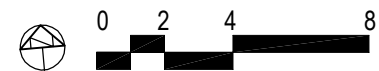
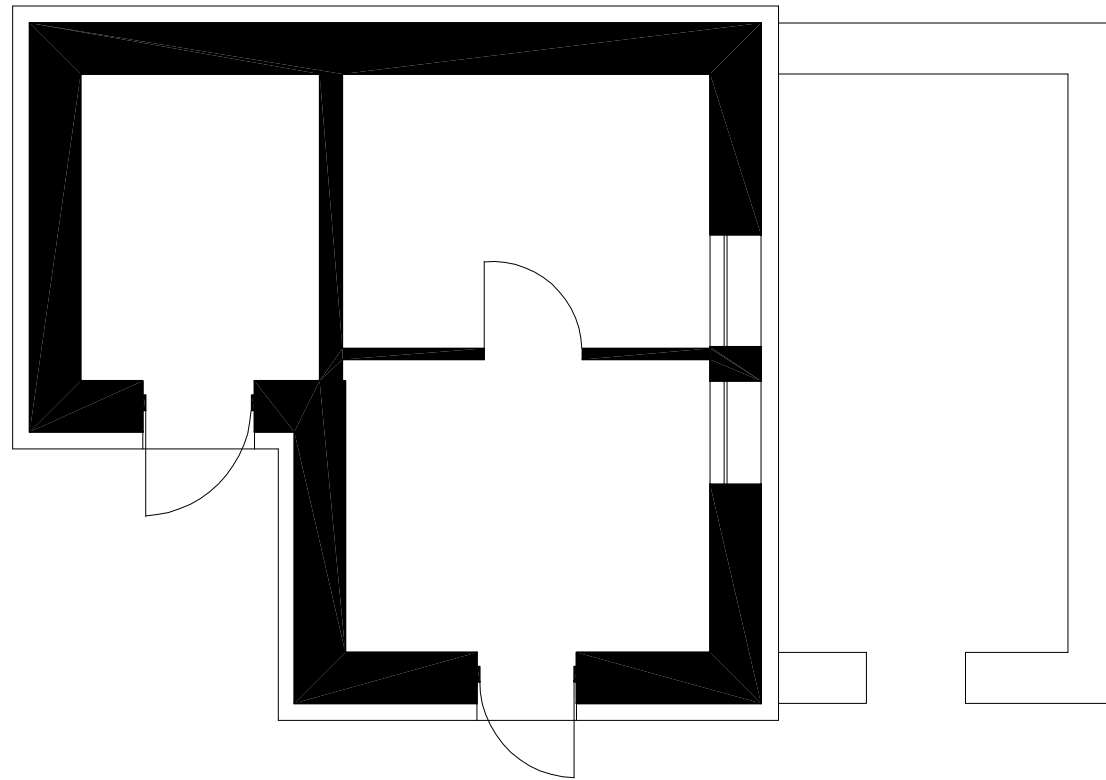


Rainbow Forest Gas and Oil Building in 1949.

PEFO Photo Archive #15720

Rainbow Forest Gas and Oil Building #101






Floor Plan



Rainbow Forest Lodge

RF150

Design Goals

- ① Understand How the Building Has Changed Over Time  
- ② Determine Concessionaire's Needs 
- ③ Reduce the Scale and Mass of the Building  

Maintenance References

Note: Because maintenance of Rainbow Forest Lodge is the responsibility of the concessionaire, this document does not present specific maintenance references for this historic resource. However, because Rainbow Forest Lodge is an important component in the overall Rainbow Forest Historic District, it is advisable for PEFO management and maintenance staff to be involved in maintenance and management decisions.

Building Background

Constructed in 1929 as a store by entrepreneur Dick Grigsby, Rainbow Forest Lodge, is the oldest remaining building in the park. The lodge and a number of small cabins, including the remaining stone cabin to the east of the lodge, served visitors during the early development of the park. Over the years, the original stone structure has become engulfed by a number of large additions, the most recent in 1957, that has created a structure that overpowers the other buildings and elements of the Rainbow Forest Historic District. The 2003 General Management Plan calls for a reduction in the scale of the building to be more in harmony with the surrounding cultural landscape. The supporting documentation presented herein should assist the park's concessionaire and management team with restoring and rehabilitating this structure to be more sympathetic to the surrounding buildings and landscape. The plans and historic photographs that follow dissect the Rainbow Forest Lodge, revealing significant dates of construction and changes to the interior layout and the relationship of the lodge to the surrounding landscape. The building is currently not eligible for inclusion in the Rainbow Forest Historic District due to the multiple incompatible additions.

Design Strategy

The design changes suggested are based solely on our understanding of the architectural evolution of the building and the need for the building to “conform” to certain parameters as a contributor to the larger historic landscape. Taking into account the needs and goals of the concessionaire, in addition to an understanding of the character of the building, would likely reveal other possibilities for the future of this significant resource.

One possible solution would be to remove all or parts of the 1960s addition. It appears that there may be excess interior space that could be removed or converted to patios

for exterior use. The creation of an outdoor patio space on the west side of the building could give an economic boost to the restaurant by being more accessible and prominent to visitors. Additionally, reorienting the restaurant would help to reduce the scale of the building's north facade, bringing the building more in scale with the other structures surrounding the central plaza.

Other ideas for reducing the overall scale of the building would be to remove the existing entry canopy and replace it with a longer, but lower entry porch. A shaded area adjacent to the main entry is a desirable element to the building and the visitor experience.

Reducing the scale of the northeast corner of the building is also important to bringing the structure more in harmony with the other elements of the historic district. If the overall height and mass of these walls cannot be reduced, adding windows could provide some visual relief to this elevation.



Rainbow Forest sometime between 1928 and 1931 looking northeast showing the south elevation of the stone RF Lodge in the midground. Other structures are the first museum and two ranger residences. *PEFO Photo Archive #15730*

Rainbow Forest Lodge Floor Plan and Historical Analysis

1930s (2,535 Gross Square Feet)

As originally constructed, the Rainbow Forest Lodge was a symmetrical stone structure with recessed covered areas on both the north and south elevations. Containing a store and lunchroom, the building was originally entered from the south. Sometime after 1931, the building was reoriented towards the north and the newly completed central plaza.



Rainbow Forest Lodge and auxiliary buildings around 1930.
PEFO Photo Archive

1940s (3,111 Gross Square Feet)

The first documented alterations to the Rainbow Forest Lodge occurred in 1940, during the time of the most significant growth and construction in the Rainbow Forest District. A small stone storeroom was added to the south side of the building.



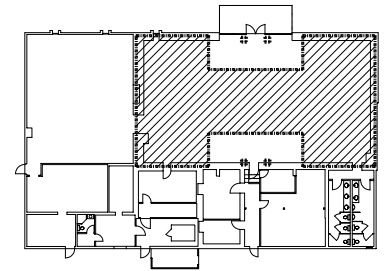
Rainbow Forest Lodge in the 1930s and 1940s.
PEFO Photo Archive #15668

1950s (4,976 Gross Square Feet)

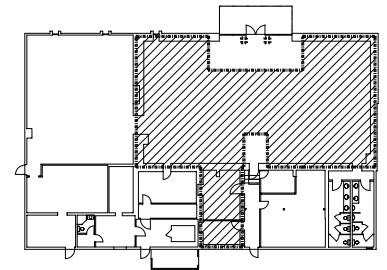
The building was expanded in the 1950s with changes taking place in 1952 and 1958. A covered entry, supported by a series of columns, was extended to the north towards the central plaza. Small additions were added to the south of the building creating a structure that was nearly a square in plan.



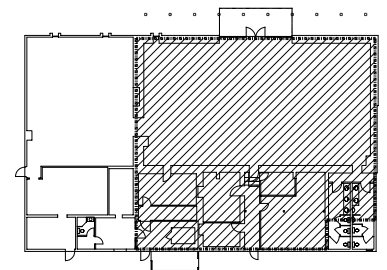
Rainbow Forest Lodge in 1958.
PEFO Photo Archive #21248



1930s Plan



1940s Plan



1950s Plan



RF Lodge Reference Plans

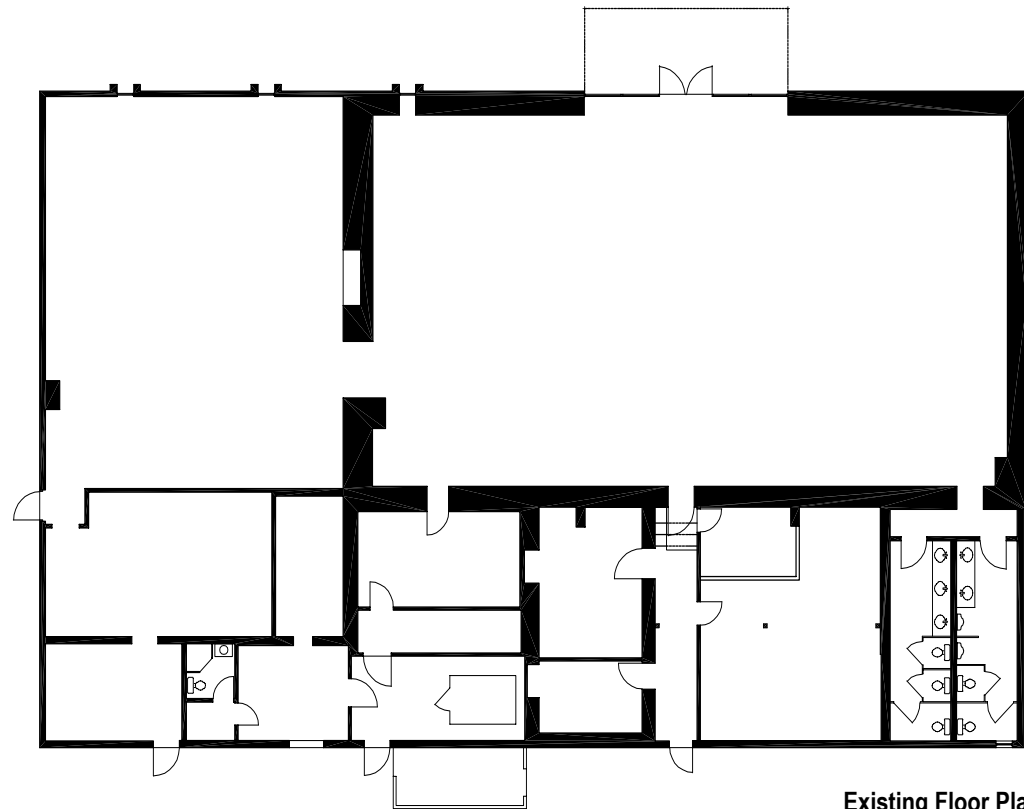
Not to Scale

1960s to the Present (7,591 Gross Square Feet)

In the 1960s, attention began shifting away from the Rainbow Forest District with the opening of the Painted Desert Community Complex. At the same time, with visitation increasing, the park could support major visitor services at both ends of the park. The transformation of Rainbow Forest Lodge from an outpost to a significant visitor amenity was completed in 1963 with a large addition and redesign of the building's exterior. The addition was constructed primarily of concrete block and stucco with large laminated wood beams being used to support the raised entry canopy. Clerestory windows, facing south, brought natural light into the gift shop. The large addition added to the west featured an expanded kitchen and lunchroom. Since 1963, there have been a few minor changes to the building: Interior spaces have been reoriented to address visitation needs and the clerestory windows are no longer visible. A drop ceiling has been installed throughout most of the interior public spaces.



South elevation of Rainbow Forest Lodge, 2004
Photo by author



Existing Floor Plan

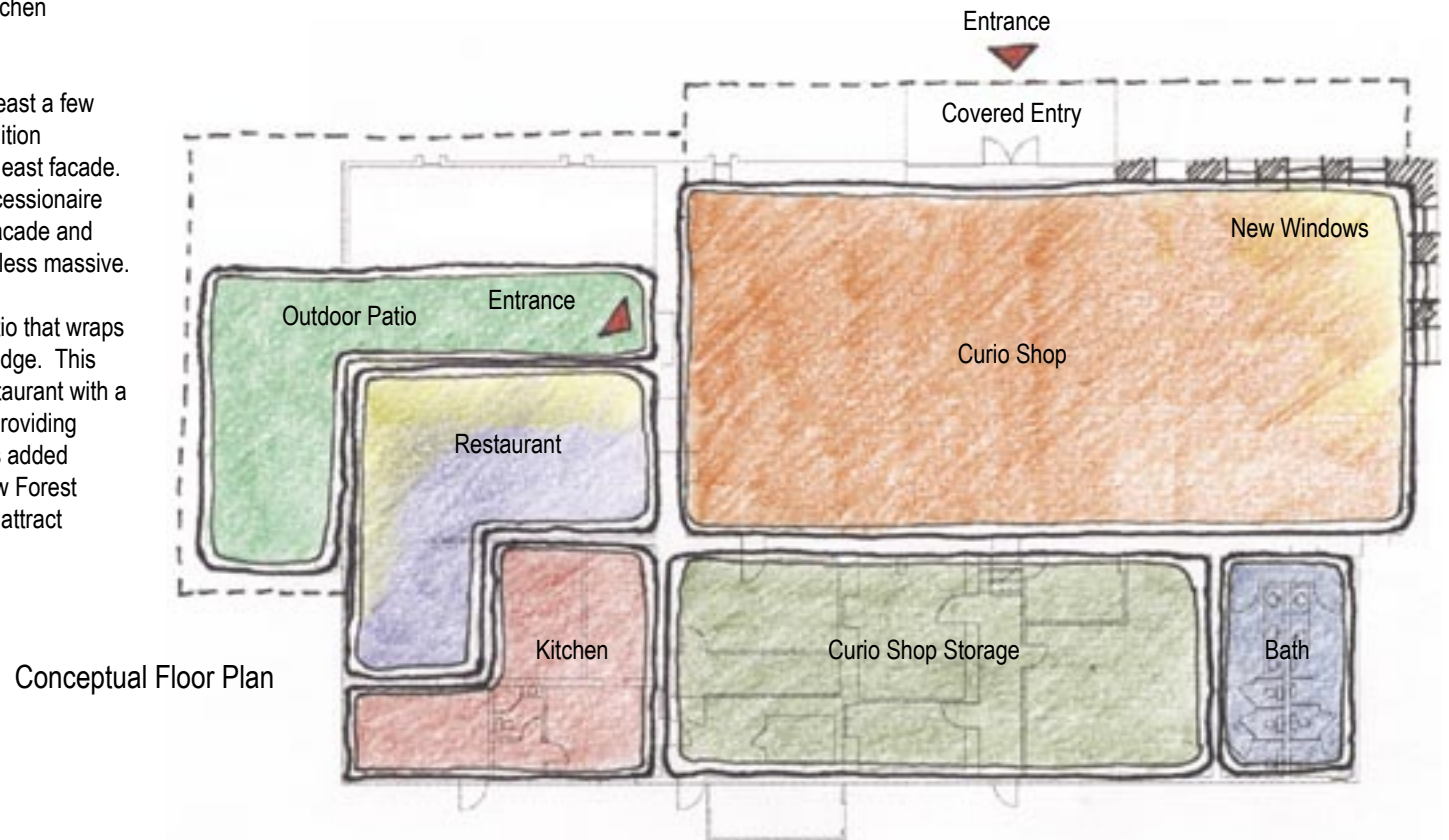
③ Reduce the Scale and Mass of the Building

Since there are no plans to restore the Rainbow Forest Lodge to any particular period, a reduction of the buildings perceived scale can be achieved without costing the concessionaire square footage.

- Remove the entrance canopy, thereby reducing the buildings vertical presence
- Reduce the restaurant dining space so that the north facade no longer reads as one continuous mass. The kitchen remains in the same place to avoid having to retrofit another area with kitchen equipment.
- Expand the curio shop to the east a few feet so that the bathroom addition no longer reads as part of the east facade. This will actually give the concessionaire more space, while the north facade and east facade will appear much less massive.
- Create an shaded outdoor patio that wraps the north-west corner of the lodge. This will ultimately provide the restaurant with a larger dining area while also providing picnickers a place to sit. This added outdoor activity at the Rainbow Forest Lodge's north-corner will help attract customers from the Rainbow Forest Museum.






Perspective from Rainbow Forest Museum



Rainbow Forest Cabins

RF151

Design Goals

- ① Remove Unsightly Equipment and Wiring from the Exterior 
- ② Remove Gable Roof 
- ③ Remove Entry Porch 

Maintenance References

Note: Because maintenance of Rainbow Forest Cabins is the responsibility of the concessionaire, this document does not present specific maintenance references for this historic resource. However, because Rainbow Forest Cabins is an important component in the overall Rainbow Forest Historic District, it is advisable for PEFO management and maintenance staff to be involved in maintenance and management decisions.

Building Background

Rainbow Forest Cabins is a small, one story stone structure dating to 1930. It is sited to the southeast of the Rainbow Forest Lodge. Photos dating from the 1940s show the building with a flat roof. The flat roof has been covered over with a gable roof and a small wood porch has been attached to the entry elevation. The interior originally consisted of two small studio apartments with kitchenettes, however it was remodeled into one apartment in the 1990's. The recommended management treatment is preservation / adaptive use. The building is considered contributing to the Rainbow Forest Historic District.

Design Strategy

The Rainbow Forest Cabins are one of the first buildings visitors see when approaching the Rainbow Forest Historic District along the park road from the north. While the building is in good condition, there is an assortment of items that could be cleaned up on the exterior of the building. If possible, the evaporative cooler and ductwork should be screened. Any unused conduit or wiring should be removed from the exterior of the building.

The gable roof should be removed to restore the historic character of the building.

The small entry porch should be removed to restore the west facade to its original appearance.



Rainbow Forest Cabins, 2004. *Photo by author*



Rainbow Forest Cabins from the 1940s. *PEFO Photo Archive #15745*



Rainbow Forest Cabins, looking north 1949. Note flat roof with parapets. *PEFO Photo Archive #15743*

Rainbow Forest Historic District

Design Guidelines for New Construction

Summary

This section provides an overview of considerations to be taken into account when constructing new facilities within the Rainbow Forest Historic District. Although there are few immediate needs for new space within Rainbow Forest, a new accessible restroom is needed. While it may be possible to expand or rehabilitate an existing building to accommodate this need, it is more than likely that a new stand alone structure will be constructed. Petrified Forest has received preliminary approval from AZSHPO to place the structure north of parking plaza and adjacent to the existing picnic area. In addition to sensitively placing the structure in the landscape, the scale, massing and materiality of a new building will be critical to preserving the openness of the central plaza and surrounding landscape.

Design Principles

When designing any new buildings for the Rainbow Forest Historic District, one of the most important considerations should be the overall form and massing of the building. How the new building relates to the Puebloan inspired buildings is important. Also, the overall scale of the building or addition should be deferential to the district's historic character.

Materials





There are a number of materials that are appropriate for new construction within the Rainbow Forest Historic District. The use of sandstone masonry would be a good choice because it is the most prominent building material at Rainbow Forest. However, a strict replication of the detailing utilized on the earlier sandstone buildings is not necessary. The use of details or construction techniques may be more reflective of those seen in contemporary building. For example, the use of steel for lintels and exposed structural elements could give any new structures

characteristics to distinguish them from older structures in the district. Other modern materials that may be used include: stucco and CMU.

Sustainable Design

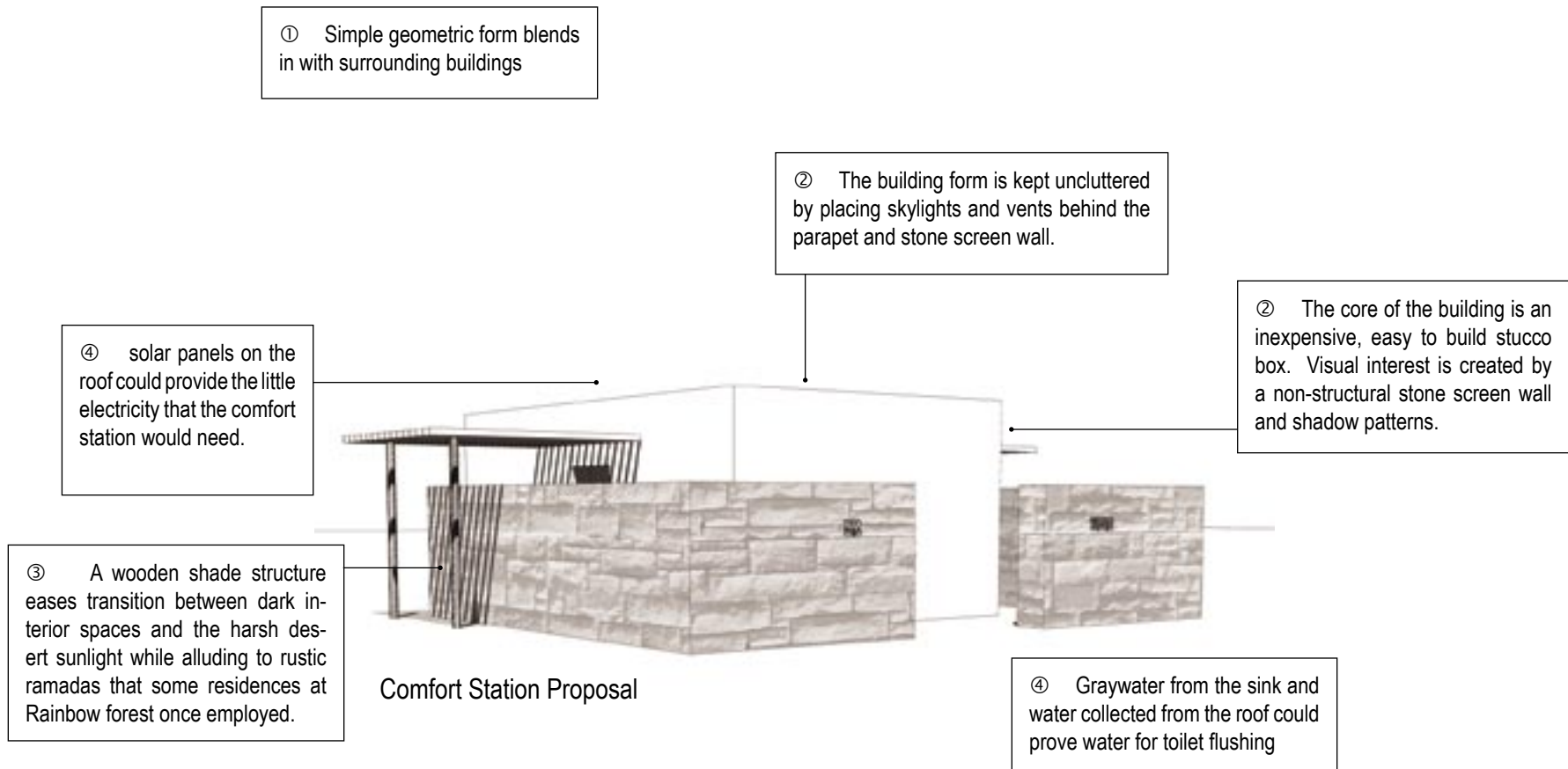
New sustainable technologies and ecological design principles should be incorporated into any new designs. The natural features of the Rainbow Forest environment, including solar and water harvesting opportunities should be explored.

Design Goals

- ① Building Forms and Massing should Compliment Historic Buildings 
- ② New Materials Should be Compatible with Existing Context 
- ③ Consider the Modern Interpretation of A Historic Material 
- ④ Integrate Sustainable Design Principles into any New Construction 

Rainbow Forest Historic District

Design Guidelines for New Construction



Painted Desert Community Complex Historic District (PDCCHD)

Introduction

In this section

- ① Design Guidelines for Classified Structures and Landscape Elements in the PDCCHD.
- ② Links to suggested maintenance and preservation treatments.
- ③ Info on appropriate materials and finishes for the PDCCHD.

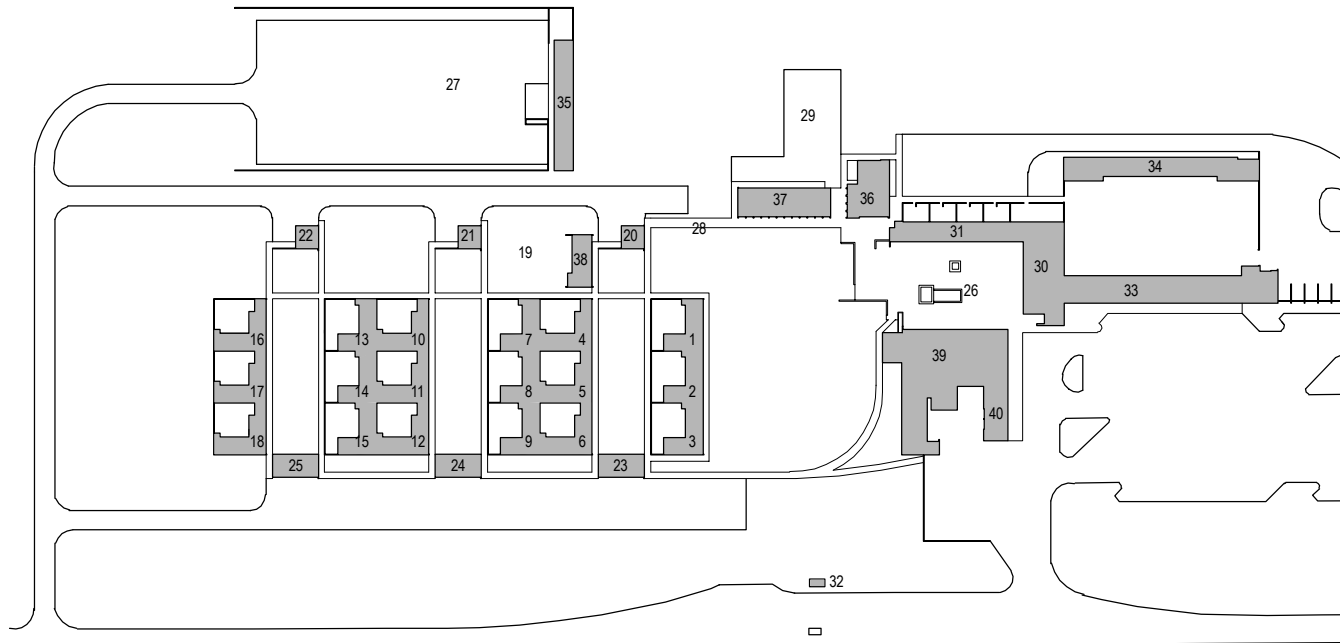
References

Allaback, Sarah *Mission 66 Visitors Centers: a History of a Building Type*

U.S. Department of the Interior *Painted Desert Community Complex Historic District National Register of Historic Places Registration Form*

U.S. Department of the Interior *Painted Desert Community Complex Historic District Historic Structures Report*

U.S. Department of the Interior *Painted Desert Community Complex Historic District List of Classified Structures*



0 50' 100' 150' 200'



True north



Reference north

1-18	PD201-218	PD Residences	32	PD252	PD Gatehouse
19	PD219A,B	PD Picnic Shelters	33	PD254	PD Maintenance and Fire Cache
20-22	PD220-222	PD Two Car Ports	34	PD255	PD Vehicle Storage
23-25	PD223-225	PD Four Car Ports	35	PD256	PD Trailer Court Building
26	PD226	PD Central Plaza	36	PD257	PD Community Building
27	PD227	PD Trailer Court	37	PD258	PD School Building
28	PD228	PD Covered Walkways	38	PD258A,B	PD Teacherage
29	PD229	PD Tennis Courts	39	PD259	PD Fred Harvey Curio Shop and Rest.
30	PD251	PD Visitors Center and Admin. Bldg.	40	PD260	PD Fred Harvey Service Station
31	PD251A-H	PD Apartments A-H			

Painted Desert Residences 201-218

PD201-218

Design Goals

- ① Preserve and maintain the 🏠☺️✂️ south facade of Block A.
- ② Replace all T1-11 siding with 🏠☺️ more appropriate cladding.
- ③ Remove covered mudrooms 🏠 in all C plan units.
- ④ Remove all unnecessary can-tilever support members. Replace where necessary with pipe columns.
- ⑤ Coordinate future interior 🏠☺️ renovations.
- ⑥ Drainage issues should be 🏠☺️✂️ studied and an over arching drainage plan should be instated.
- ⑦ Investigate the possibility of ✂️🌧️ water harvesting.

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The Painted Desert Residences were designed by Neutra and Alexander in 1961. They were constructed by the Rasmussen Construction Company from 1961 until 1963. Several major changes have been made to the residences including; the removal of much of the south facade of blocks B-D and the insertion of frame wall and large wood sash windows, The enclosure of the service yards in all units, the removal of all original windows and sliding doors, the refinishing of all unit interiors several times in several ways, the addition of a sloped roof to units C and D, the sporadic addition of extra space on several kitchens, among other lesser things.

Design Strategy

The south facades of all residential blocks, excepting block A, have been modified to an extent that makes restoration impractical. The original fabric of the south facade of Block A remains relatively intact, and is approximately representative of all the original residential south facades. This façade is also the most visible of the residential facades from the more public areas of the PDCCHD. Due to its high integrity and visibility it should be a priority of the park to maintain block A's façade as the only unaltered south façade. Extra care should be given to maintaining its CMU masonry and plaster work. It may even be appropriate to restore the eyebrow windows to the jalousie windows specified in the original drawings.

At some point, most likely in the 1970s, the southern facades of blocks B-D were dramatically altered to provide more interior light and insulation. An approximately 12'-9" section of block was removed from the south wall of the living area of each unit and infilled with wood frame and a large wood sash window. Eventually T1-11 siding backed with rigid insulation was

installed on these facades. Since it is desirable to keep the added natural light and insulation, yet the board and batten siding is incompatible with the character defining materials of the PDCCHD a solution that uses materials more in harmony with the original material palette is in order. Two design options have been illustrated at the end of this section.

Exterior treatments and hardware, i.e. doors heads, door handles, lights, doorbells, unit numbers, scuppers, etc., should be coordinated and similar in appearance and material.

All service yards converted to covered mudrooms in the northern units in each block should be removed. This will help the restore the northern profile of each block.

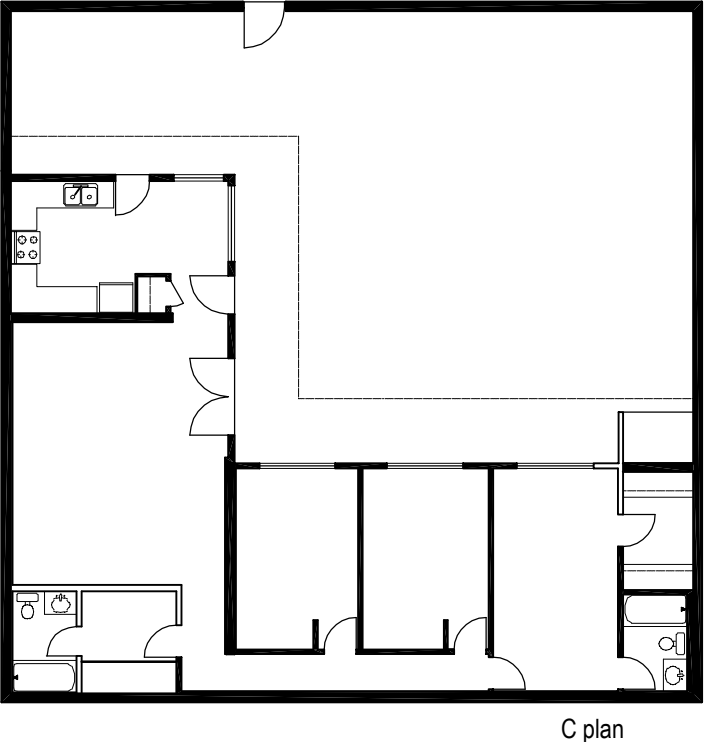
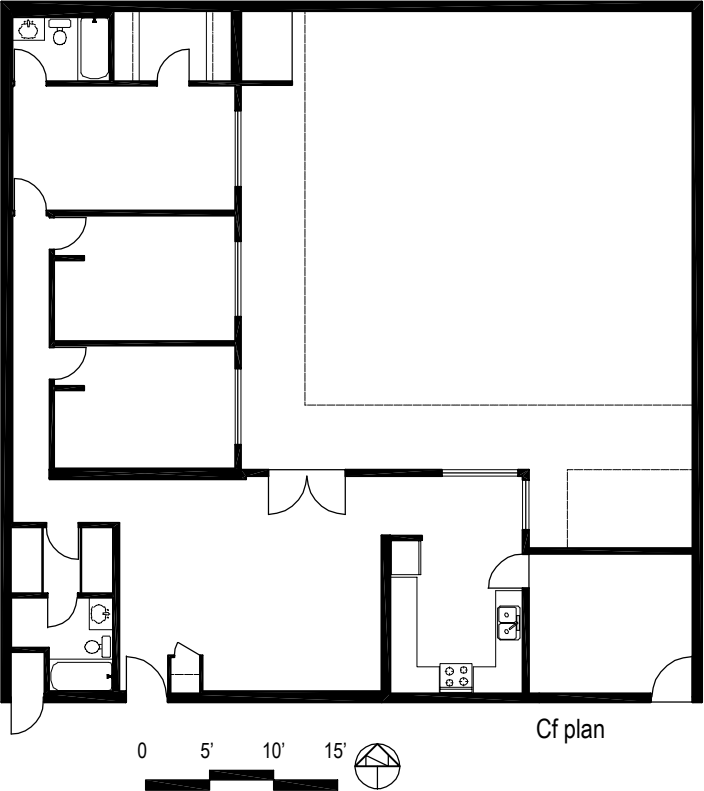
A structural analysis of the cantilevers along the south facades of the residence blocks should be conducted and supports should be used only as needed. Supports should be as uniform in placement and spacing as possible. They should be simple pipe columns, similar to those that support the covered walkways. No support should be placed at a corner, this will help to best preserve the "floating" effect of the cantilever.

Over the years the interior of each unit has been renovated using whatever materials and furnishings were available. For future renovations, guidelines should be followed so that a common decorative language is eventually reestablished within all PD residential interiors. Ornamental or floral patterns should be avoided for furniture and flooring. A solid color or simple geometric pattern is more appropriate. Ceiling fans and light fixtures should also be free from ornament and alike in nature. Cabinetry should be solid in color and free from decorative molding. When possible, the hardware from the original cabinets should be used on new cabinets,

Painted Desert Residence Plans

Drainage is handled differently in each residential block. An in-depth study of the state of the current drainage system should be made of the residential blocks and a coordinated system should be developed for the whole residential area. The possibility of water harvesting should be investigated as a way to maximize water conservation and as a way for keeping water away from the foundations of the buildings.

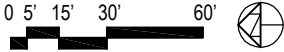
The Painted Desert Residences consist of 2 different plans; the C plan and the Cf plan. Block A consists of 3 C plan units. Block B and C consist of 3 C plan units and three Cf plan unit; the C plan units being on the north side and the Cf plan units on the south side. Block D consists of 3 Cf plan units. Almost all residences have been modified in some way. Consequently, no longer can any two residences be considered exactly alike. The plans presented below should serve as base plans only.



Painted Desert Residence Plans



Site plan





This photo, likely taken in sometime between the late 1960s and the mid 1970s, displays the original service yard configurations for the Cf plan units. The support column holding up the cantilever is also a good example of an appropriate support column. *PEFO Photo Archives photo by Stitt*



PD Residence 217 c.1970s *PEFO Photo Archive, uncataloged*



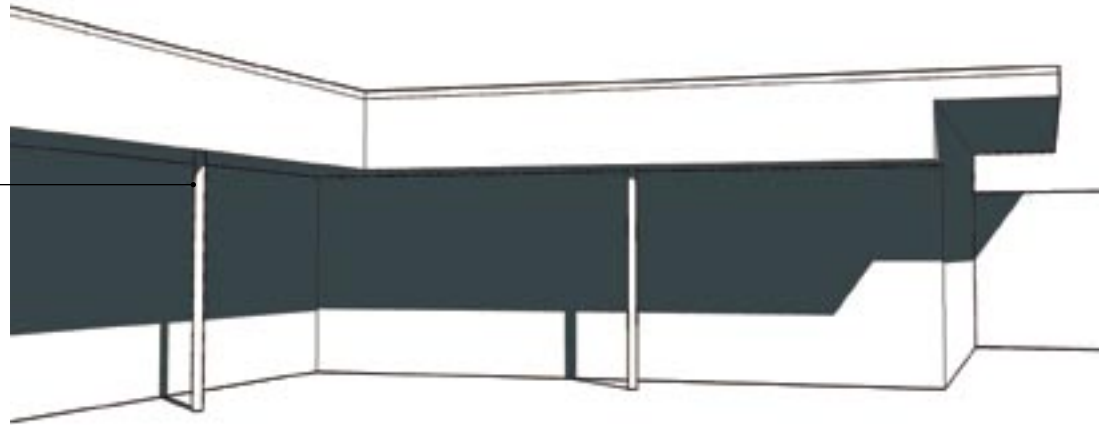
PD Residence Block A 2004 *2005 Photo by author*

② This photograph from the PEFO Archives shows the result of alterations made to provide more lighting to the Cf plan residences. The photograph shows the wall as one could expect to find it if the board and batten siding that currently clads the south facades of blocks B-D was removed.

① The south facade of block A serves as an example of what all residence south facades once looked like. The eyebrow window configuration on the other south facades was slightly different, but the overall effect was the same. A horizontal plaster band runs the entire length of the facade and along with the cantilever adds to the dramatic perspectival effect of long horizontal lines converging.

PD Residences Design Goals Illustrated

⑤ Supports, if needed, should help to preserve sense of “floating” cantilever by not being placed directly at a corner.



③ All coping/flashing should be of a uniform size. For specifics, see maintenance references

Photo by author



③ All doorbells should match doorbell pictured.

Photo by author

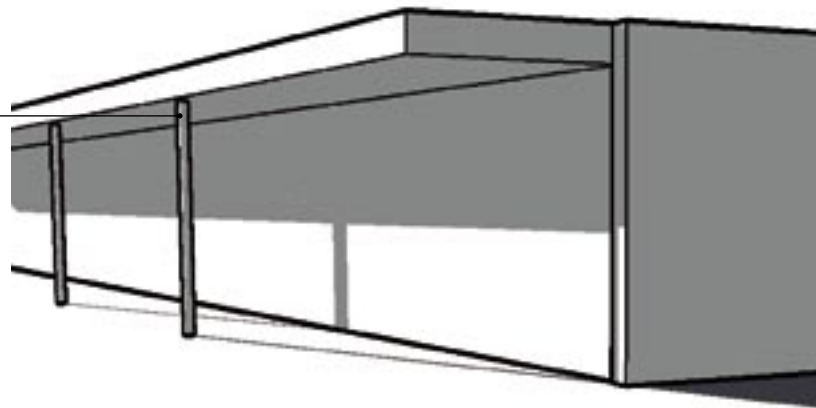
⑤ inappropriate column style



Residence Block B 2004 2004 Photo by author

⑦ evaluate current roof drainage collection system, apply uniformly to all PD residences

⑤ More appropriate column style and placement. Note, no column at corner, to preserve "floating effect."



③ inappropriate door top detail



Photo by author

③ appropriate door top detail

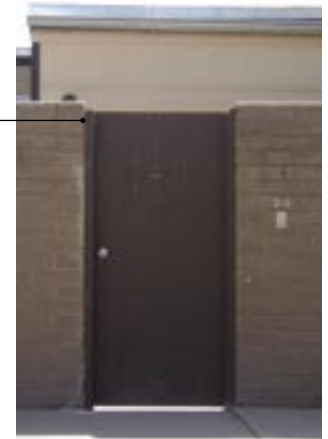
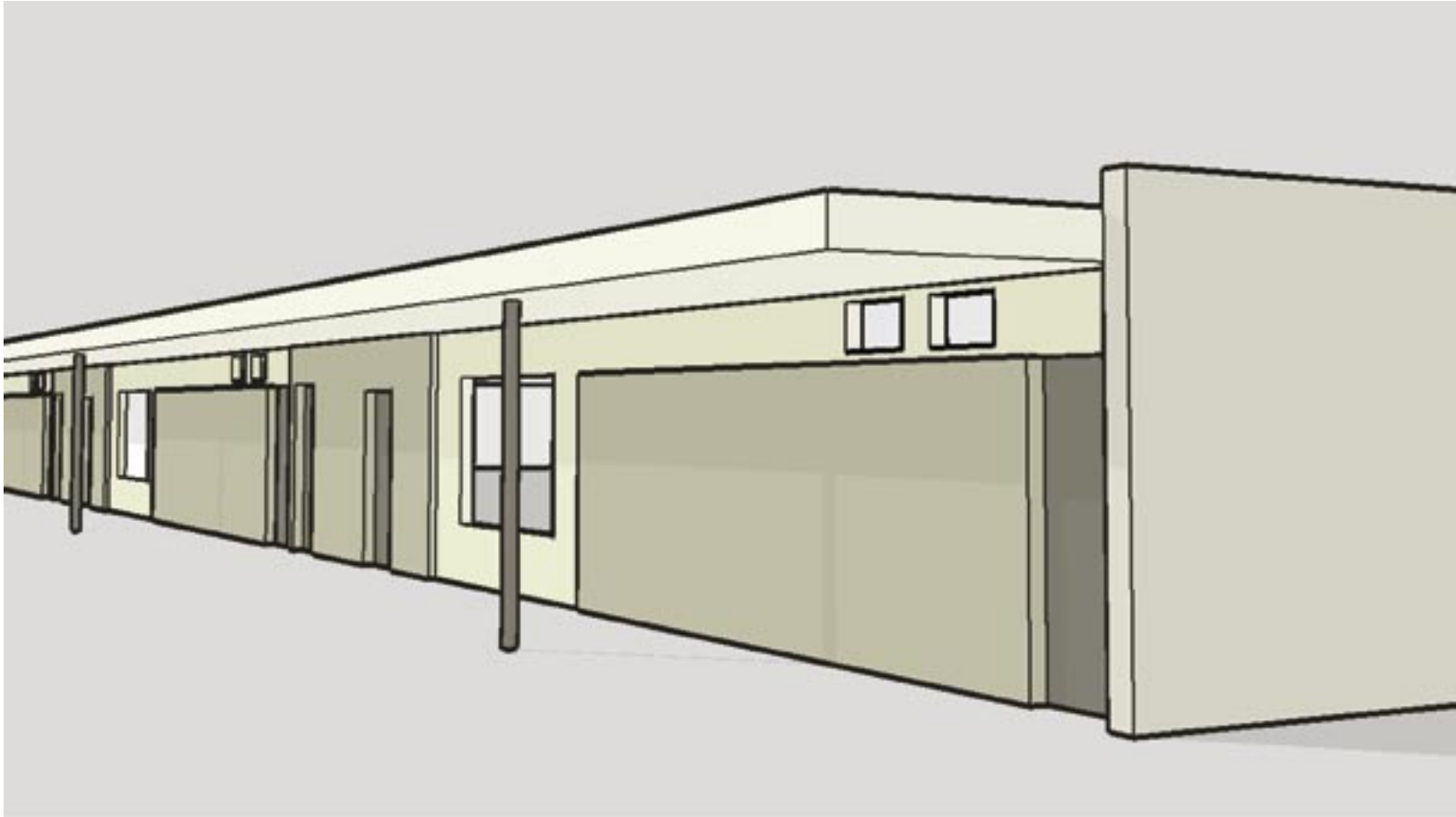
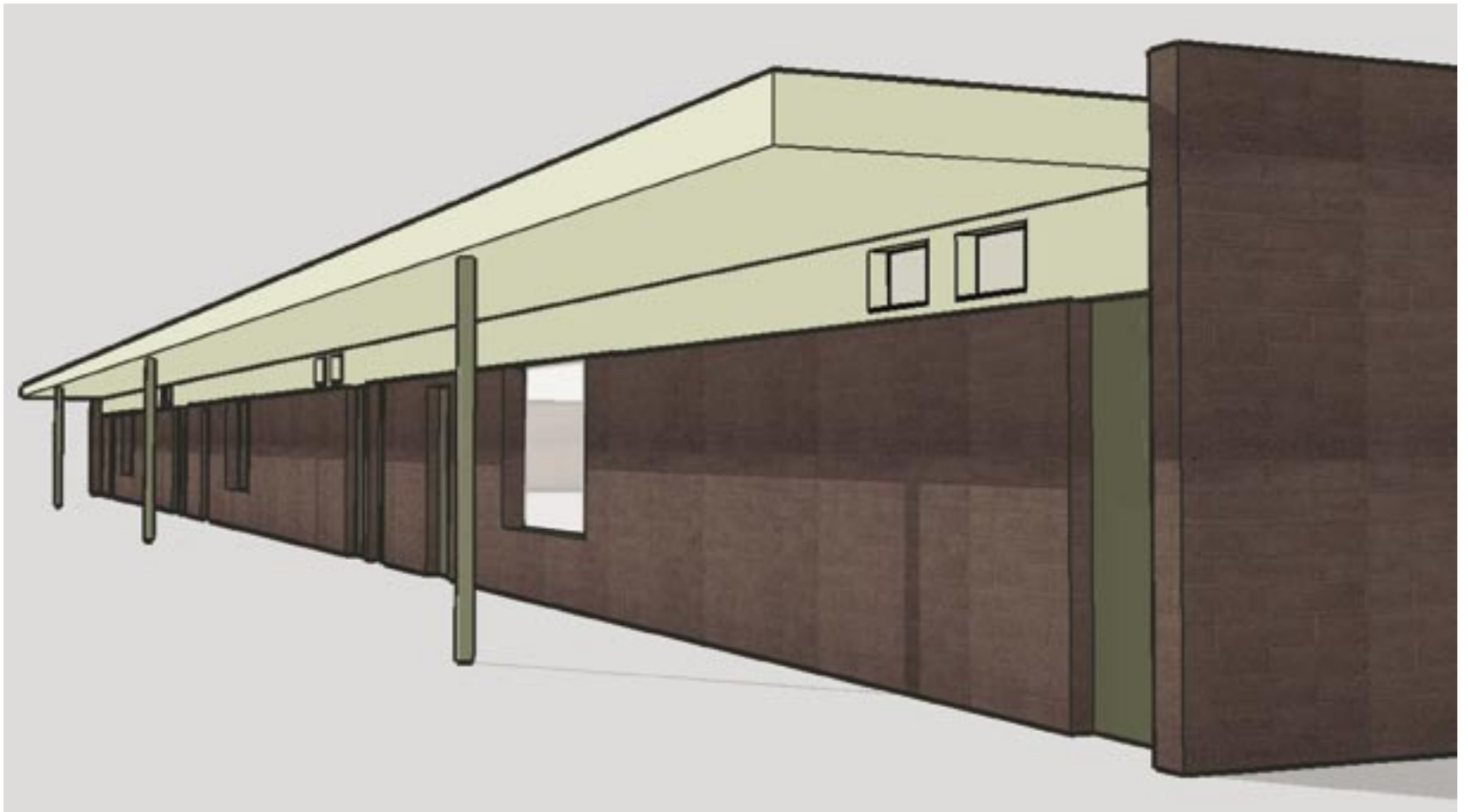


Photo by author

PD Residence South Facade Design Option 1



② This design option examines the possibility of removing the board and batten siding but leaving the frame and insulation. The frame would then be clad with plywood and stuccoed. The horizontal band that originally ran the entire length of the facade would be re-established in some places and would blend with the area where block has been removed around the window. The different stuccoed planes would be colored similarly to the colors existing now, with a darker brown similar to the color of the block for the protruding planes and a lighter brown matching the color of the cantilever for the recessed plane. All edges would be left without trim. This option seeks to balance the original design intent and materials with the current needs and resources of the park. Eventually it would be desirable to replace the large wood frame windows with insulated aluminum frame windows, similar to others found in the Painted Desert Community Complex.



② This design option illustrates the possibility of removing the board and batten siding and repairing the masonry underneath. Areas where block has been removed would be reconstructed, but the large window would remain. The stucco band that historically ran across the entire length of the facade would be reestablished. This design option seeks to restore the facade as closely as possible, while preserving the added natural light provided by the large windows. Eventually it would be desirable to replace the lar

Painted Desert Picnic Shelters

PD219 A&B

Design Goals

- ① Regularly clean charcoal grills. ☺
- ② Improve accessibility to electrical outlets and lighting control. ☺

Maintenance References

Concrete
Drainage
Electrical Retrofit
Exterior Finishes

Building Background

The Picnic Shelters were designed and built by the National Park Service and constructed in the mid 1990s based on a model from the 1960s, which can be seen at other locations such as Rainbow Forest and Chinde Point. The picnic area was called out in the original PD Community Complex plans, but whether or not any structures ever existed on the current site previous to the 1990s structures is unknown.

Design Strategy

The picnic shelters remain in good condition and have undergone no alterations since their construction. They should be preserved and maintained as they are.

Charcoal grills should be cleaned regularly to keep them free from bird droppings and other grime.

In order to make this picnic area more useful to residents of the PDCCHD, electrical outlets and light controls should be more accessible to them. A motion detecting system that controlled both lighting and the availability of electricity would be an appropriate solution.

















Picnic shelters looking northwest 2004 Photo by author

Painted Desert Two-Car Carports

PD220-222

Design Goals

- ① Remove east facade infill. 
- ② Remove T1-11 siding and replace with stucco or plaster.  
- ③ Replace obtrusive outdoor lighting. 
- ④ Replace roof.   
- ⑤ Relocate ladder storage.  
- ⑥ Add vertical coping to unit PD222.  
- ⑦ Lower impact of exterior conduit.  
- ⑧ Investigate storage rooms for asbestos panels. If found, remove or contain. 

Maintenance References

Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Roofing

Building Background

The two-car carports were designed by Neutra and Alexander in 1961. Construction was carried out by the Rasmussen Construction Company and completed in 1961. Originally, the beam and columns were painted metallic grey with the 1"x4" filler above dark grey. Soffits and all exposed wood were painted white. PD222 is the northern most car port, PD221 the middle carport and PD220 the southern most carport. Various alterations have been made to all the two-car carports at unknown dates since their construction. Frame partition walls have been added to the interiors of all units. Also, the north facades of each unit has been infilled. The east facade of PD220 has been completely infilled, obscuring the roof cantilever and support beam. PD222 retains the highest level of historic integrity as the east facade remains open and the cantilever unobstructed.

Design Strategy

The most important design feature of the two-car carports is the cantilevered roofs and the posts and beams that the roofs are supported by. The eloquent way the roof is supported by, and extends itself over, the simple wooden beam is the central point of visual interest in the original design. Since construction, the structural clarity of the buildings has been obscured by the addition of partition walls and the framing of the east and north facades. Therefore, the priority should be to remove any material that obscures the cantilevers, posts, and beams. Framed partitions should be either removed or shortened to reveal their non-structural function. Of all the two car ports, PD222 retains the highest level of historic integrity. It should serve as a model for changes made to the others.

North facades should be removed. If this is not feasible, all T1-11 siding on the north facades should be stuccoed over with a smooth finish to at least use a material that was

used in the original design of the complex. Any accents, such as windows, doors, or trim should be removed or repainted to match the color of the north wall.

Exterior lighting on the east walls of units PD221 and PD222 is obtrusive and should be replaced with lighting similar to that of PD220 or by suggestions made in the Exterior Lighting Cut Sheet.

The current foam roof should be replaced with a single-ply membrane roof. Roof drainage should be handled in a manner similar to that of other PD buildings with single-ply membrane roofs. The possibility of water harvesting should be investigated. Scuppers should be simple and durable.

Ladder storage and ladder storage hardware should be removed from units PD220 and PD222, repairing holes created in block from removal.

Coping on the west wall of unit PD222 should be detailed similarly to that of PD 221, with the coping continuing vertically down the wall.

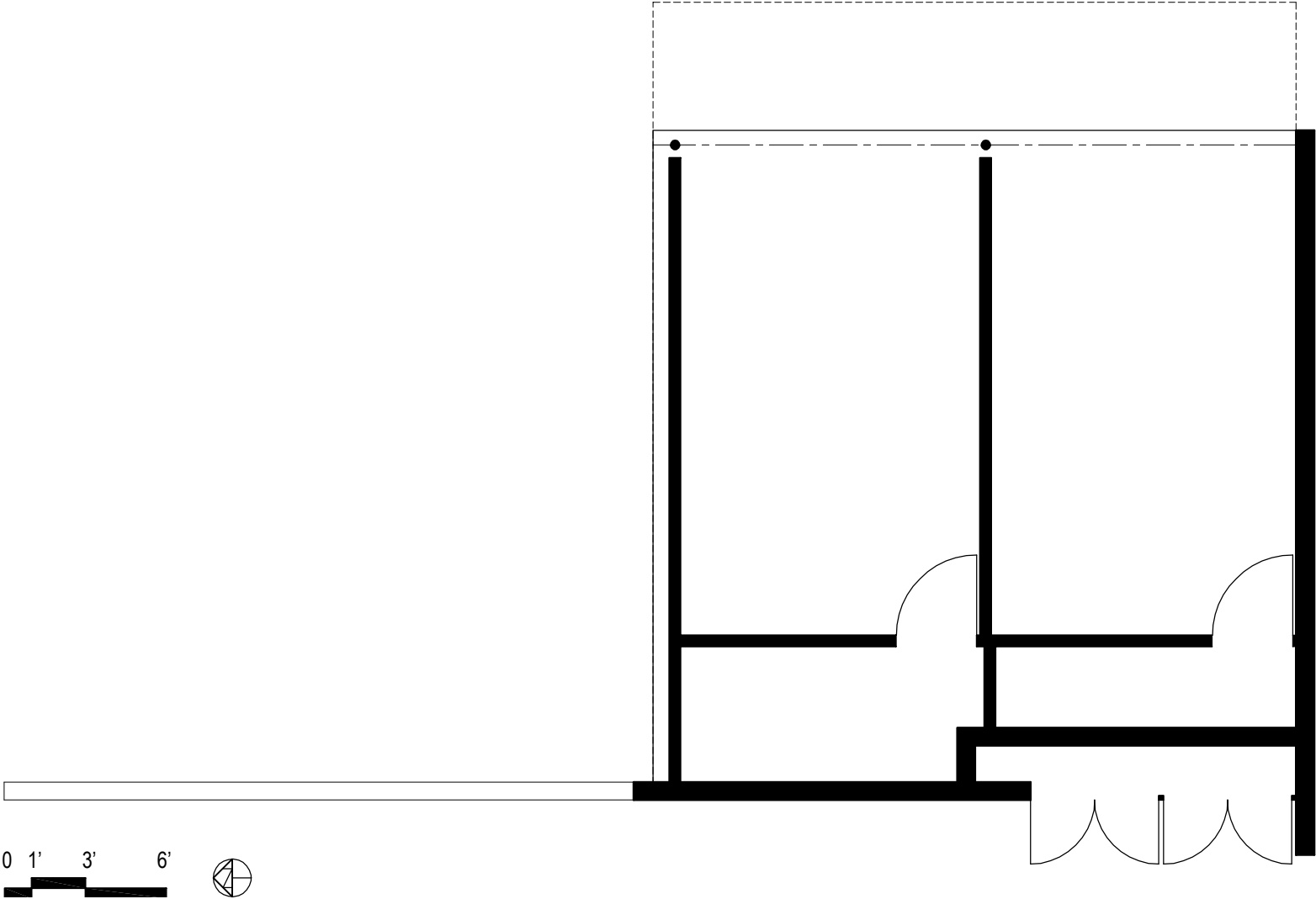
Exterior conduit should either be moved to a less obtrusive location or painted to blend with the block.



Two-car carport as it looked when built

Painted Desert Two-Car Carport Plan

Note: Plan is for reference only and exhibits existing conditions typical of the 3 two car port units. Individual units vary slightly from the plan below and should be modified to address the design strategies outlined.



PD 220-222 Design Goals Illustrated



PD220 looking south-west 2004 Photo by author



Photo by author

③ Flashing should match fascia in color

④ Outdoor lighting should be less obtrusive, use PD220 as a model



Photo by author

② Remove north infill and interior partitions

① Remove east facade infill, as in PD222



Photo by author

⑤ Replace foam roofs with single-ply membrane. Remove foam from parapets

② If north infill cannot be removed, accents should be removed or painted, including doors, trim and flashing



Photo by author



PD 222 looking west 2004 Photo by author

⑦ Apply vertical coping to exposed block ends on PD222, as done on PD220

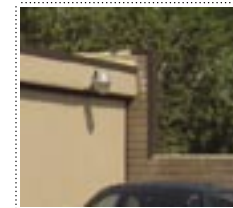


Photo by author

Painted Desert Four-Car Carports

PD223-225

Design Goals

- ① Remove west facade PD225. 🏠😊
- ② Remove partitions. 🏠
- ③ Replace obtrusive outdoor lighting. 🏠😊
- ④ Replace roof. 🏠😊✂️
- ⑤ Lower impact of exterior conduit. 🏠😊
- ⑥ Investigate storage rooms for asbestos panels. If found, remove or contain. 🏠

Maintenance References

Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Roofing

Building Background

The four-car carports were designed by Neutra and Alexander in 1961. Construction was carried out by the Rasmussen Construction Company and completed in 1962. Originally, the beam and columns were painted metallic grey with the 1"x4" filler above dark grey. Soffits and all exposed wood were painted white. PD225 is the northern most car port, PD224 the middle carport and PD223 the southern most carport. At an unknown date frame partition walls were added to all units. Also at an unknown date, the west facade of PD225 was framed in with board and batten siding. When built, the support beam extended over the sidewalk to a pipe column and served as a portal to the south residences of each block. For unknown reasons, these were removed at an unknown date from each four-car carport and the beams were cut flush with, and attached, to the north block walls.

Design Strategy

The most important design feature of the four-car carports is the cantilevered roofs and the posts and beams that the roofs rested on. The eloquent way the roofs are supported by and extend themselves over the beam, which also originally extended themselves over the adjacent sidewalk, is the central point of interest in the design. Since construction, the structural clarity of the buildings has been obscured by the addition of partition walls and the infilling of the entire west facade of unit PD225. This facade should be removed.

Frame partitions should be either removed or shortened in all units to reveal their non-structural function. If not removed, all partitions should be clad on both sides and painted white.

Flashing should conform to dimensions established in the Exterior Finishes maintenance cut sheet.

Exterior lighting should be reduced in scale and incorporated into the soffit of the cantilever.

The current foam roof should be replaced with a single-ply membrane roof. Roof drainage should be handled in a manner similar to that of other PD buildings with single-ply membrane roofs. The possibility of water harvesting should be investigated. Scuppers should be simple and durable. Any gutters should be removed.

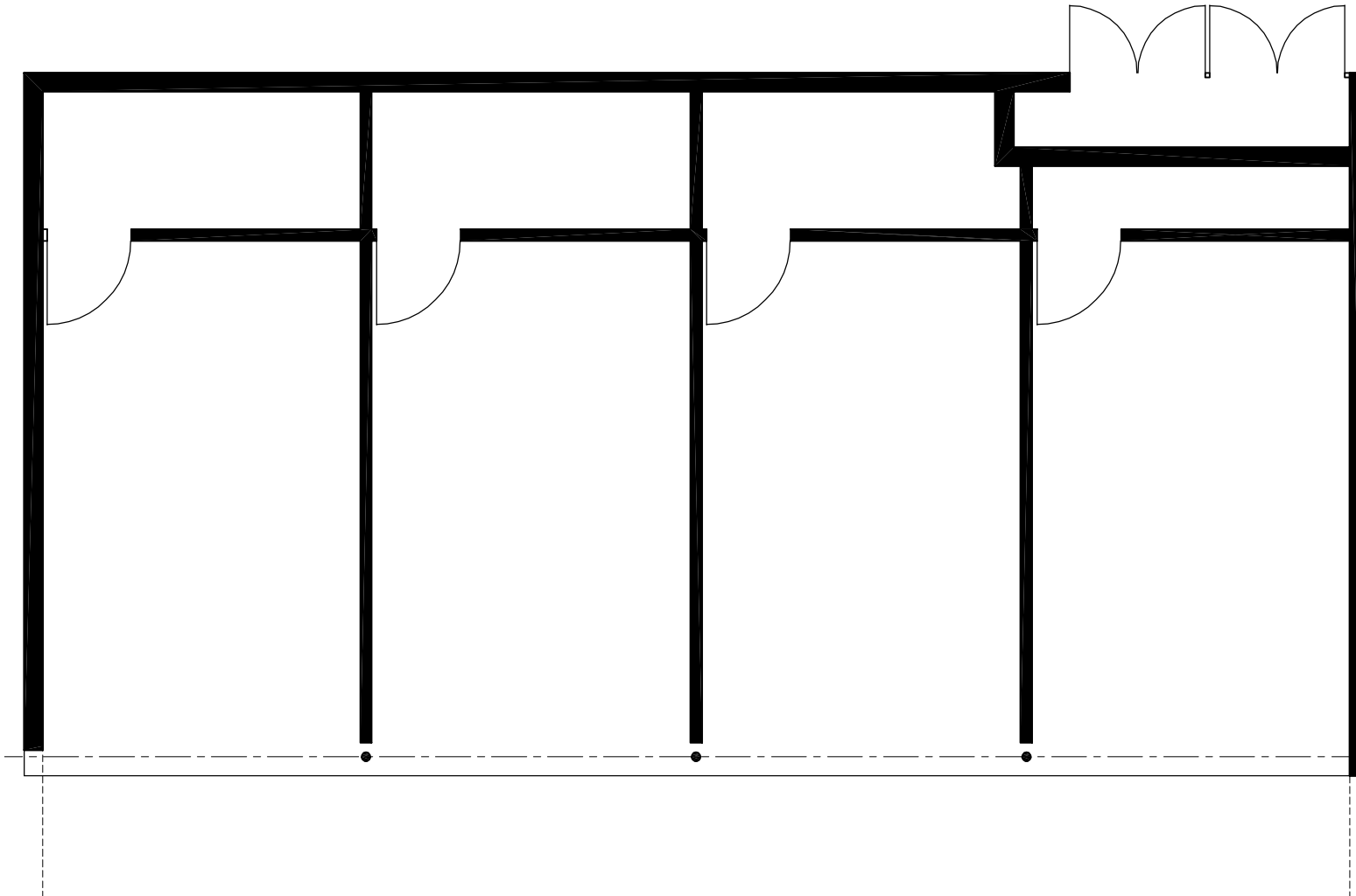
Any unnecessary exterior conduit should be removed, essential conduit should either be moved to a less obtrusive location or painted to blend better with the block.



Four-car carport as it looked when built

Painted Desert Four-Car Carport Plan

Note: Plan is for reference only and exhibits existing conditions typical of the 3 four car port units. Individual units vary slightly from the plan below and should be modified to address the design strategies outlined.



0 1' 3' 6'



PD 223-225 Design Goals Illustrated



PD225 west facade 2004 Photo by author

① ② ③ Remove west facade and interior partitions, flashing should blend with fascia



PD 225 c.1963 PEFO Photo Archive photo by Stitt

④ Exterior lighting should be less obtrusive, should be smaller and attached to the fascia or soffit

② Replace foam roof with single-ply membrane roof, remove oversize scuppers replace with smaller scupper, remove gutter, remove foam from parapet

Painted Desert Central Plaza

PD226

Design Goals

- ① Repair patterned concrete work. 🏠☺✂
- ② Replace block cap on sandstone masonry planter. 🏠☺✂
- ③ Replace gabled information board. 🏠☺
- ④ Replace decorative benches. 🏠☺
- ⑤ Re-evaluate and replace or restore plaza drainage system. 🏠☺✂
- ⑥ Clean sandstone benches regularly. ☺

Maintenance References

Aluminum Windows and Doors
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Window Replacement (PD)

Building Background

The central plaza serves as the focal point of the PDCCHD. All public and private spaces are mediated by this area. It was designed by Neutra and Alexander in 1958 and constructed by the Packer Construction Company in 1962. Landscape Architects from the Western Office of Design and Construction worked with Neutra and Alexander on the landscape design for the plaza, which included modern descendants of Triassic period plants and a marsh-like reflecting pool. Nearly all of the original plantings have since been removed. A more natural area with walking paths to the north was also designed by Neutra and Alexander and the WODC, but not realized until 2005.

Design Strategy

Currently, the central plaza serves as little more than a curiosity to park visitors. There is little to engage them in the plaza and it lacks adequate shading and seating. This lack of public use stems from the lack of any compelling reason for the visitor to be in the space, and is independent from the plaza's current state of deterioration. Efforts should be made to make this area more attractive for public use. The natural area with walking paths to the north that is currently being developed should help achieve this. Frequent ranger programs conducted in this area would also help. Impermanent outdoor seating for the Fred Harvey restaurant could also help activate the plaza. The idea of adding temporary yet attractive shade structures should also be entertained. This would help to make the space more inviting until the trees that have been recently planted are able to provide adequate shade. If adequately shaded seating is provided it will be used.

Repairs should be made to the patterned concrete work in the plaza. Concrete work should be carefully restored with attention given to original pattern, texture and color.

Original concrete work should under no circumstances be replaced with uncolored, un-patterned concrete. For further specifications, see the Concrete maintenance cut sheet

The block cap that tops the southern sandstone masonry planter should be replaced due to the inconsistency of previous repairs. Block and mortar similar to the original block and mortar should be used. Work should be completed with the highest standards of craft.

The gabled information board located near the entrance to the visitor center should be replaced with an information board more sympathetic to Modern design principles. A simple vertical information tree similar in design to the one located at the entrance to Puerco Pueblo would be appropriate. The orientation of the board should be turned ninety degrees so it doesn't block views of the plaza from the visitor center and so it can be viewed, and serve as a welcoming element, upon entrance to the plaza from the Visitor Center or the parking lot. It could also be placed near the entrance to the natural area north of the central plaza to help draw people through the plaza



Central plaza looking south 2004 Photo by author

to the natural area.

The trash can nearest the existing information board should be moved to a less conspicuous location and the bench should be restored to its original configuration.

Replace decorative benches that line the Fred Harvey building with benches more consistent with the character defining features of the PDCCHD. Monolithic cast concrete benches would be cheapest, easiest, and most appropriate. Concrete of similar color should be used for benches as was used in patterned concrete work.

The original drainage system in the plaza is obsolete because of the incompatibility of the drainage systems of newer roofs on the surrounding buildings. Drainage should be evaluated in depth for the entire plaza and the old drainage system should be replaced or repaired in respect to the findings of that study.

Built in place sandstone benches should be cleaned regularly



Central Plaza 1963 PEFO Photo Archives photo by Beinlich

③ Replace and re-orient information board and move trash can to a less conspicuous location, restore bench to original configuration



Central plaza 2004 Photo by author

① Repairs to concrete should match original in pattern, color and texture

② reconstruct block cap on sandstone planter




Appropriate bench Photo by Author

④ replace benches with more appropriate benches, poured in place concrete is an appropriate replacement

Painted Desert Trailer Court

PD227

Design Goals

- ① Restore area enclosed by  planters near the southern end of the trailer court.

Maintenance References

Concrete
Concrete Masonry Units
Drainage
Electrical Retrofit
Exterior Finishes

Building Background

The trailer court was designed by Neutra and Alexander in 1961 and constructed by the Rasmussen Construction Company the same year.

Design Strategy

An interesting aspect of the trailer court is that the large expanses of block walls remain in good condition when compared to some of the other non-load bearing walls in the complex. The construction of these walls should be studied in order to determine what makes them less susceptible to damage than other walls within the complex.

The area enclosed by planters on the southern end of the trailer courts should be restored and used as an outdoor gathering area for residents of the trailer court.



Trailer court looking north 2004 Photo by author

Painted Desert Covered Walkways

PD228

Design Goals

- ① Re-evaluate drainage system. ☺
- ② Investigate water harvesting possibilities. ✖

Maintenance References

Concrete
Drainage
Electrical Retrofit
Exterior Finishes
Roofing

Building Background

The Covered Walkways were designed by Robert Alexander and built by Glen D. Plumb in 1964.

Design Strategy

The covered walkways remain in good condition and should be preserved and maintained as they are. A comprehensive study should be done on drainage issues for the entire PDCCHD. In this study the drainage from the walkways should be examined. The possibility of the columnar supports performing double duty as downspouts should be examined, as the current method is visually awkward. The possibility of water harvesting should be studied.



Covered walkway looking east 2004 Photo by author

Painted Desert Tennis Court

PD229

Design Goals

- ① Repair/replace pavement. 🏠👤✂️
- ② Examine different wind blocking techniques. ☺️

Maintenance References

Concrete
Electrical Retrofit
Exterior Finishes (PD)

Building Background

Construction of the Tennis Court began in 1963 and was finished in 1965. At a later date basketball hoops were added and the tennis net fell to the wayside.

Design Strategy

The PD Tennis Court is still functional, but in need of maintenance. The pavement is cracked in many places and may need to be entirely replaced. The fence surrounding the courts serves primarily to block the wind, which it does fairly well on the east side of the court. However, this system too is in need of repairs and it might be favorable to examine different wind blocking/ shading techniques that are more attractive than the current chain link fence.



Tennis court looking east 2004 Photo by author

Painted Desert Visitors Center and Administration Building

PD251

Design Goals

- ① Remove hipped roof; restore flat roof, exposing spider leg outrigging over north terrace. 🏠
- ② Remove any extraneous downspouts, gutters, conduit, and pipes. 🏠😊
- ③ Restore E facade/terrace. 🏠😊
- ④ Restore NW corner of building. 🏠😊
- ⑤ Relocate information desk. 🏠
- ⑥ Relocate auditorium. 🏠
- ⑦ Restore N terrace entrance. 🏠😊
- ⑧ Restore 2nd floor hallway ceiling. 🏠😊
- ⑨ Coordinate interiors and hardware. 😊
- ⑩ Install HVAC system, remove all window AC units 😊✂

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The Visitor Center and Administration Building was designed by Neutra and Alexander in 1961 and built by the Kealy Construction Company in 1962. Sometime in the 1970s the east half of the visitors center was framed in to gain space for an auditorium. In 1988 a hipped metal roof was added to the building. This roofed in a terrace that overlooks the central plaza to the north. Also around 1986-1987 a similar terrace directly east of the library was enclosed. The interiors of the building have been altered several times since its construction.

Design Strategy

The VC&A building contains one of the most distinctively “Neutra-esque” characteristics; the structural steel “spider leg” outrigging that was a trademark of Neutra’s later work. Because one of the main reasons for preserving this building is its association with Richard Neutra, it is recommended that when the opportunity presents itself, the “spider legs” should be restored to their original configuration, both in the north terrace and in the terrace previously adjacent to the library.

In several places downspouts have been placed in a way that mars the building’s appearance. Downspouts should be placed as inconspicuously as possible, and painted so that they match their surroundings.

The east facade has been altered in several places. The terrace east of the library that was walled in should be at least partially restored. If it is not practical to restore it completely to an exterior space, then perhaps it can be restored in a way that exposes the original “spider leg” outrigging, but allows for the space to still be enclosed. This could perhaps be accomplished by using glass between the I-beams, instead of just framing them in. Since the east terrace was originally roofed, it may be possible to restore a smaller portion of terrace and

still leave some space for the added rooms at the back. Any T1-11 siding that has been added to the east facade should be removed and replaced with stucco, a material more in harmony with the original material palette. Original window configurations should be restored.

The north-west corner of the building, where the PD Oasis building and the PD VC&A come together is an important visual intersection. It is the terminus of long perspectival lines created by the elongated horizontal facades and cantilevers of the intersection buildings. This is the point where all new coming visitors’ eyes are first drawn too, therefore it is important that this be one of the most pristine areas architecturally. The unpainted lumber that runs along the bottom edge and the vertical wood strips that clad the facade above the entrance area should be removed. This area should be stuccoed smooth. The tint that has been added to the windows of the superintendents office should be removed. Downspouts from the roof should be relocated to a less visually important area.

The original flooring throughout the entire building has been replaced sporadically over the years, adding to the feeling of incoherence between the different building spaces. A single flooring should be selected for the entire building. It might be useful to consider the use of tiled carpeting. The aesthetics and interchangeability of tiled carpet works well with Modern design principles, and the convenience of being able to replace damaged sections of the carpet will be an added bonus.

The information desk should be moved to the opposite side of the visitor center, where it resided historically. This will help to create a more private feeling for the stairs and door located on the south wall. This will also free up the view out the north window-wall into the

plaza area. Eventually, it should be a goal of the park to relocate the auditorium to a different location. The Visitor Center could use the added space for exhibits or sales, and the original window wall could then be restored in its entirety.

Another important intersection of materials and spaces is the entrance to the north terrace on the second floor. This used to be an elegant confluence of building materials and forms, but the closing in of the apartment hall and the addition of a sliding door to serve as an entrance to the terrace has considerably muddled this connection. The connection should be simplified greatly. Board and batten siding should be removed and replaced with either stucco or glass. Bulky framing members should be removed from the glass in this area in favor of cleaner glass planes.

The cabinets in the copy room should be replaced with cabinets more in harmony with Modern design principles.

The ceiling in the administrative office wing should be renovated. It is in need of repair and any major changes done will require major changes to meet current code. Any new ceiling should be similar in appearance to the original ceiling in that lighting should be provided from a trough that runs the entire length of the hallway.

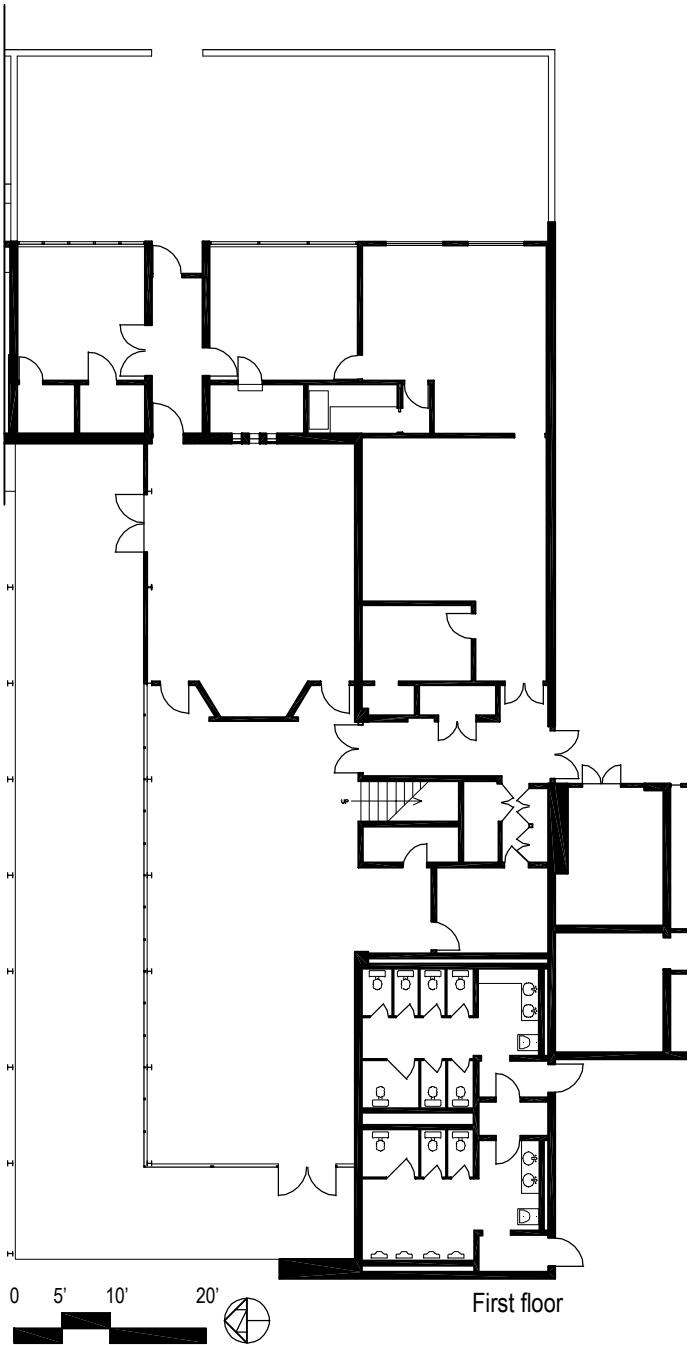
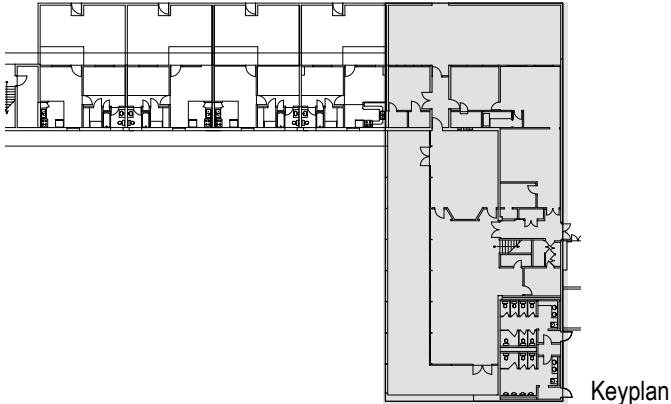
Office interiors should be restored to an approximate original configuration and materiality. The wood paneling on the interior of the Head Interpreters office should be removed and restored to match other interior walls.

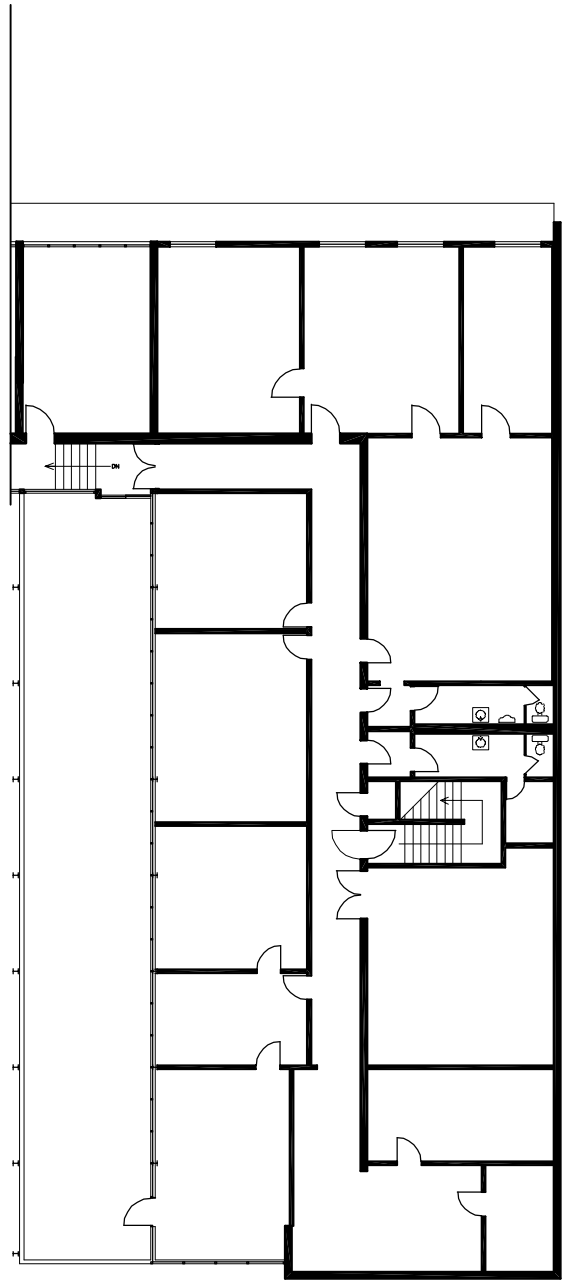
All doors and door hardware should match and should be of a satin aluminum, clear anodized finish.



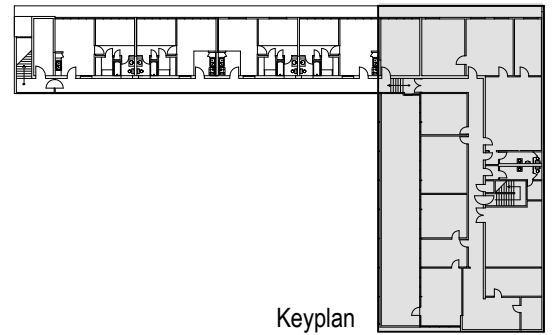
Visitor Center and Administration Building looking east 2004
Photo by author

Painted Desert Visitor Center and Administration Building Plans





Second floor



Keyplan

Painted Desert Visitor Center and Administration Building Design Goals Illustrated

②④ Move unsightly downspout to less conspicuous location. Paint to match adjacent material

④ De-emphasize flashing



Intersection of PD Oasis and Administration Buildings 2004 Photo by author

④ Remove tint from windows

④ Remove all extraneous wood trim

④ Paint soffit same color as facade above



Visitor center entrance c.1963
PEFO Photo Archive photo by Stitt



North terrace 2004 Photo by author

① Eventually, pitched roof should be removed, once again exposing the spider leg outrigging

② Remove unnecessary gutters and downspouts



Original terrace configuration c.1962 PEFO Photo Archive photo by Stitt



Former east terrace location 2004 Photo by author

③ Area that was once east terrace should be restored. If a complete restoration is impossible, T1-11 siding should be removed and a facade design that expresses the existence of the spider leg outrigging should be developed. I.e., a design where cladding is placed between flanges of I-beams, so they are still visible.



East terrace c.1963 PEFO Photo Archive photo by Beinlich

⑦ Originally, the intersection of the second story hallway of the apartment building and the entrance to the administration building's north terrace was an elegant intersection of overlapping materials and planes. In the last 40 years it has become muddled. This intersection should be re-detailed more sympathetically to the clarity of the original design.













3 views of the original north terrace entrance c.1963 PEFO Photo Archive first photo by Stitt following by Beinlich

Painted Desert Apartments

PD251 A-H

Design Goals

- ① Restore east facade. 
- ② Install HVAC system, remove individual AC units.   
- ③ All conduit and gutter should be removed or hidden.  
- ④ Remove or more carefully detail door at north end of 2nd story hall.  
- ⑤ Remove corrugated fiberglass panel from stairway.  

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The apartment building was designed by Neutra and Alexander in 1961 and built by the Kealy Construction Company in 1962. At an unknown date the original aluminum sash windows from apartments A,C,D and F were removed and were infilled with wood framing and wood sash windows.

Design Strategy

The most evident modifications that have been made to the apartment building have been the removal of the original windows in several apartment units along the east facade. The most visible of these being the modifications done to apartment F. All T1-11 siding should be removed from east facade of the apartment building. Due to its visibility the exterior restoration of unit F should be a priority. It may be possible to remove the windows currently in unit B to replace the windows in unit F. Since the facade of all the lower level apartments is obscured by courtyard walls, the restoration of these windows isn't as urgent. If the windows from B and F were switched and all the windows along the lower story were replaced with appropriate aluminum sliding sash windows, then each stories windows would be from the same era, and would wear relatively evenly.

An HVAC system should be installed to service all units. It should be placed as inconspicuously as possible. All obsolete heating and cooling apparatus should be removed from windows.

All extraneous conduit and gutter pipes that are currently cluttering the exterior of the building should be removed. Conduit or gutter that is absolutely necessary should be carefully hidden or painted to blend as best as possible.

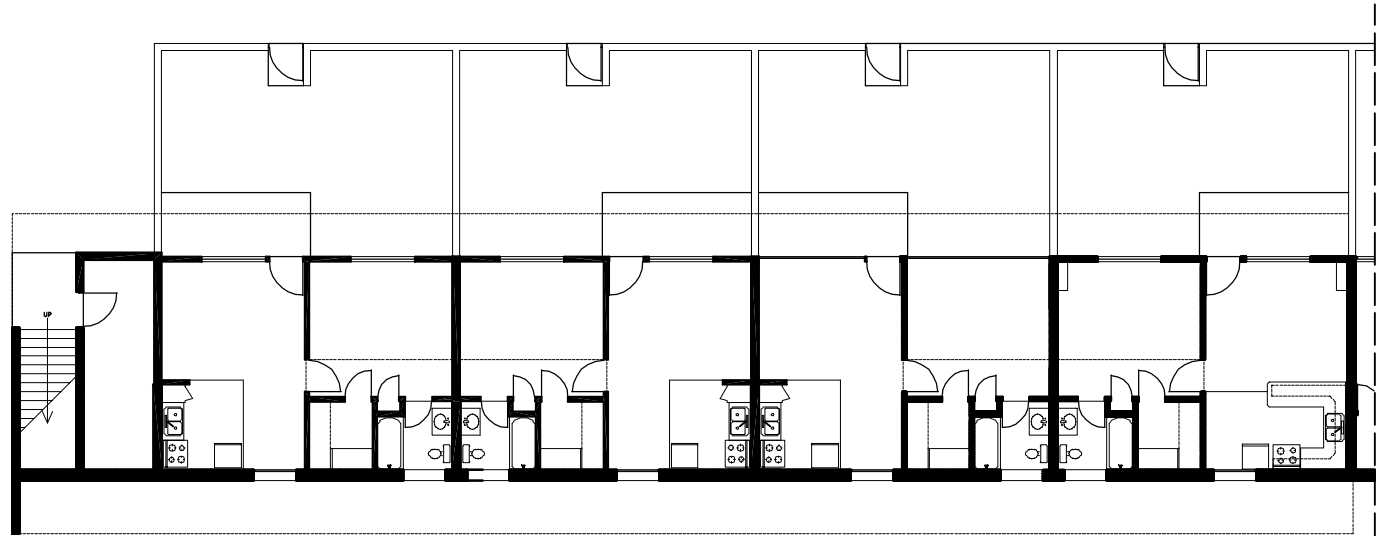
The door at the north end of the second story hall should be removed or detailed so that the open edge with insulation exposed isn't directly visible in the courtyard.

The corrugated fiberglass panel in the north stairway should be removed.

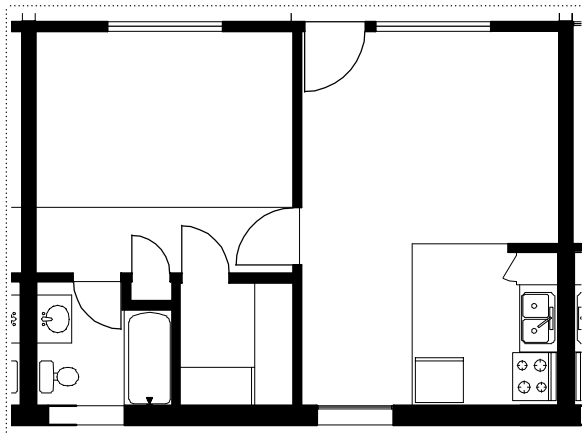


Apartment building looking south 2004 Photo by author

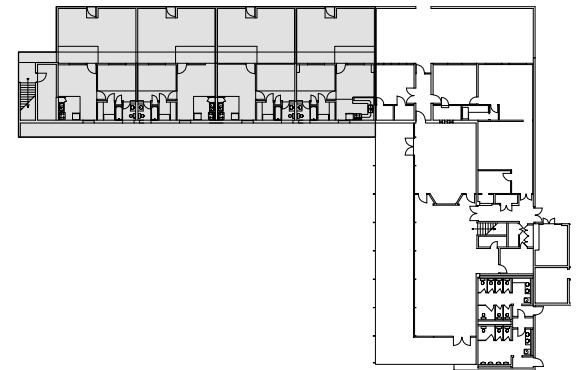
PD Apartment Building Plans



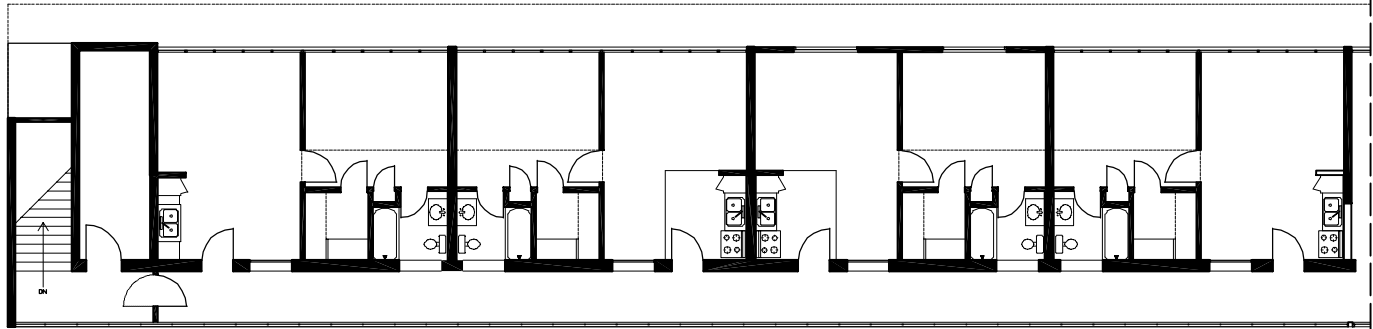
First floor



Typical first floor apartment plan



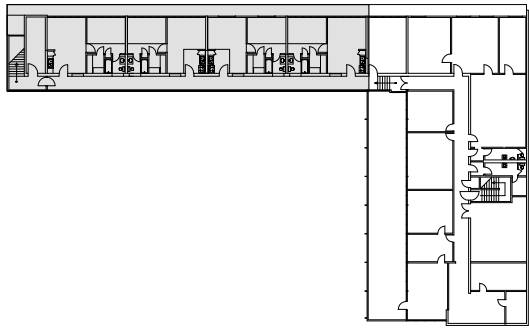
Keyplan



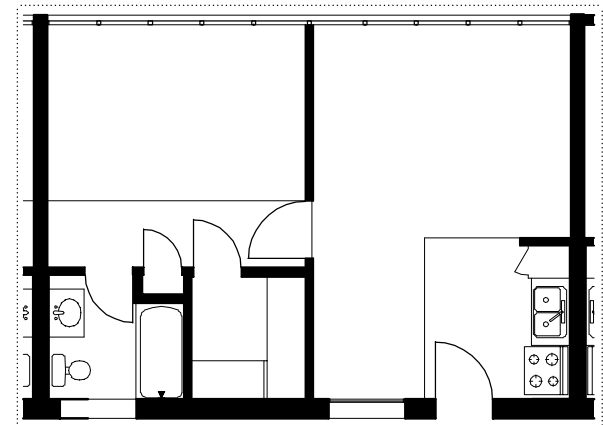
0 3' 9' 18'



Second floor



Keyplan



0 2' 5' 10'

Typical second floor apartment plan

PD Apartment Building Design Goals Illustrated



Apartments east facade 2004 Photo by author

② Restore altered second story facade. Windows from apartment below could be sacrificed for use in more visible upper story



Apartments east facade c.1963 PEFO Photo Archive photo by Stitt

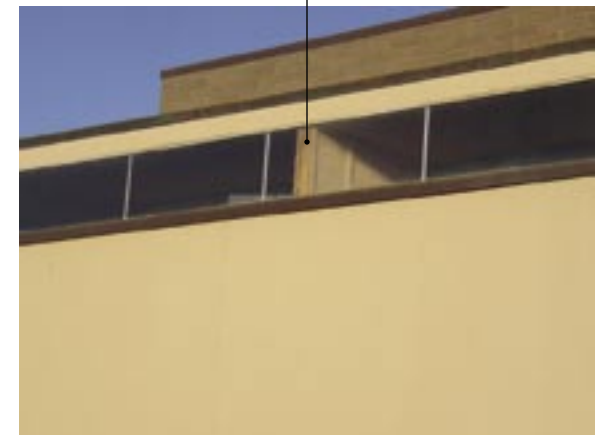
③ Remove extraneous gutters, conduit and pipes. All that are necessary should be hidden



2004 Photo by author

④ Remove door from second floor hallway. If this isn't feasible, detail so that it is less unsightly from the courtyard

⑤ Remove corrugated fiberglass panel







2004 Photo by author

Painted Desert Gate House

PD252

Design Goals

- ① Remove gutter on west facade. 
- ② Relocate conduit. 
- ③ Investigate panels possibly containing asbestos. 
- ④ Remove window tinting. 

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Roofing
Window Replacement (PD)

Building Background

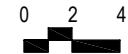
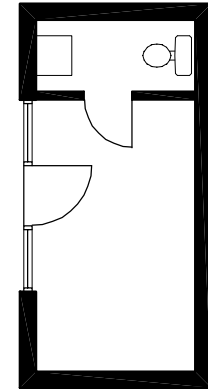
The Gatehouse was designed in 1961 by Neutra and Alexander and built by the Kealy Construction Company in 1961. For the most part it remains unaltered. At some point the windows on the west facade were tinted.

Design Strategy

The Gatehouse remains largely unaltered and should be maintained as such. A rain gutter has been placed across the west facade of this building. It should be removed and placed in a less conspicuous location.

Electrical conduit has been run along the outside of the building. Conduit should be moved to a less conspicuous location.

There is a possibility that asbestos panels have been used inside the gatehouse. This should be verified. Follow appropriate actions as laid out in the maintenance guides.



- ② move conduit
- ① remove gutter
- ④ remove tinting



Gatehouse looking south-east 2004 Photo by author

Painted Desert Maintenance Building and Fire Cache, Vehicle Storage

PD254, 255

Design Goals

- ① Remove all areas with T1-11 ✖ siding visible from exterior.
- ② Replace exterior storage area 🏠😊 wall.
- ③ Remove or relocate all 🏠✖😊 extraneous conduit and power meters.

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Roofing
Window Replacement (PD)

Building Background

The Maintenance building and Fire Cache as well as the Vehicle Storage Building were designed By Neutra and Alexander and built between 1961 and 1963 by the Rasmussen and the Packer Construction Companies. During the 1980s a wood frame addition was added to the Maintenance Building that currently serves as the sign shop. Also during the 1980s many of the bays in the Vehicle Storage building were framed in.

Design Strategy

These buildings are situated to form a large interior maintenance yard. Because of the utilitarian nature of these buildings, the interior spaces are not as important visually. Interior spaces should focus on the maintenance and upkeep of current conditions. The buildings only need to be preserved aesthetically on the exterior, especially in areas with high visitor visibility.

T1-11 siding should be removed where it is visible from outside the maintenance court.

The southernmost portion of the maintenance building wall, used as exterior storage, is failing structurally and should be replaced. It should be executed using block as similar to the original block as possible.

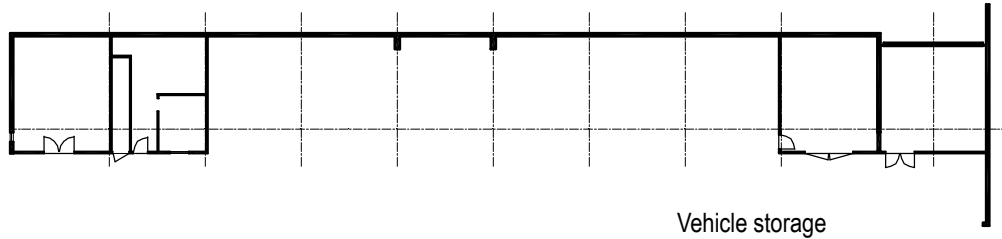
All unnecessary conduit, gutters and utility meters should be removed. If they are determined necessary they should be concealed as well as possible.

Drainage issues should be looked at in respect to the entire complex and handled similarly throughout. The possibility of water harvesting should be studied.

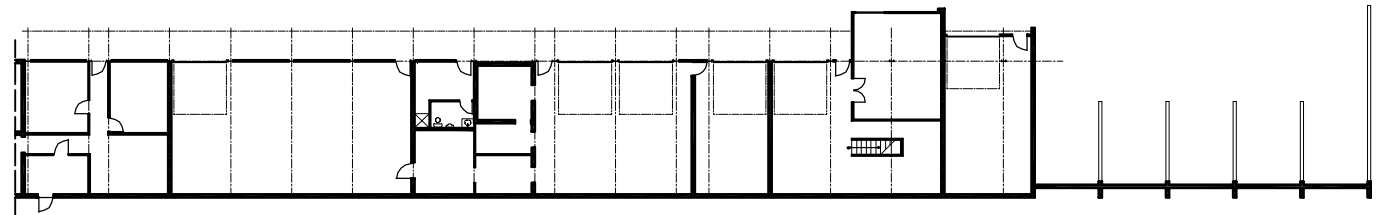


Maintenance and Fire Cache, Vehicle Storage interior yard looking south 2004 Photo by author

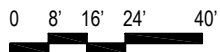
PD Maintenance and Fire Cache, Vehicle Storage Plans



Vehicle storage



Maintenance and fire cache



PD Maintenance Building and Fire Cache, Vehicle Storage Design Goals Illustrated



PD254 south facade 2004 Photo by author

① All additions visible from outside of the maintenance yard should be removed. If nothing else, the T1-11 siding should be replaced with stucco.



PD 254 north facade 2004 Photo by author



PD 255 west facade 2004 Photo by author

② The south service yard wall is failing and should be reconstructed. It should be executed according to the Secretary of Interior Standards for reconstruction.



PD 254 2004 2004 Photo by author



Maintenance building 1963 *PEFO Photo Archive 18427*



Maintenance and apartment building c.1960s
PEFO Photo Archive 18388



Vehicle storage building c.1960s *PEFO Museum Collection-Building Files*

Painted Desert Trailer Court Building

PD256

Design Goals

- ① Remove gabled roof. 🏠
- ② Removed T1-11 siding. 🏠😊
- ③ Remove dilapidated wooden sheds. 🏠😊
- ④ Remove chain link fence. 🏠😊

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Roofing
Window Replacement (PD)

Building Background

The Trailer Court Building was designed by Neutra and Alexander in 1961 and constructed by the Rasmussen and Packer Construction Companies between 1961 and 1963. At a later date an asphalt shingled gable roof was added and a courtyard, where the exercise room is now, was walled in.

Design Strategy

The gabled roof should be removed, restoring the original flat roof.

Any T1-11 siding should be removed from the exterior. It should be either replaced with stucco, or in the area that was once the courtyard, should be replaced with windows to regain the openness that the space once possessed.

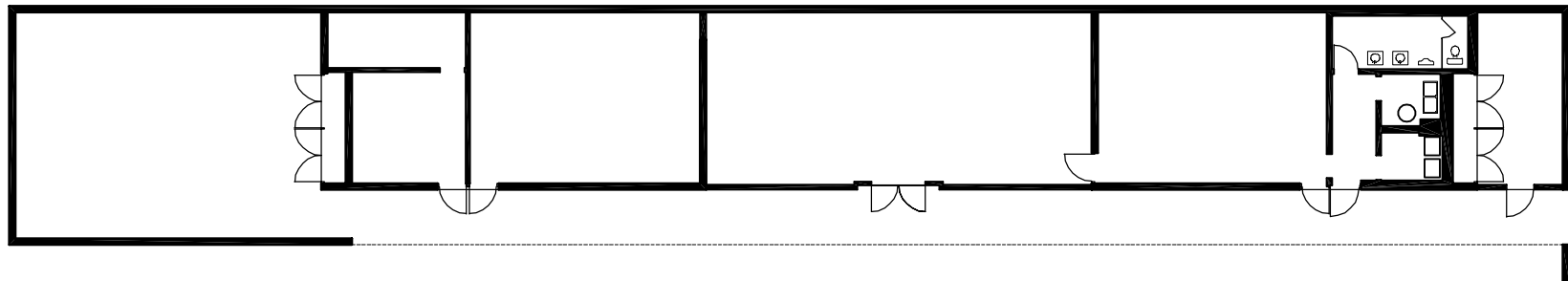
The dilapidated wooden sheds on the east side of the building should be removed.

Chain link fences should be removed from the area around the trailer court building.



Trailer Court Building 2004 Photo by author

PD Trailer Court Building Plan



PD Trailer Court Building Design Goals Illustrated



⑤ Remove fence

① remove gabled roof

Trailer court building 2004 Photo by author

① Remove T1-11 siding. Originally this space was an open courtyard. If it is not going to be returned to a courtyard space, the siding should be replaced with glass. This would help to reestablish the massing of the building.



Trailer Court Building c.1960s PEFO Photo Archive 18790



Trailer Court Building c.1960s *PEFO Museum Collection-Building Files*

Painted Desert Community Building

PD257

Design Goals

- ① Restore clerestory windows. 🏠🌞

Maintenance References

- Aluminum Windows and Doors
- Asbestos
- Concrete
- Concrete Masonry Units
- Doors (PD)
- Drainage
- Electrical Retrofit
- Exterior Finishes
- Roofing
- Window Replacement (PD)

Building Background

The Community Building was designed by Neutra and Alexander in 1961. The Rasmussen Construction Company began construction in 1962. The Packer Construction Company took over and finished construction in 1963. In the late 1960s five clerestory windows on the north facade were covered with painted plywood panels. At a later date a full-bay roll-top door on the west side was concealed by T1-11 siding. In 2004 an extensive rehabilitation of the space was conducted. The original roll-top door was restored and wood slats were removed on the west side. On the east side a historic sliding door was restored and inappropriate cladding was removed. The entire floor was also replaced.

Design Strategy

The renovation of the community building executed in 2004 should serve as model for quality and attention to detail in future renovation projects conducted at the PDCCHD.

However, despite the thorough renovation that the community building has recently undergone, it still lacks natural light on the west end. The clerestory windows on the upper north facade should be restored and outfitted with an electronic shutter system that allows them to be open or closed, based on the desired light level required in the building.



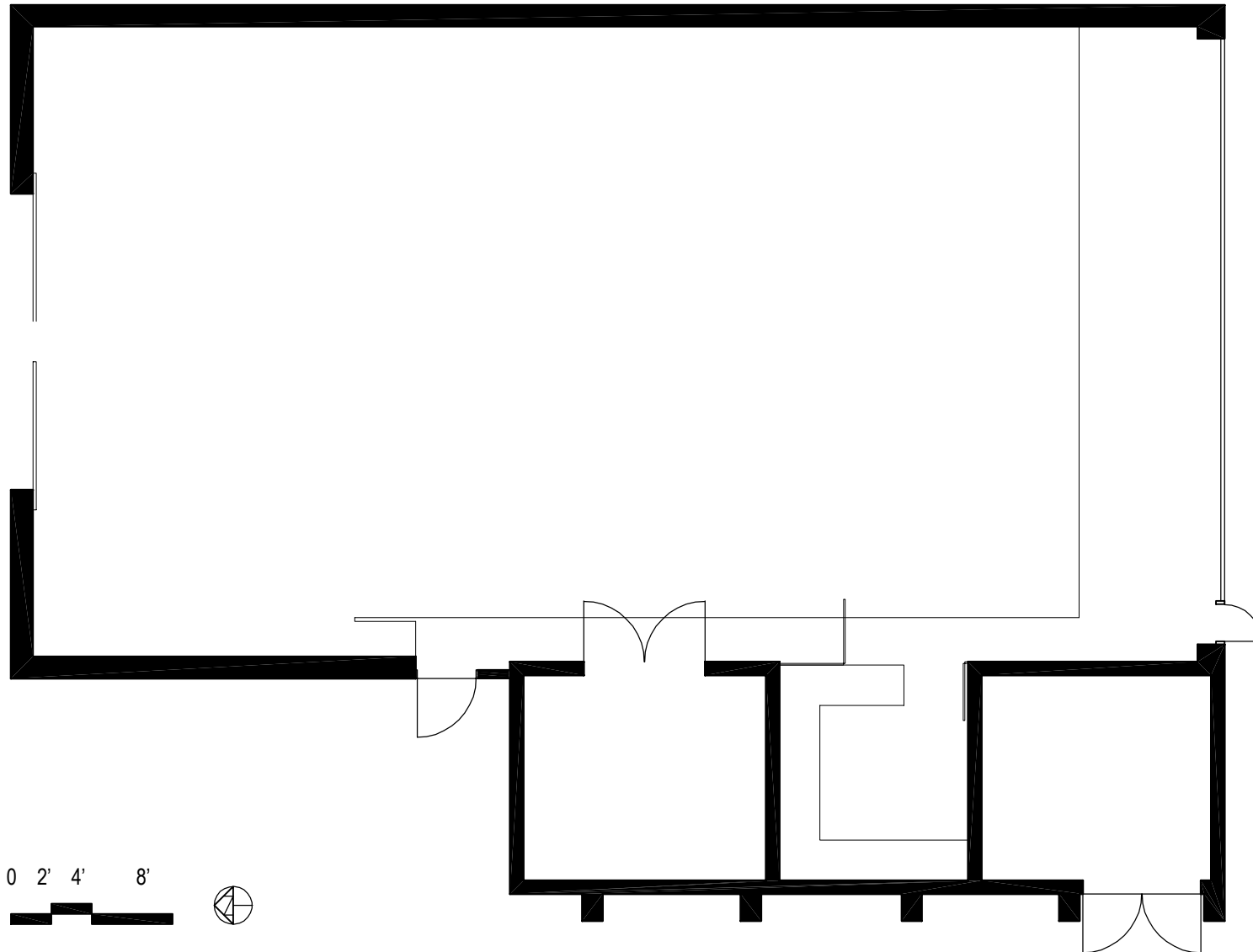
Community building c.1963 notice clerestory windows
PEFO Photo Archive Photo by Stitt



Community building before renovations 2004 Photo by author



Community building after renovations 2004 Photo by author



Painted Desert School

PD258

Design Goals

- ① Finish north classroom interior. 🏠😊
- ② Restore north end of east facade. 🏠😊
- ③ Implement HVAC system. 😊✂️
- ④ Coordinate finishes. 😊

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The School Building was designed by Robert Alexander in 1963 and built by Arimexal Incorporated from 1963-1965. It consisted of two classrooms, a north classroom and a south classroom. In the late 1960s a small post office was inserted into the west side of the north classroom. Later the south classroom was converted to Interpretation offices, but still retains much of its original character. The original aluminum sash windows were framed in on the north side, but they still remain on the south side.

Design Strategy

If the intention is for the post office to remain where it is, then the walls should be finished. The unfinished quality of these walls severely detracts from the north classroom. Walls should extend to the ceiling and should be finished and painted

T1-11 siding should be removed from the north end of the east facade and windows similar to those on the south end should be restored.

Originally, a unique swinging wall system was used in the classrooms to help open up, or partition off, the west sides of the room. This system still exists in what was the south classroom. These elements should be maintained as an interesting example of the way technology was used to create versatile spaces in architecture of the Modern period.

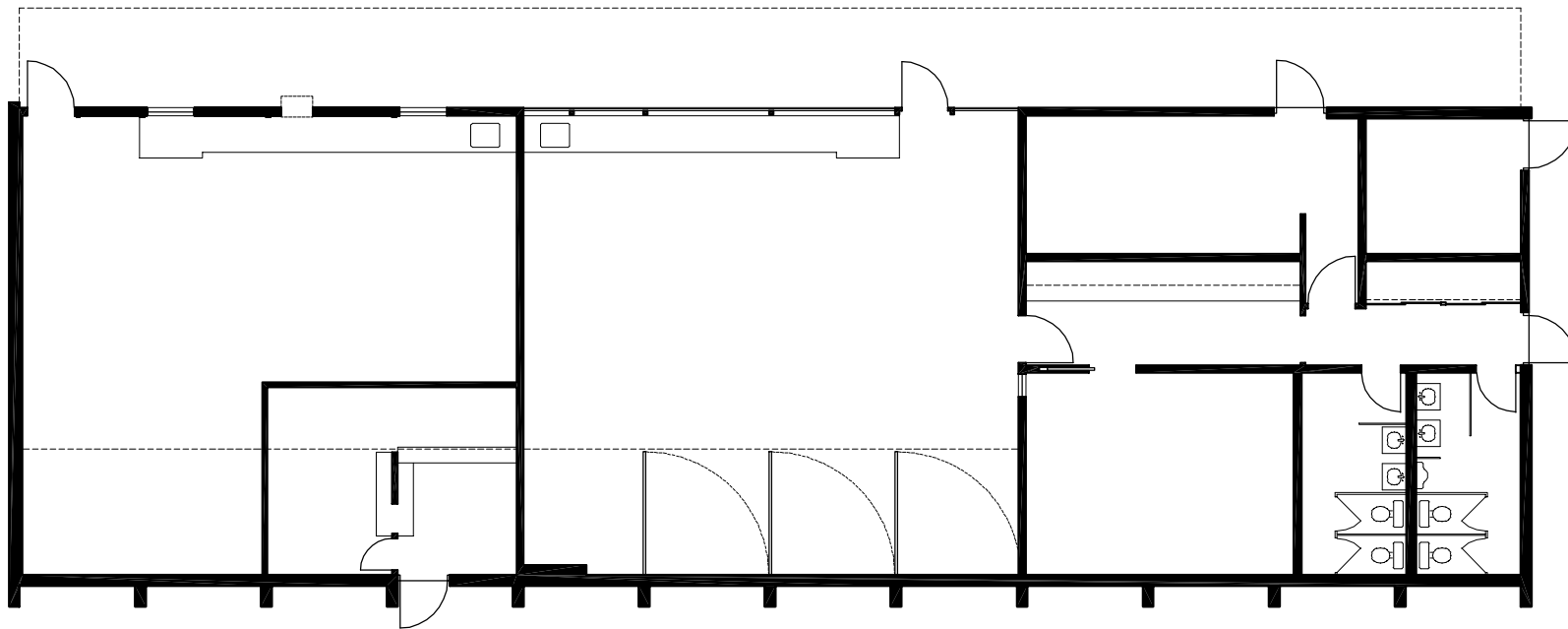
An HVAC system should be implemented in order to free the east facade of individual air conditioning units. The system should be inserted as inconspicuously as possible.

An attempt should be made to unify the finishes of the north and south classrooms, i.e., flooring, trim, and

fixtures. The south classroom had green accents as indicated by the partitions and the counter tops. The north classroom had yellow accents, as demonstrated by the counter tops. These color themes should be respected with any changes to the finishes that might occur.



School building west facade 2004 Photo by author



PD School Design Guidelines Illustrated



School building east facade 2004 Photo by author

③ An HVAC system should implement in the building. All AC window units should be removed.

② The north end of the east facade should be restored to match the south end. If it is not to be restore, it should be stuccoed, and windows should be added in a similar pattern to those on the south end



School building east facade c.1965 PEFO Photo Archive photo by Stitt

②③ Middle wall should either be restored to a movable partition, as it once was, or finished.

②③ The post office should either be moved to a different location or its walls should be finished









School building north classroom looking south 2004 Photo by author

Painted Desert Teacherage

PD258 A&B

Design Goals

- ① Remove apt. K bumpout, clad  beam if not removed.
- ② Replace large sliding doors  on north facades.
- ③ Remove all T1-11 siding. 
- ④ Remove all extraneous  conduit and power meters.
- ⑤ Remove washer and dryers,  fill dryer vent holes.
- ⑥ Replace wood fence with  concrete block wall.

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The Teacherage was designed by Robert Alexander in 1962. It was constructed by Arimexal Incorporated from 1963-64. Significant alterations have made on the south facade. Large aluminum sash sliding windows were replaced by smaller wood sash windows and the original doors were replaced with solid core wood doors. The living room of apartment K was bumped out by approximately 4 feet.

Design Strategy

The bumpout on apartment K should be removed, reestablishing the cantilever across the entire north facade. If this isn't feasible, then the beam that holds up the cantilever inside apartment K should be covered with gypsum board and painted.

Large sliding doors should be replaced in the north wall of the living areas in each apartment. This will help to re-establish the intended relationship between interior and exterior spaces.

All board and T1-11 siding should be removed from the exterior of the building. The areas where T1-11 siding is removed should be stuccoed.

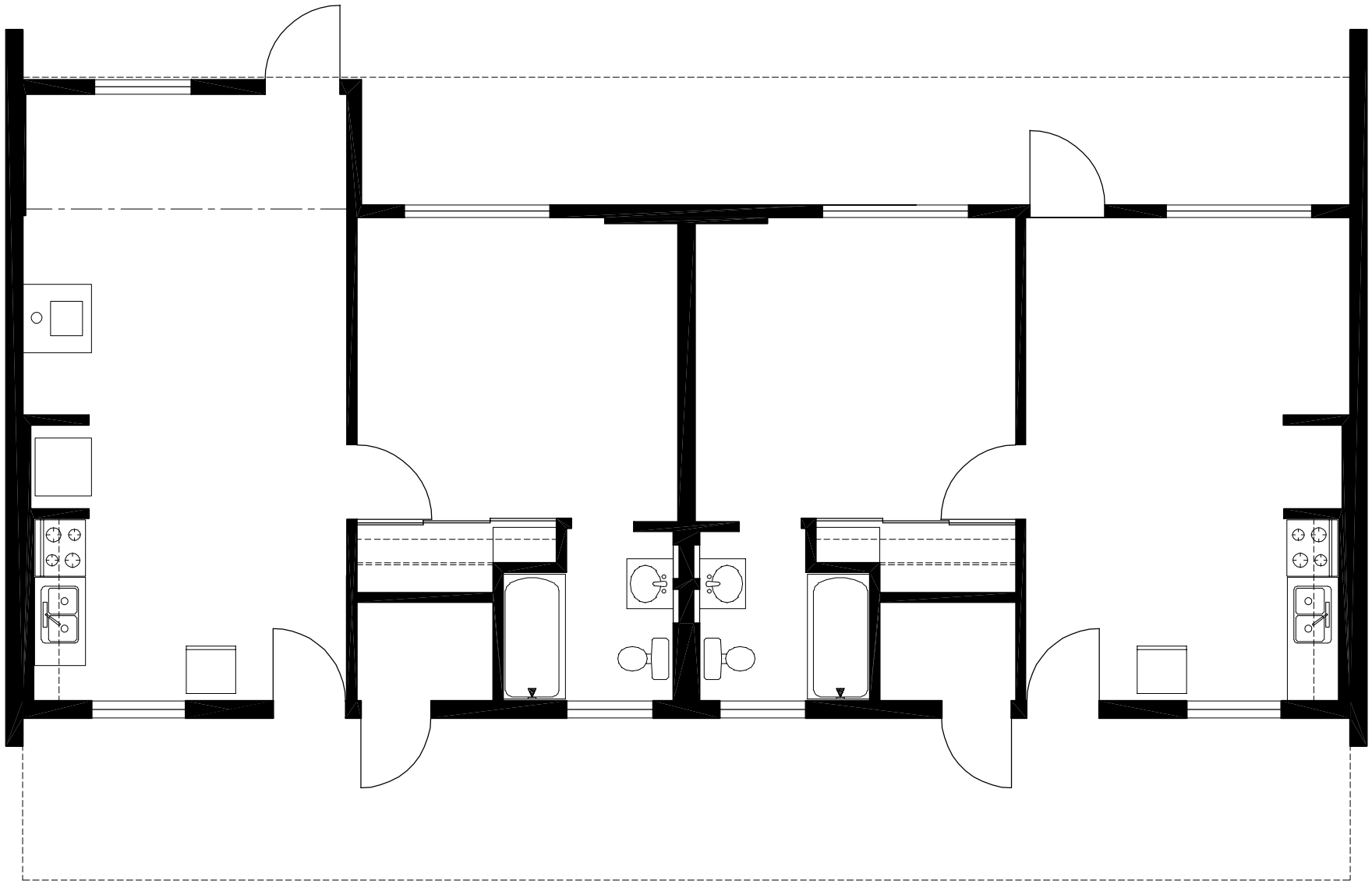
Gas meters should be removed from the east facade.

The washer and dryer currently located within apartment K should be removed. The dryer vents located on the east and west facades should be removed and filled.

The wood fence that currently surrounds the north yards of the teacherage should be replaced with 8 inch concrete block wall. The wall should be no higher than four feet and should be separated from the existing wall by a gate in order to ease the transition between two unlike materials.



Teacherage 2004 Photo by author



PD Teacherage Design Guidelines Illustrated



Apartment K north facade 2004 Photo by author

① Apartment K bumpout should be removed. If it can not be removed, it should be stuccoed. Whether or not it is removed, access from the yard should be by a large sliding glass door. Restoring this will help to reestablish the relationship that once existed between interior and exterior space.

① If the bumpout is not removed, and the original wall is not restored, this beam should be clad in gypsum board and painted.



Apartment K exposed beam Photo by author



Apartment J undergoing infill c.1980s
PEFO Photo Archive, uncataloged

Painted Desert Oasis and Fred Harvey Service Station

PD259-260

Design Goals

- ① Replace pitched metal roof. 🏠😊
- ② Restore east facade. 🏠😊
- ③ Repair tiled columns. 🏠😊✂️
- ④ Replace benches. 🏠
- ⑤ Replace signage. 🏠
- ⑥ Reunite Oasis cantilever and service station canopy. 🏠
- ⑦ Remove all extraneous conduit, meters, and pipes. 😊
- ⑧ Remove paint from west service station facade. 🏠

Maintenance References

Aluminum Windows and Doors
Asbestos
Concrete
Concrete Masonry Units
Doors (PD)
Drainage
Electrical Retrofit
Exterior Finishes
Finish Recommendations (PD)
Roofing
Window Replacement (PD)

Building Background

The PD Oasis and Fred Harvey Service Station building was designed in 1960 by Neutra and Alexander. It was constructed from 1962-1963. It originally featured 14 full-height plate glass windows that covered the entire east facade. Circa 1979 a set of double doors were added to the south facade of the building to gain access to the Fred Harvey gift shop. Around 1980 the east facade was framed in with board and batten siding pierced by eight smaller wood sash windows. In 1983 the interiors of the PD restaurant and gift shop were radically altered. The roof has been altered several times since its construction, the most recent being the addition of a pitched metal roof executed in 1990. In 1998 a bathroom addition was added on the north side of the building.

Design Strategy

Eventually the flat roof should be restored in order to restore the buildings horizontality, this can happen when the current roof needs replacement.

The east window wall should be restored. Insulated, double pane glass should be used for energy conservation.

The tiled columns on the east facade are beginning deteriorate near their bases. The bottoms should be re-tiled with neutral colored tiles.

The decorative wood benches that line the east and south facades should be replaced with benches more consistent with the character defining characteristics of the PDCCHD. Cast concrete benches would be an appropriate alternative

Signage should be more sympathetic to the original design intent.

Originally, the cantilever on the south facade and the canopy over the gas pumps were part of the same plane and extended over the second set of pumps. This should be restored. If this isn't feasible, the cantilever and the canopy as they exist now should be reconnected to form a corner

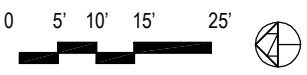
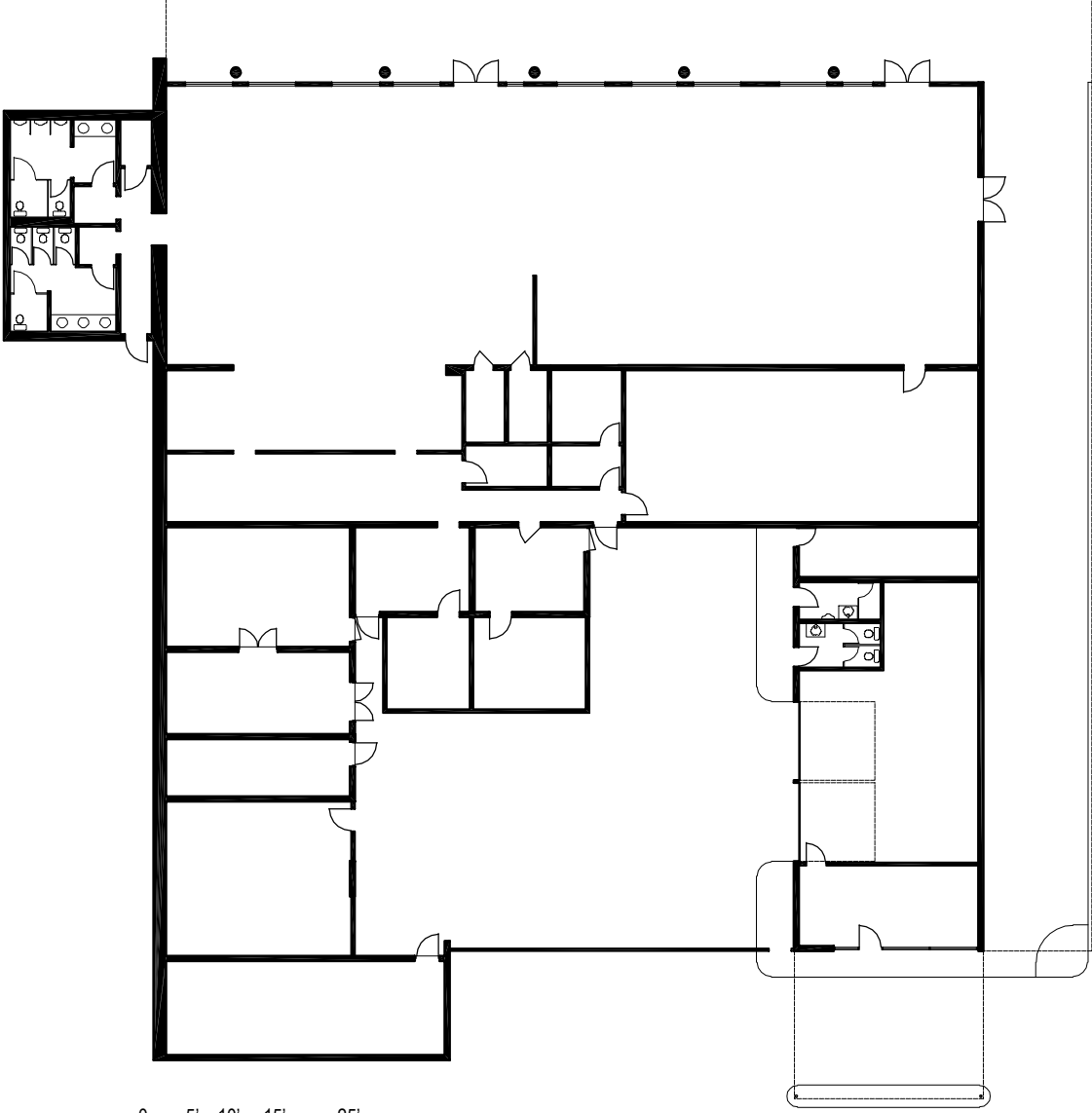
All extraneous pipes, meters, and conduit should be removed.

Paint should be removed from the concrete block on the west facade of the service station.



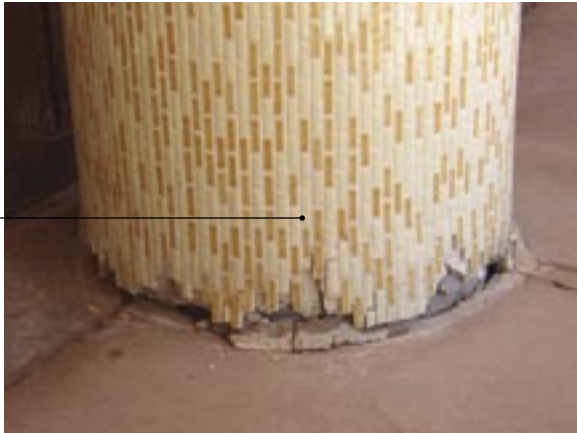
Painted Desert Oasis building 2004 Photo by author

PD Oasis and Fred Harvey Service Station Plan



PD Oasis and Fred Harvey Service Station Design Guidelines Illustrated

③ Column bases should be re-tiled using similar or neutral tiles. If this is not feasible, tiles should be cut 6 inches up and the base should be plastered.



PD Oasis Building tiled column base 2004 Photo by author

① Pitched metal roof should eventually be replaced with flat single ply membrane



PD Oasis building east facade 2004 Photo by author

② Full east facade windows should be restored



PD Oasis Building east facade 1963 PEFO Photo Archive photo by Beinlich

④ Decorative wood benches are inappropriate to style of architecture. They should be replaced with benches more consistent with the aesthetics of the complex. A poured in place concrete bench might be more appropriate.



Service station 2004 Photo by author

⑤ Decorative wood signs are inappropriate to the aesthetics of the PD complex. Signage should be brushed aluminum



PD Oasis original signage PEFO Photo Archive, uncataloged



Appropriate cast concrete bench

Photo by author

⑥ The canopy over the gas pumps should be reconnected with the cantilever that runs along the south facade of the PD Oasis Building.



Service station 2004 Photo by author



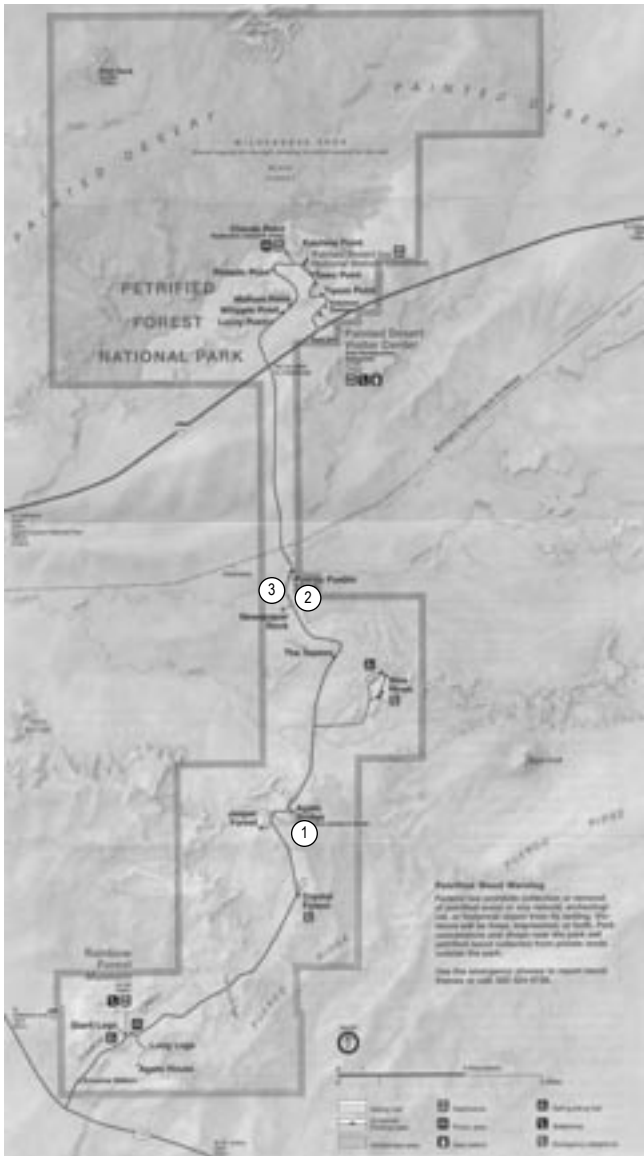
Service station c.1960s PEFO Photo Archive 20782

Park Road Landscape

Introduction

In this Section

- ① Design Guidelines for Classified Structures and Landscape Elements along the Main Park Road
- ② Links to Suggested Maintenance and Preservation Treatments



Park Plan
from PEFO Official Map and Guide



- 1 003 Agate Bridge Comfort Station
- 2 004 Rio Puerco Comfort Station
- 3 102 Rio Puerco Pump House

Agate Bridge Comfort Station

003

Design Goals

- ① Reestablish Breezeway by Removing Stone Infill 
- ② Preserve Exterior Features 
- ③ Replace Roof 

Maintenance References

Concrete Walks / Sandstone Curbs

Drainage

Electrical Retrofit

Roofing

Sandstone Masonry (Cleaning)

Sandstone Masonry (Repair)

Steel Windows (RF)

Window Replacement (RF)

Wood Vigas

Background

This stone building, constructed in 1935, was originally a combination checking and comfort station. When constructed, the building consisted of two small restrooms connected by a breezeway. Around 1968, the breezeway was infilled with stone to create a storage room between the restrooms. The comfort station has battered, Pueblo style walls that create a structure that is similar to those found at Rainbow Forest. Wood lintels and decorative wood vigas are dominant elements on this otherwise simple building. A flagstone floor surface was originally found both inside and outside the building. Currently, interior floors are concrete with flagstone remaining around the exterior of the structure. The building has lost much of its integrity due to the infill of the breezeway and is therefore has not been considered for placement on the NRHP.

Design Strategy

Reestablishing the breezeway between the two restrooms would return much of the historic character to the building. While this would make the restroom situation uncertain, it would open up space for additional interpretive materials within the breezeway. Opening the center of the building would also provide a better visual link from the parking area to agate bridge.

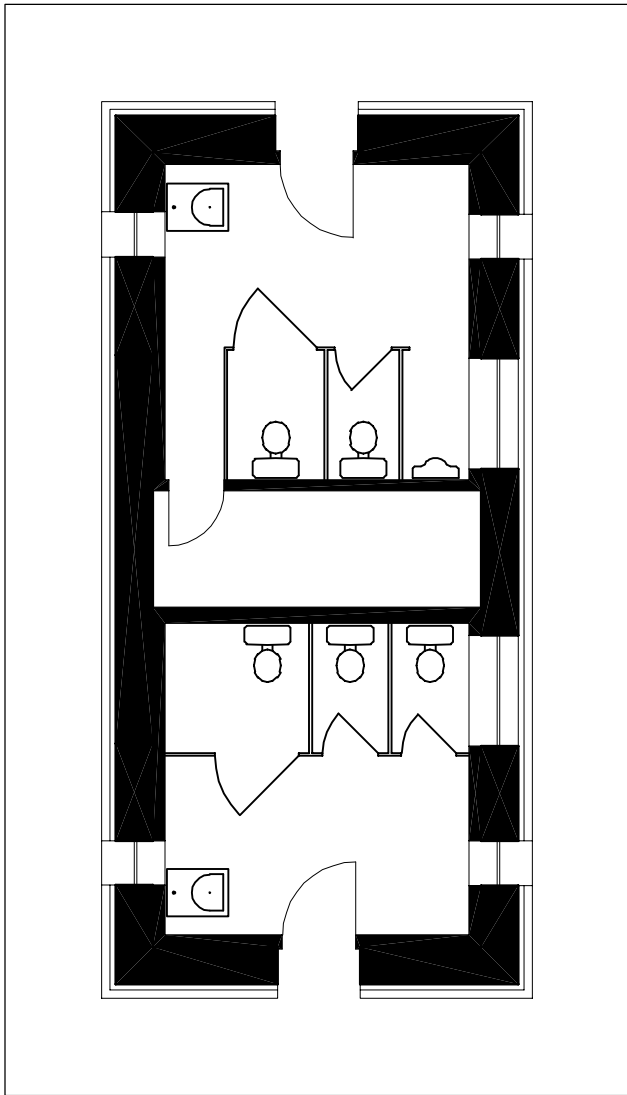
The roof appears to be in poor condition and should be replaced with a single-ply membrane system. Wood vigas should be inspected and maintained. Stone masonry should be inspected and repointed as required.



Agate Bridge Comfort Station viewed from the northeast in 2004.
Photo by author






Agate Bridge Comfort Station with its open breezeway in 1949.
PEFO Photo Archive #15688



Rio Puerco Comfort Station

004

Design Goals

- ① Remove Wood Infill and Reestablish Area for Interpretive Material 
- ② Preserve Exterior Features 
- ③ Replace Roof 

Maintenance References

Concrete Walks / Sandstone Curbs

Drainage

Electrical Retrofit

Roofing

Sandstone Masonry (Cleaning)

Sandstone Masonry (Repair)

Steel Windows (RF)

Window Replacement (RF)

Wood Vigas

* Note: The name of the river is Rio Puerco in New Mexico, while in Arizona it is simply called Puerco River. The historic name of this building, however, is "Rio Puerco" and should be maintained when referring to this building and the Pump House.

Background

This Pueblo-style structure, located adjacent to the Puerco Pueblo and Puerco River*, was constructed in 1935. The comfort station has battered, Pueblo style walls that create a structure that is similar to those found at Rainbow Forest. Wood lintels and decorative wood vigas are dominant elements on this otherwise simple building. This structure was originally an interpretative structure / ranger station with an open center section that could be fitted with removal panels during inclement weather. Interpretive exhibits, including some archaeological material was likely displayed for visitors. A ranger station, storage area and one-hole bathroom were incorporated into the stone ends. Sometime in the 1950s, it appears that the center was infilled, as the checking function of the building was no longer necessary. Due to this loss of integrity, the building has not been nominated for inclusion on the NRHP.

Design Strategy

The current plan is to restore this structure to its interpretive mission and to construct a new comfort station adjacent to the emergency phone in the existing parking area. Providing a space for more permanent exhibits could be established. Incorporating removal panels, as were provided for in the original design would make the structure flexible for use under variable weather conditions.

The roof appears to be in poor condition and should be replaced with a single-ply membrane system. Wood vigas should be inspected and maintained. Stone masonry should be inspected and repointed as required.



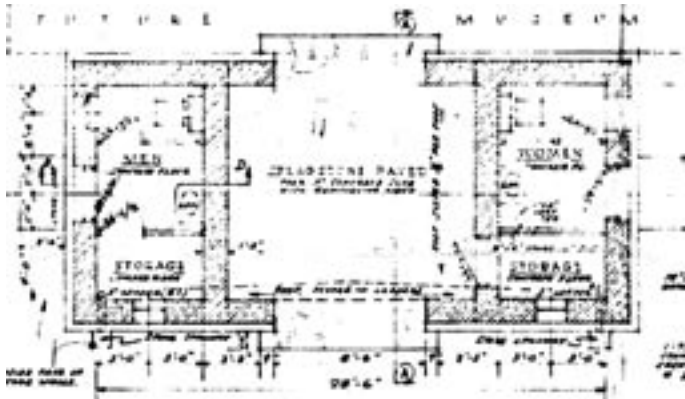
Rio Puerco Comfort Station viewed from the east in 2004.

Photo by author

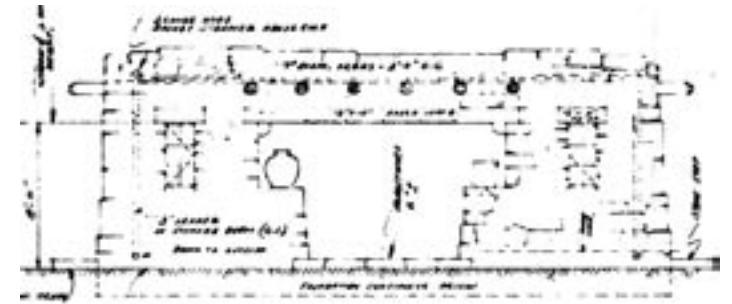


Rio Puerco Checking Station in 1938.

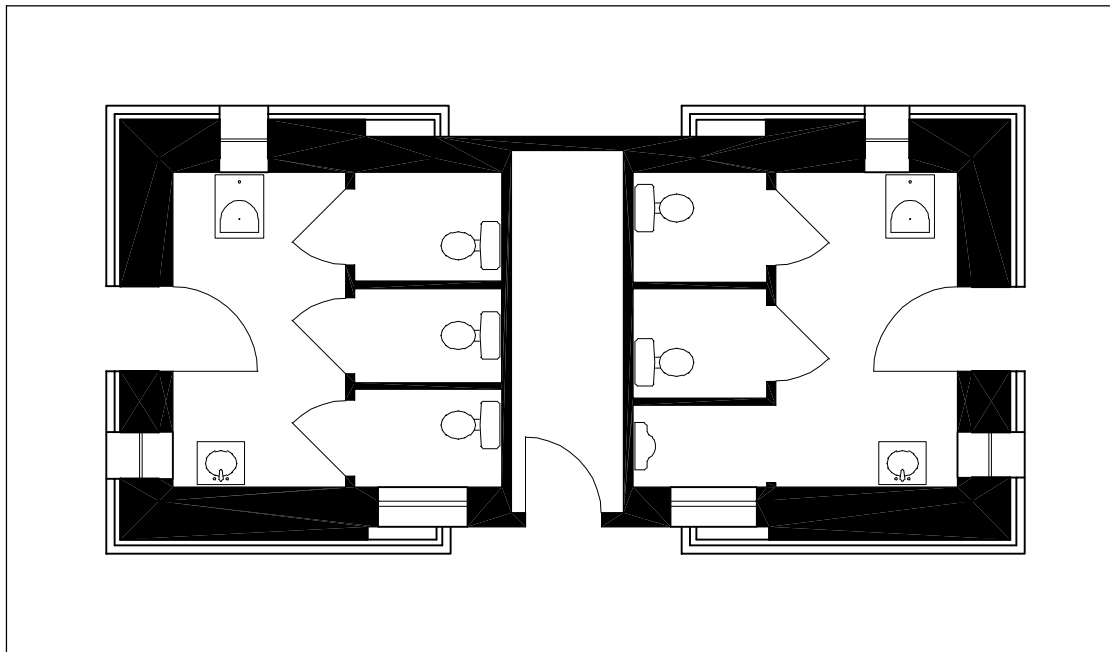
PEFO Photo Archive #15676



Rio Puerco checking station construction drawing (floor plan)
PEFO Drawing Files



Rio Puerco checking station construction drawing (elevation)
PEFO Drawing Files



Rio Puerco Pump House

102

Design Goals

- ① Preserve Exterior Features   
- ② Replace Roof  
- ③ Clear Vegetation from Around the Building   
- ④ Determine a New Use for the Building  

Maintenance References

Concrete Walks / Sandstone Curbs

Drainage

Electrical Retrofit

Roofing

Sandstone Masonry (Cleaning)

Sandstone Masonry (Repair)

Steel Windows (RF)

Window Replacement (RF)

Wood Vigas

* Note: The name of the river is Rio Puerco in New Mexico, while in Arizona it is simply called Puerco River. The historic name of this building, however, is "Rio Puerco" and should be maintained when referring to this building and the Comfort Station.

Background

A one room structure was constructed by the CCC in 1935 to provide water to the adjacent Rio Puerco comfort station. An additional room was constructed in 1940 to accommodate additional pumps associated with the expansion of the park's water system. Both the original structure and addition were constructed in a Pueblo style with the same native sandstone. The prominent architectural characteristics of this structure, including the wood vigas with integrated canales and steel casement windows are still intact. No longer utilized as a pump house, this structure is currently unused with its long-term use undetermined. This structure is in excellent overall condition and maintains a good level of integrity. The recommended management treatment is preservation / adaptive use.

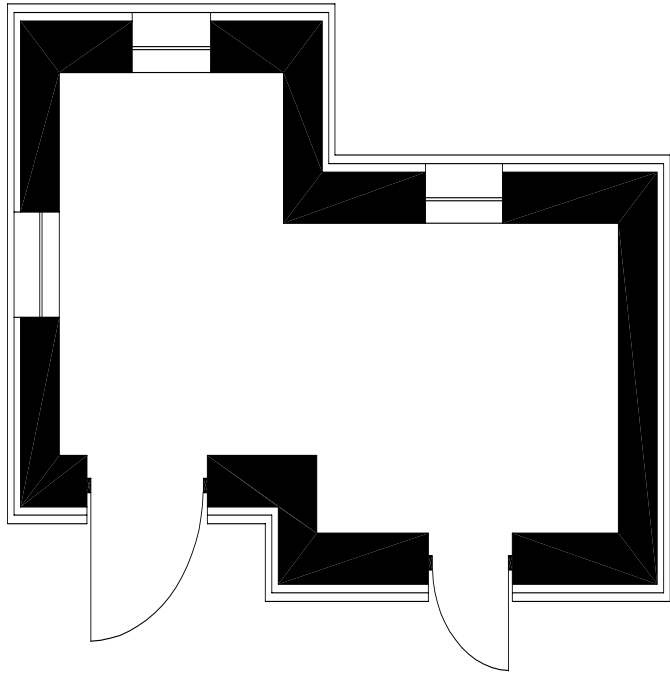
Design Strategy

Beyond conducting long-term maintenance on the exterior features of the pump house to preserve the condition of the structure, little maintenance is necessary. Protecting the steel casement windows with wood coverings should be continued until a new use is determined for the structure. The roof appears to be in fair condition and should be replaced with a single-ply membrane system. Wood vigas, including those with integrated canales, should be maintained. Stone masonry should be inspected and repointed as necessary. Vegetation that has encroached on the building should be cleared to prevent damage from falling branches, insects and animals.

It would be beneficial to return a new use to this relatively isolated structure, as it may be easy to forget about it when scheduling cyclical maintenance. Furthermore, its location along the Puerco River* offers the opportunities for unique visitor and interpretive experiences.



Rio Puerco Pump House, 2004. Photo by author



Park Road Landscape Features

Overview

Principles

- ① New landscape elements should be compatible with the existing context ☺
- ② Unify features throughout the park, when appropriate ☺✂
- ③ Use excess material stored at the boneyard or made available during other projects. ✂🗑

Summary

This section provides an introduction to design and maintenance issues associated with the park road landscape. As was mentioned in the character-defining features section, the park road landscape is an important non-historic resource that links the different areas of the park. There exists great potential to unify the various turnouts and visitor amenities found along the road by thinking holistically about the park road landscape and how it can become more unified. The landscape elements discussed in the following sections provide guidance into those qualities of the built environment that will be both responsive to the park's natural conditions and provide some level of consistency between different locations in the park.

At least seven elements contribute to the overall park road landscape. The seven elements we will focus more specifically on in this section are: landscape walls, railings and fences, walks and curbs, interpretive signage and trail markers, amenities, drainage, and roadside signage. Each of the seven elements is analyzed as to how it contributes to the overall park road landscape with suggestions for modifying existing details or adding new ones.

Several points should be kept in mind when considering changes to the existing park road landscape. Overall, the park road exists in a natural setting of remarkable power and beauty. Elements of the built landscape in the park should compliment, rather than, compete against the natural setting. Accordingly, when adding to existing landscape elements, new elements should strive to compliment those existing elements in form, material, color and texture.

Secondly, opportunities for unifying the park road landscape, through more consistent treatments, should be explored. Although the materials used to construct



Rio Puerco Parking Area, 2004. *Photo by author*



Material resources are available at the park's "boneyard"
Photo by author



At the older turnouts, walls and curbs are of a consistent material.
Photo by author

landscape walls has changed over time, with new materials and construction techniques being introduced during different periods of development, the basic landscape elements have remained consistent. Landscape walls, walks, curbs, railings and interpretive signs can be found at nearly every turnout. How these elements are combined creates the overall visual aesthetic for the park. Elements, such as roadside signage, that may receive a complete overhaul, offer excellent opportunities to tie together the different areas of the park.

The park has a large inventory of historic and modern building supplies at its disposal at its maintenance storage yard, “the boneyard”. Under some circumstances, the park may have enough of a particular material to construct new elements from a hard to obtain or expensive resource. Another possible use of the materials found in the boneyard would be to add an a touch of the material to a new landscape feature. For example, by adding a rustic stone cap to a new CMU and stucco wall, it may be possible to visually connect the new construction within adjacent historic stone wall. Reusing older building materials in new construction has environmental and economic benefits as well.

Park Road Landscape Features

Landscape Walls

Design Goals

- ① Maintain Distant Views 
- ② Separate New from Existing Walls 
- ③ Compliment Color and Texture of Existing Walls 
- ④ Maintain Wall Cap with Shadow Line 

Maintenance References

- Concrete Masonry Units (PD)
- Concrete Walks / Sandstone Curbs
- Drainage
- Sandstone Masonry (Cleaning)
- Sandstone Masonry (Repair)

Summary

Landscape walls are the low walls that surround many viewpoints and parking areas along the park road. Most of the existing landscape walls located along the park road are of solid stone or stone veneer. In recent years and into the future, we expect other materials, including poured-in-place concrete and concrete block walls to be more prevalent due to cost and maintenance concerns. This section addresses the construction of new landscape walls and includes sketches of acceptable alternative designs for the construction of landscape walls within the park. One purpose of landscape walls is to help integrate built features, such as roads and trails, with the natural contours of the land. They are often used to retain earth and protect visitors from steep slopes. Visually, landscape walls help to emphasize the horizontality of the natural landscape, while being of a color and texture that is complimentary to the natural features of the area. The design features listed in the design strategy below should be considered when building new landscape walls in the park.

Design Strategy

A primary character defining feature of landscape walls is their integration with the natural landscape. New walls should be designed to fit within the landscape, maintaining the low profile and distant views provided by existing walls. Generally, the height of existing landscape walls does not exceed 24"-36" above finished grade. While exceptions to this height do exist and slightly taller walls may be necessary under some circumstances, keeping walls within this range will help preserve distant views and reduce the visual weight of walls within the park. Walls should be seen as an unobtrusive element that do not distract from the natural features of the park. While the addition of new walls at many pullouts may be desirable to help reduce maintenance and safety concerns, care should be taken to maintain a balance between natural and built features.

For several reasons, it is desirable to physically separate new walls from existing features. In most cases, leaving approximately 2-4" between new and existing walls would be appropriate. From a historic preservation perspective, it is important to distinguish between eras of construction. Although it may be possible to match the look of an existing wall, it is important to acknowledge the different construction techniques of today. Secondly, if in the future it is determined that older portions of the landscape walls are historic, the designation will be clearer. From a construction perspective, a gap provides a place for expansion and contraction to occur in the new wall. Tying new walls into existing construction could cause cracking to occur to the existing walls as the new walls move and settle. The design opportunities presented by a gap include the option of changing materials and some flexibility to how well horizontal lines align.



A gap between new construction and the existing structure is a preferred detail. *Photo by author*

As previously mentioned, many of the existing landscape walls were constructed from native stone of various colors and textures. Colors range from sandstone and tan to bluish gray and gray. The texture of some walls is quite coarse, while others are more smooth in appearance. New walls can compliment these existing characteristics by being of a color and texture that is compatible. Color consistency is particularly important because it helps to place the walls as passive elements in the landscape. Contrasting colors create visual distractions by highlighting inconsistencies in the built environment. Texture, or the way light interacts with the surface of a material, is also important to maintaining visual consistency. Because materials of differing textures may look quite different, even when they are of a similar color, it is important to use texture to provide a harmony between surfaces.

An existing feature that should be maintained in the design of new walls is the use of a wall cap. Approximately 4" in height and overhanging the lower wall surface by 2", the cap provides a clean termination to the wall while giving the wall a distinct horizontal shadow line.



A stone cap provides a distinct shadow line. *Photo by author*



Stone wall with stone cap:

- Best choice for walls at turnouts where existing stonework exists. Color should compliment existing context.



CMU wall with stucco finish (with stone cap or CMU cap)

- Wall cap creates shadow line. Wall should be under 24". Stone provides transition to natural areas beyond



CMU wall with stucco finish

- An economical choice that is most appropriate for new turnouts and for walls under 24"



Poured in place concrete wall with exposed aggregate finish

- May be used as an accent in areas where exposed aggregate has been used in existing walks, walls, and signs.

Park Road Landscape Features

Railings and Fences

Design Goals

- ① Use Consistent Material and Details Throughout for Railings ☺✂
- ② Incorporate Landscape Walls into Railings when Appropriate ☺✂
- ③ Remove Pine Pole Barricades, where Appropriate ☺

Summary

Railings refers to those permanent devices, typically steel, found at overlooks and along trails to protect the visitor from unsafe and sensitive areas. Metal railings are used at overlooks where visitors need to be separated from a steep slope or drop-offs. Semi permanent fences, including pine pole barricades have been used in the park to discourage visitors from leaving trails. Pine pole barricades have also been used to keep vehicles from parking along the shoulders of the road, particularly along the more dangerous portions of the road. This section provides clarification on issues involving railings and fences, calling for a consolidation of design types and the removal of temporary fences incompatible with the natural landscape.

Design Strategy

Maintenance has been determined as one of the most significant issues regarding railings. Because of the wide variety of designs and materials used to construct railings in the park, specialized equipment and skills are required to repair and / or extend railings. For example, the portion of the metal railing along the parking area at Pintado Point that has been damaged cannot be easily fixed using the welding equipment available at the park. Metal railings are not as durable as stone or concrete walls and are susceptible to damage from climbing and hanging. In certain areas, it may be appropriate to replace existing metal railings or parts of existing metal railings with low landscape walls. This is probably most pertinent to those areas where vehicles could drive into the railings and damage them. Care should be taken to maintain the view to the landscape beyond as much as possible, by limiting the height of landscape walls.

The installation of new railings should meet certain design and maintenance standards to help reduce the time and cost associated with their maintenance. A variety of off the shelf

options are available that could be more economically feasible than custom built sections and details. The benefits of off the shelf components are that many of them come in modular sections that can be easily replaced when damaged. Also, railings can easily be extended and material is usually readily available at larger home and garden centers. The use of wrought iron or other products primarily found in residential development is not recommended.



This railing along the parking area at Pintado Point is susceptible to damage by vehicles and visitors and could be replaced with a low stone wall. *Photo by author*



One of the more unusual railings in the park is found at Jasper Forest. Too many different designs could be problematic to repair and maintain. *Photo by author*



The use of pine pole barricades should be limited to temporary installations. *Photo by author*

The use of pine-pole barricades are widely distributed throughout the park. The merits of the pine-pole barricades include their portability, ease of construction and inexpensive cost. They can be quickly and easily located at “hot-spots” along the park road to keep visitors away from sensitive areas. When used as a temporary measure to block a road or to keep visitors outside an area, they are effective and should be used. However, the use of the pine-pole barricade has become ever-present in the park, especially along trails at popular pullouts, such as at Puerco Pueblo and Crystal Forest. Used in large numbers to discourage visitors from entering areas with petrified wood or from tramping through areas that contain sensitive artifacts, the pine pole barricades have become a dominant feature on the landscape.

Several options exist for removing the pine-pole barricades located along trails in the park. Small signs located along trails could be an effective deterrent. Signage should be small and selectively placed. Secondly, trails, including walks and curbs, should be designed in a manner to discourage visitors from cutting across sensitive areas.

Park Road Landscape Features

Walks and Curbs

Design Goals

- ① Include Color, Texture and Pattern at New Walks and Curbs ☺
- ② Use Different Materials to Transition Between and Create Different Areas ☺
- ③ Integrate Drainage Devices into Curbs and Walks ☺✘
- ④ Eliminate Unsightly Areas and Tripping Hazards by Making Surfaces Smooth ☺✘

Maintenance References

- Concrete (PD)
- Concrete Walks / Sandstone Curbs
- Drainage
- Sandstone Masonry (Cleaning)
- Sandstone Masonry (Repair)

Summary

Walks are the relatively flat surfaces used for circulation at developed pullouts and trailheads in the park. Curbs provide a break between materials or help transition areas of differing heights. Popular materials used to construct walks and curbs include sandstone, asphalt and concrete. This section discusses important features of walks and curbs, along with the appropriate details and specifications for their construction. This section does not refer to the paving and curbing details for the main park road.

Design Strategy

Of primary concern in the construction of walks are the safety of the visitor and the preservation of the park's resources. Surfaces shall be smooth and slopes shall be as flat as possible and not exceed 8%. Slopes should provide proper drainage and not allow water to puddle or freeze, which can cause both maintenance and safety problems.

Aesthetic or visual concerns include using materials that offer a desirable color, pattern and texture. One of the most flexible materials is poured in place concrete. While the use of plain gray concrete should be avoided in public areas of the park, untextured concrete with an integral or applied color is an acceptable material. Furthermore, there are several existing areas of the park where exposed aggregate concrete walks and curbs have been attractively installed. While exposed aggregate is a more expensive option, if used sparingly, it could compliment other materials of the built environment, including native stone walls.

Asphaltic concrete is often a preferred material because it is cheaper and easier to install than concrete. While an attractive option for trails, widespread use adjacent to interpretive areas and other landscape features should be avoided. The dark surface lacks the richness of other materials available for use in walks. While it is possible to

use colored aggregate to give the asphalt top coat surface some color and texture, it is probably not the most economic option and may cause the asphalt to wear prematurely.

When used sparingly, more expensive materials such as native sandstone and precast concrete pavers can be attractive options. Using native stone to surround an entryway or important interpretive sign is a good idea and helps to create areas with more appeal. The recent addition of sandstone paving to create a different ground plane for the entry to Puerco Pueblo helps create a more unified and distinct entry experience. By being more fully integrated with the adjacent sandstone wall and of richer texture and quality, this small area of sandstone makes a positive impression on the visitor. The limited use of sandstone is also effectively used around the Puerco Pueblo and Agate Bridge Comfort Stations.



An effective transition area between the parking lot and pueblo site was created by introducing sandstone paving at Puerco Pueblo.
Photo by author



Natural material, such as this sandstone recently removed from the patio at the Painted Desert Inn, should be reused. *Photo from park*



A smooth transition at a change in materials. In this example from Tawa Point, the edge of the exposed aggregate concrete walk aligns with the end of the low wall. *Photo by author*

Another technique that can be effective to integrating different materials into the landscape is to make transition points where other design features are being resolved. For example, changes in paving materials can easily be accommodated where landscape walls are terminating or where the trail approaches or leaves an important physical feature in the landscape.

Curbing provides a transition between surfaces that are separated by a minor change in elevation. Curbing can be integrated with an adjacent paving surface, as is the case with many concrete curb and gutter systems, or constructed separately.

Drainage devices, such as grating and culverts should be properly installed and maintained to eliminate tripping and so as not to detract from the quality of trail. Depressions should be carefully constructed to avoid areas where erosion and potholes could develop.



Exposed aggregate curb and gutter at Whipple Point. Note how use of exposed aggregate concrete for the curb relates to the adjacent walk. *Photo by author*



Tripping hazards, such as this drainage grate, should be properly maintained. *Photo by author*

Park Road Landscape Features

Interpretive Signage and Trail Markers

Design Goals

- ① Signs Should be Purposely Designed and Placed in the Landscape ☺
- ② Coordinate Signage with Adjacent Landscape Features ☺✖
- ③ Use Consistent Graphics for All Signs ☺
- ④ Present Information in a Positive Manner ☺

Summary

There are a number of problems with the existing interpretive and trail signs at PEFO. In many cases, it appears that signs were designed and placed in a reactionary manner, in response to particular visitor behaviors. Without a thorough consideration of their relationship to the immediate micro landscape or to the overall landscape of the park, signage often appears jarringly out-of-place and confusing to the viewer. This section attempts to clarify the purpose and intent behind signage, while providing a number of suggestions for improving this important element of the park landscape. A number of NPS publications exist and should be consulted for further details on the effective design and placement of signage.

Design Strategy

Signs are used throughout the park to provide information to visitors. The purpose of a sign may fall under one of four categories: informational, identification, directional and regulatory. For interpretive and trail side signage we are most concerned with informational, directional and regulatory signs. Identification signs, such as roadside signage directing visitors to pullouts and visitor facilities is covered in a complimentary section of this document entitled Roadside Signage.

Informational signs include graphic and written content designed to provide increased enjoyment and knowledge to the visitor. At Petrified Forest, informational signs can take several forms. Large information signs are located at turnouts and viewpoints and provide the visitor an interpretation of what they are seeing. In the hierarchy of sign types, informational signs should be the most prominent and permanent types of signs visitors see at a pullout. The park's best informational signs are integrated with nearby features and often have a stone or solid base.

In many cases, however, interpretive signage is overpowered by directional and regulatory signs that are sized disproportionately to their purpose. Directional signs help visitors with wayfinding and with their ability to navigate the site. For pedestrian traffic, they should be small and simple in design and placed at important intersections in the landscape.

More problematic, however, are regulatory signs that, more often than not, are ill conceived and dominate the signscape of the park. Regulatory signs typically warn visitors of prohibited activities, such as the removal of petrified wood or of restricted access to certain areas of the park. More often than not, these signs are large and prominently placed, appearing to the visitor as the most important information to be gathered while visiting the park. In addition to being out of scale with respect to the information being presented, these signs should be reworded to address visitors in a more positive way.



The brown “Do Not Enter” sign appears more important than the interpretive sign at this overlook at Blue Mesa. The warning sign should be smaller and the content edited to be more minimal.

Photo by author



The interpretive sign at Lacey Point is effectively integrated into the landscape walls. *Photo by author*



When signage cannot be integrated into other landscape features, it should be as unobtrusive as possible. While this sign along the rim trail may be a little too large, its placement away from major views is appropriate. *Photo by author*

Along with deciding upon the hierarchy of signs at each pullout and overlook, it is important to consider the sign's placement, including the possibility of integrating it into adjacent landscape features. In many areas, this has been effectively done through the construction of a raised platform within the landscape walls. In several cases, especially where pullouts are only partially developed, interpretive signage should be integrated with any future walls added at these locations.

When signs are placed away from developed pullouts and viewpoints, they should be as minimal as possible. Placing numerous large signs along trails should be avoided. The use of small, ground level signs is an attractive option and should be included in other areas of the park.



This small interpretive trail sign, located along the rim trail, is appropriate for the information it is presenting. *Photo by author*



This interpretive sign at Chinde Point should be incorporated into a new landscape feature. *Photo by author*

Park Road Landscape Features

Amenities

Design Goals

- ① Integrate Amenities into Other Landscape Features ☺✖
- ② Combine Objects Together to Create a More Unified Whole ☺
- ③ Consider Relocating Shelters at Crystal Forest ☺

Maintenance References

Concrete (PD)
Concrete Walks / Sandstone Curbs
Drainage

Summary

Amenities refers to objects in the landscape that provide visitors with additional experiences or services. Amenities, such as benches, trash receptacles and picnic shelters are expected by most visitors and are one way that the NPS creates a world-class visitor experience. While Petrified Forest has a limited number of amenities when compared with other parks, there are several aspects of the landscape that could benefit from their more careful design and placement.

Design Strategy

At almost every pullout or viewpoint there are landscape objects that are not easily incorporated into the other features of the park road landscape. Trash receptacles are the most obvious example and are most often left to stand on their own without much integration with walls, benches or signage.

At those turnouts where new walls are being constructed there is an opportunity to incorporate amenities into the new design. Recessing trash receptacles into new walls is a good solution and should be employed where possible.

Likewise, it may be possible to combine several functions into one well designed object. For example, it may be possible to combine a seating element with a trash receptacle and / or interpretive sign. Concentrating several elements together could be an effective way to plan for future visitor amenities and to bring disparate objects together to create a more unified whole.

Besides the smaller objects found at turnouts and trailheads, there are several larger shelters that could be relocated or redesigned to be less obtrusive. In particular, the shelter at Crystal Forest is objectionable because of its placement above the parking area on a ridge. While having



Bench and interpretive signage along rim trail. *Photo by author*



The difficulty of incorporating trash enclosures into existing walls is seen at Lacey Point. *Photo by author*



While this bench and trash receptacle would not be compatible with rustic elements in the park, it does show how several objects can be grouped together to create more harmony in the landscape.

Photo by author

visitors hike to this prominent location to take in the view is desirable, the placement of a large landscape element tends to dominate this area, drawing the visitor away from the wonderful features of the natural landscape in this location.

In lieu of moving the shelter, it may be possible to redesign the shelter to be less monumental. Constructing the shelter of lightweight and translucent materials could help ameliorate the condition of placing the shelter high on the landscape. Providing visitors a place with shade at Crystal Forest is of obvious benefit and the abandonment of a shelter should be replaced with some area that provides refuge from the summer sun.



Shelter at Crystal Forest could be relocated to a less prominent location in the landscape. *Photo by author*

Park Road Landscape Features

Drainage

Design Goals

- ① Incorporate Drainage into Paving ☺✖
Materials
- ② Drain Water Away from Landscape Walls ☺✖
- ③ Install Culverts and Drainage Devices to be Inconspicuous ☺

Maintenance References

- Concrete (PD)
- Concrete Walks / Sandstone Curbs
- Drainage

Summary

This section provides an overview of the basic drainage systems being used at turnouts and landscape features within the park. While drainage devices perform the functional objective of moving water, they should also be considered for their aesthetic appearance. Additionally, drainage is important because it should move water away from objects built in the park's expansive soil, a priority for building under these conditions.

Design Strategy

To avoid maintenance issues caused by water, it is important to consider how and where water will be drained during the design and construction phases. Ideally, drainage devices should be integrated into the overall design of turnouts and visitor areas. A functional, aesthetically pleasing drainage system prevents damage to other landscape elements and fits seamlessly into the built and natural environment.

Deciding the best place to move water should be one of primary considerations in the park because of concerns about building in expansive soil. Even at the scale of landscape walls, problems can develop from the failure to evacuate water away from the footings of landscape elements. Overall, it appears that moving water away from landscape walls and towards adjacent parking lots and roads where it can runoff into the landscape is a successful strategy.

Where water cannot be directed towards larger paved areas and has to be deposited adjacent to landscape elements, it is critical to move water as far away from footings as possible. Drainage devices, such as channels integrated into the paving are good ways of handling this situation. Besides being functionally efficient, simple drainage devices should appear unobtrusive in the built environment



Draining water away from landscape walls and towards parking lots where it can be moved towards the natural landscape is a successful drainage strategy. *Photo by author*



This simple drainage channel at Tawa Point is integrated into the paving material and moves water away from landscape walls. It is also visually pleasing and compliments the color and texture of the wall and paving. *Photo by author*



Draining water under this landscape wall at the “no-name” turnout likely caused the crack in the wall to develop from movement in the soil. *Photo by author*

by complimenting the color and texture of adjacent landscape elements.

One situation that should be avoided is draining water towards landscape elements. While this detail is frequently used in landscape design, it should be avoided at Petrified Forest because of expansive soils that can cause structural damage to walls and other landscape features. Where this detail has been utilized, it appears that cracks have developed in walls from soil expansion and contraction caused by moisture.

Where it is necessary to use culverts to carry water under landscape elements, including paved trails, it is important to minimize their disturbance in the landscape. Care should be taken to bury culverts completely and to avoid exposing sharp edges that could be hazardous to visitors.



Culverts should be integrated into trails with installation appropriate to prevent tripping and provide aesthetic appeal. This exposed ends of this culvert make it more obtrusive than necessary. *Photo by author*

Park Road Landscape Features

Roadside Signage

Design Goals

- ① Strive For Consistent Roadside Signage ☺✂
- ② Make Signage Visible but not a Dominant Landscape Feature ☺
- ③ Refer to NPS Signage Guidelines for Other Requirements ☺✂

Maintenance References

- Concrete (PD)
- Concrete Masonry Units (PD)
- Exterior Finishes (PD)

Summary

This section includes proposals for developing new roadside signage intended to direct visitors to pullouts along the park road. It does not include guidance on safety and traffic control signage. The major goal in introducing new signage is to create a consistent treatment throughout the park. Currently, there are a variety of roadside signs that can cause confusion with visitors. This section should be used in conjunction with the latest NPS standards for roadside signage to create informative and visually consistent signage.

Design Strategy

The purpose of improving signage used to direct visitors to roadside pullouts and visitor amenities is to create a more consistent visual identity in the park. As mentioned previously, the system currently in place provides little guidance to visitors as they approach turnouts along the park road. Creating signs of consistent style and appearance could begin to offer visitors a more intuitive method of understanding the park's physical layout. The placement of roadside signs should be at a consistent distance before turnoffs to provide visitors adequate time to make their turns.

The designs found on the proceeding page suggest a few appropriate designs for turnout signs in the park. The forms and materials of these signs are based on existing signs and landscape elements found in the park. While it may be desirable to use one sign design throughout the park, the variety of materials and landscapes in the park could support a combination of sign types if the overall format and execution of the signs was consistent.



This roadside sign directing visitors to Interstate 40 near the Painted Desert Community Complex is simple with bold forms and graphics. *Photo by author*



Standard roadside signage should follow NPS standards. The back of roadside signs should be painted to blend with the natural environment. *Photo by author*



Stone base / exposed aggregate concrete top with painted alum. letters

- Combines existing elements of the park roadside landscape



Stacked stone sign with painted aluminum letters

- Appropriate where stone is the predominant landscape element along the park road



Exposed aggregate concrete sign with painted aluminum letters

- Compliments elements found in the signs at the north end of the park



CMU sign with stucco finish with painted aluminum letters

- Simple and cost effective sign compliments existing signage and natural features in the park



Exposed aggregate concrete sign with painted aluminum letters

- Compliments elements found in the signs at the north end of the park

Park Road Landscape Features

Roadside Barriers and Traffic Calming Features

Design Goals

- ① Use Materials Native to the Landscape to Create Barriers ☺🌳
- ② Remove Pine Pole Barricades and Replace with Other Devices ☺✂
- ③ Use Curbs Sparingly ☺✂

Summary

Because of the sensitive and fragile natural environment along the park road, it is necessary to keep vehicles out of certain areas. Along other parts of the road it is too dangerous for vehicles to be stopped and the construction of a deterrent is required. This section identifies the issues associated with providing barriers along the park road and prescribes a few guidelines for creating barriers that are effective and visually compatible with the park's natural and built features.

Design Strategy

As one drives through the park, it becomes obvious that controlling vehicles is a persistent problem. Drivers stopping at undesignated pullouts can create safety and environmental issues that require thoughtful interventions. Keeping in mind that the overall goal of the park road is to provide a virtually uninterrupted experience within the scenic landscapes of the park, the use of barriers should be minimal and of a visual quality that compliments the parks natural features.

While the use of pine pole barricades has several advantages (see landscape section on Railings and Fences), their use should be discontinued in the future. Because the natural landscape of the park is mostly barren and consists of low lying grasses and shrubby plants, the use of pine pole barricades is visually intrusive.

The use of large objects that sit low to the ground, such as boulders, should be explored as a means of protecting sensitive areas from vehicular access. While it is possible that many visitors will simply run over a stone barrier, there is probably no solution, short of constructing guardrails, that will keep areas completely protected from vehicles.

In other areas, especially along the park road, the adoption



Using large objects, like petrified wood, to keep vehicles from leaving park roads has been used successfully in the park. While the use of petrified wood is no longer possible due to management guidelines restricting its movement the use of boulders may be a possible alternative. *Photo by author*



This barricade created from boulders is one possible means of preventing vehicle access to sensitive areas. *Photo by author*

of curbs is a practical solution. Once again, however, it is important to consider the overall context of the park road and how it is a minimal intrusion into the landscape. Throughout the park, the road is a sliver of pavement that is only minimally displaced from its high desert surroundings. The use of curbing should be limited and carefully detailed to provide as little visual distortion as possible. The back-filling of curbs to bring the back of curb grade closer to natural grade is suggested.

Aluminum Windows and Doors

Routine Maintenance and Repairs

Causes of Corrosion

Corrosion can occur when aluminum comes into contact with hydrochloric acid, chlorides, sulfates, dirt, high humidity, concrete, mortar, plaster, and some forms of wood.

Cleaning

Regular cleaning will help to prolong the service life of aluminum by retarding corrosion. Mild cleaners, such as soaps, detergents, solvents, and emulsions can be used to remove loose grime. More aggressive soaps and detergents can be used to remove grime where milder cleaners are not successful. Heavily soiled aluminum may be cleaned with abrasive cleaners, polishes, or etching chemical cleaners at a risk of damaging surface treatments. Strong alkaline and acidic cleaners should be avoided.



Aluminum storefront systems hold up very well with proper maintenance and cleaning. 2004 Photo by author



Often it is the case that it isn't the failure of the window itself that is the problem at the PDCCHD, but the failure of the window due to shifting soil conditions. 2004 Photo by author

Inspection

- Remove surface dirt and grime and look for signs of damage and wear, including damage to window frames and sashes.
- Are the windows aligned correctly? Are sashes or frames bent or bowed?
- Does the glass or glazing compound need to be replaced?
- What condition is the hardware in?
- What is the condition of the surrounding frame?

Evaluation

- Historic aluminum doors and windows shall be maintained whenever possible.
- What level of repair is needed?

Execution

- Remove light corrosion and grime.
- Clean metal with a solvent

Aluminum Windows and Doors

Routine Maintenance and Repairs

Notes

Asbestos

Recognition and Management

Asbestos is a mineral-based fiber that is resistant to chemicals and heat. It was widely used in the mid-20th century to strengthen and insulate many building products. Asbestos is considered a hazardous material and inhaling high levels can lead to an increased risk of lung cancer. Asbestos is most dangerous when it is being disturbed, either through renovation or removal.

Recognition

Asbestos is most commonly found in pipe and duct insulation, floor tiles, ceiling tiles, wall board (transite) and roof and floor mastics.

It should be assumed, unless demonstrated otherwise, that the following materials contain asbestos if installed prior to 1980:

- Thermal insulation and sprayed surfacing materials
- Asphalt and vinyl floor tile material

Risk Potential

Asbestos containing materials (ACM) can be examined for potential risk by placement into two categories:

Friable ACM: when dry, may be crumbled into powder by hand

Non-friable ACM: when dry, may not be crumbled into powder by hand

Friable ACM is a greater health risk than non-friable ACM.



Floor tiles installed prior to 1980 are likely to contain asbestos. Floor tiles are considered non-friable. 2004 Photo by author



It is likely that wall panels used in the Painted Desert carports and gatehouse contain asbestos. 2004 Photo by author

Asbestos

Asbestos Management Checklist*

- ① Confirm whether the park has building materials that may contain asbestos
- ② If yes to item 1, check whether disposal of any of these materials is planned
- ③ If yes to item 2 and the park has manufacturing specifications on materials to be disposed, verify that a determination has been made on whether the material is an asbestos containing material (ACM) or non-ACM
- ④ If no to item 3, make sure that a properly certified individual has been retained to evaluate the material. Check with your state agency to determine specific certification needs
- ⑤ Assure that during waste ACM generation:
 - Material is properly containerized to prevent visible emissions.
 - Containers are properly labeled with generator name and location and in good condition.
 - Containers are properly stored.
- ⑥ Assure that During ACM Transport:
 - The vehicle is properly configured to prevent damage and fiber release.
 - The manifest is provided to transporter.
 - The vehicle is properly placarded.
- ⑦ Verify that when disposing waste ACM:
 - A proper disposal permit is obtained.
 - A permitted facility is used.
- ⑧ Suitable locations for in-place abatement have been identified.

Notes

*excerpted from:
Department of the Interior. National Park Service. Hazardous Waste Management & Pollution Prevention Team. 1998. *Asbestos Management*. Envirofacts Bulletin

Inspection



This concrete surface is uneven and the exposed aggregate has been loosened and removed by foot traffic and weathering.

Photo by author



The unevenness of the surfaces in the PD Plaza does not meet accessibility guidelines and is a tripping danger to park visitors.

Photo by author

Inspection

- Look for cracks and uneven surfaces that could be hazardous to visitors and residents.
- Look for spalled concrete and loose aggregate.
- Determine to what extent was damage caused by poor drainage and standing water.

Evaluation

- If the concrete has an integral color, determine the appropriate admixture.
- Determine where the extent of new concrete should end.

Execution

- Determine surface drainage before repairing concrete surface.
- Match the color and texture of adjacent surfaces.

Concrete

Painted Desert

Specifications for Finished Concrete Slabs at PDCC Central Plaza

From: PDCC Plaza and Landscape Drawings and Specifications, Section 2, Concrete.

Materials

Aggregate:

"Aggregate for seeding surface of exposed aggregate paving shall consist of washed and screened, uncrushed riverbed gravel. It shall pass the 1/2" sieve and be retained on the #4 sieve. It shall show a maximum range of color and shall be well distributed as to size and color".

Coloring Pigments:

"Pigment for coloring of exposed aggregate paving, combed finish concrete paving and concrete steps shall be Consov Permatint Pigment No. 1769-3 as manufactured by Conrad Sovig Co., 875 Bryant Street, San Francisco, California".

Concrete Strength

"Concrete shall develop a minimum strength at 28 days of 2500 pounds per square inch. Concrete for exposed aggregate paving shall have a maximum slump of 3 inches".

Finishing

Exposed Aggregate Pebble Finish: (Used at PD Plaza)

"After leveling the slab, distribute evenly the special 1/2" aggregate over the surface at the rate of 1 to 1-1/2 pounds per square foot and float into the concrete surface. After initial set (under average conditions, late the same day), expose the pebbles to the required finish by light scrubbing with fibre or wire broom and washing with fog water spray. The following day remove any laitance and cement film by scrubbing with clean, sharp sand and water, rinsing thoroughly".

Combed Finish Paving Slabs: (May have been used adjacent to Community Building)

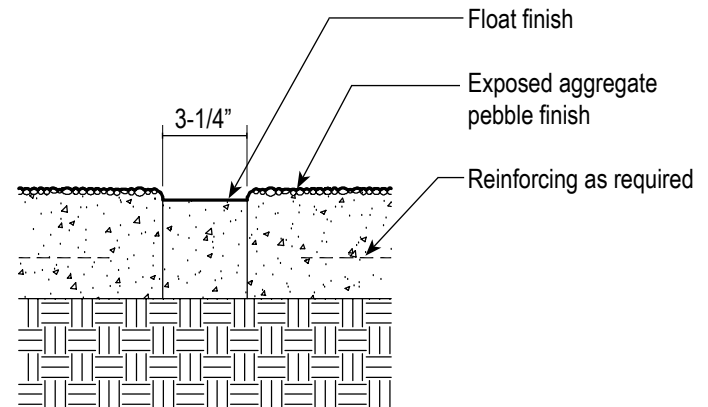
"Slabs shall have a monolithic finish which shall be obtained by screeding and tamping to force the coarse aggregate down from the surface and then floating to the required level, free from blemishes and true to a maximum tolerance of 1/8" in 10 feet. Surface shall be given a smooth, granular wood float or steel trowel finish and then lightly broomed in continuous straight lines the full length of the slab in the direction shown on the drawings to produce the pattern and degree of roughness required. Exposed edges of slabs and both sides of expansion and contraction joints shall be finished smooth with a steel edging tool having a 1/4" radius.

Execution

Specifications for Integral Concrete Color Trailer Court Building Walkway, Summer of 2004:

Davis Colors
3700 E. Olympic Blvd.
Los Angeles, California 90023

Hem# J4650
Description: Natural Brn. Umber
Quantity: .5 lb



Concrete Paving Detail at PD Plaza

From: As-built drawings, Plaza & Related Areas Painted Desert Community, 3/1963

Concrete Masonry Units (CMU)

Painted Desert

Inspection



Cracks in this wall are typical of those caused by the significant heaving and settlement of soils throughout the Painted Desert Complex. Damage to this wall is so severe that this wall cannot be repaired in place and should be reconstructed. *Photo by author*

Evaluation



Footing and reinforcing should be adequate to support CMU. Verify footing depth and reinforcing with a structural engineer before starting new walls. *Photo by author*

Inspection

- Cracks and separations that indicate excessive differential settlement in the soil
- Excessive moisture at the base of the wall
- Loose or missing mortar

Evaluation

- Can the repair be accomplished by repairing the existing block?
or does the entire section of wall need replacing?
- Is the footing and reinforcing appropriate for the wall?

Execution

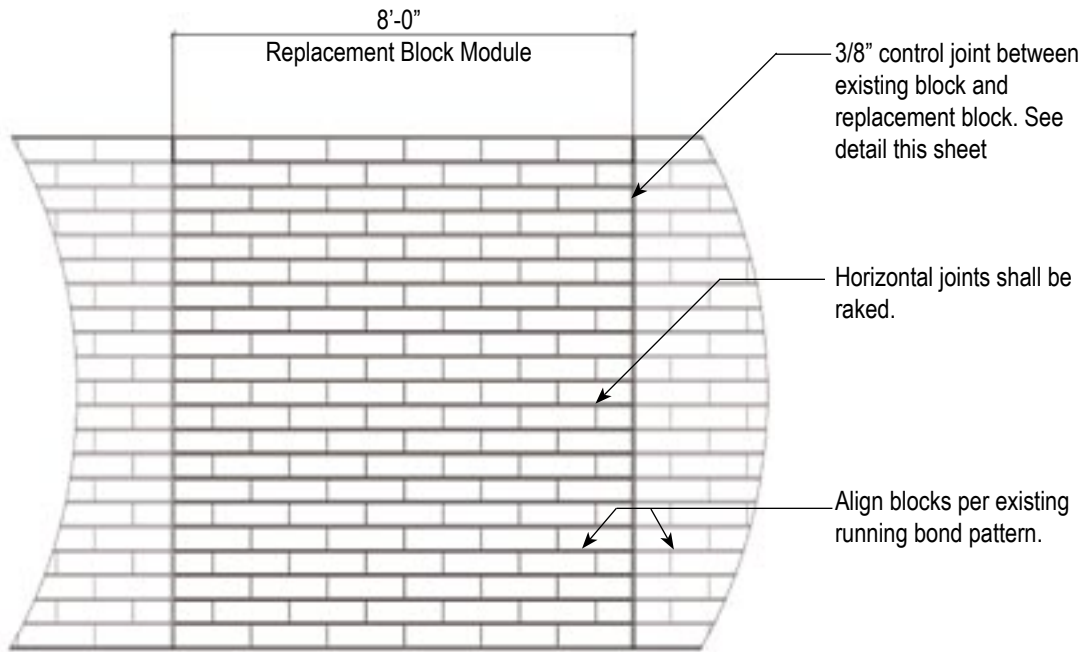
- Is replacement block similar in size, color and texture to the block being replaced?
- Is mortar the same color and hardness as existing?
- Are horizontal mortar joints tooled to match original?
- Does the vertical reinforcing align through the block?
- Is wall capped to prevent moisture from entering?

Note

- If constructing a new CMU wall, rather than replacing an existing wall, use 8 x 8 x 16 brown block from the Show Low Block Company.

Concrete Masonry Units (CMU)

Painted Desert



Execution



Inappropriate repair. Replacement block is randomly "toothed" into existing wall. Color and texture of the new block is emphasized by random replacement pattern. A more distinct separation, including a control joint, should exist between new block and the historic block.

Photo by author

In-Kind Replacement of Exterior CMU Walls

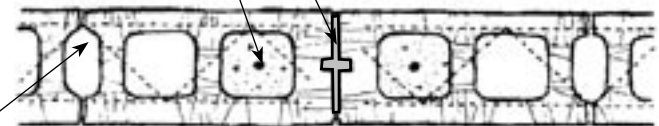
General Notes:

1. Replacement block shall be as approved by AZSHPO and verified by PEFO Historic Preservation Specialist. Replacement block shall be: Coral Lowboy (8 x 4 x 16) concrete blocks from Utility Block Company in Albuquerque.
2. Replace damaged walls in 8'-0" sections, separated from adjacent construction by 3/8" control joints.
3. Sealant at control joints shall match color of mortar.
4. Mortar joints shall be 3/8" thick. Horizontal joints, both interior and exterior, shall be raked 1/4" deep and vertical joints shall be finished by tooling to a slightly concave surface, with mortar bonded to the edge of the blocks. Verify mortar mix with structural engineer.
5. Wall shall be capped with 1" sloped concrete cap.
6. A structural engineer shall be consulted to verify location and size of footings, rebar, grouted cells and bond beams.

Preformed neoprene control joint full height of wall w/ sealant closure on both sides of joint.

Reinforce cores both sides of joint w/ continuous #5

Discontinue all horizontal joints and reinforcement at control joints



CMU Control Joint Detail. Provide control joints adjacent to existing construction and at a maximum of 8'-0" o.c. along walls.

Concrete Walks / Sandstone Curbs

Rainbow Forest

Inspection



A flush joint should exist between historic sandstone curbs and concrete walks. The concrete should be removed from this curb in front of the Rainbow Forest museum. *Photo by author*



New concrete walks should match the color and texture of existing concrete walks. Here, the color of the new concrete patch has not been closely matched to the existing. *Photo by author*

Evaluation



A good source for historic sandstone is the boneyard. It is best to replace historic curbs, in-kind, rather than with a new material that does not match the color or texture of the historic stone. *Photo by author*

Summary

Concrete walks will continue to be routinely disturbed as there is often a need to access utility lines located beneath walks. Walks also need replacing from time to time due to weathering or design changes.

When repairing or replacing walks at Rainbow Forest, it is important to not damage or disturb the historic sandstone curbs. New concrete should be flush with historic curbs and damage to curbs should not be repaired with concrete. If curbs cannot be repaired, they should be replaced with a unit of similar color, texture and dimension.

Matching the color of existing concrete walks will require some trial and error. A test batch should be mixed and poured to determine color consistency before a final pour is made. Concrete at Rainbow Forest has more sand than standard gray concrete.

Inspection

- Look for cracks and uneven surfaces that could be hazardous to visitors and residents.
- What is the condition and material of the curb?
- Determine to what extent was damage caused by poor drainage and standing water.

Evaluation

- If the sandstone curb is damaged, can it be repaired or does it need to be replaced?
- Determine where the extent of new concrete should end.

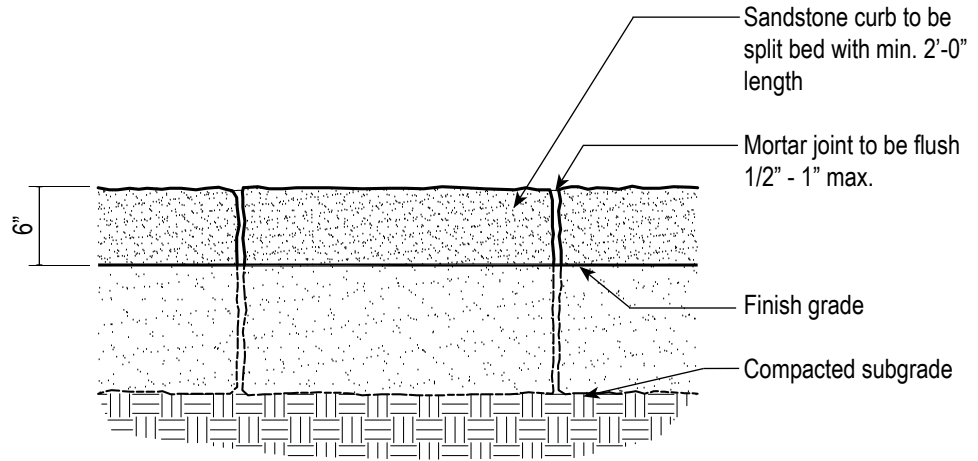
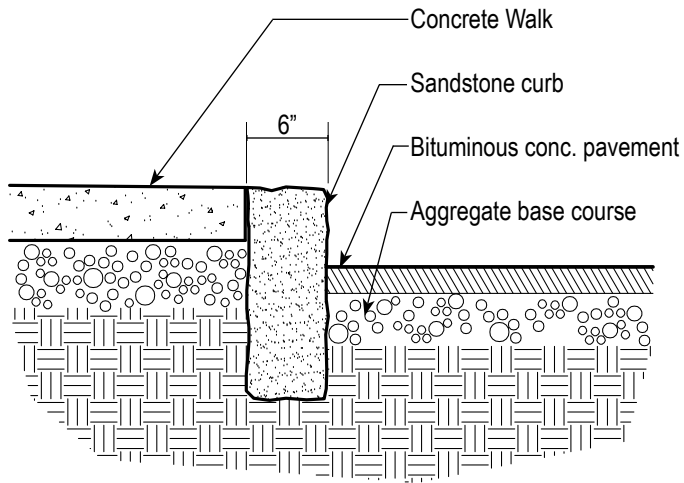
Execution

- Determine surface drainage before repairing concrete surface.
- Match the color and texture of adjacent surfaces.
- Joint between concrete slab and curb should be flush.

Concrete Walks / Sandstone Curbs

Rainbow Forest

Execution



Sandstone Curb Section at Concrete Walk

From: Landscape Construction Documents. 2/1984

Note: For reference only. Field conditions may differ.

Sandstone Curb Elevation at Concrete Walk

From: Landscape Construction Documents. 2/1984

Note: For reference only. Field conditions may differ.

Doors

Painted Desert

Hardware



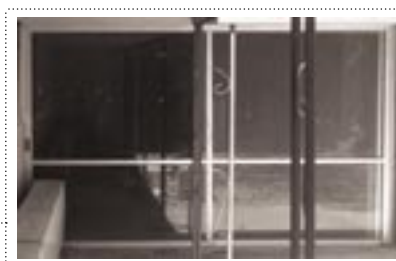
Original door hardware used on natural wood doors or aluminum frame doors has a satin anodized finish. Hardware used on hollow metal doors has a bright chrome finish. 2004 photos by author



Originally there was a sliding glass wall where this set of doors are. While restoring the glass wall is not currently in the park's agenda, an attempt should be made to adhere as much as possible to the aesthetic of the original design. In this case that means removing the decorative mullions. 2004 photo by author



Either of these doors that separate the administration portion of PD 251 from the apartment portion would be appropriate. However, these doors should match. The hardware on the door on the left is inappropriate. There should no metal with a gold/brass finish anywhere in the Painted Desert Community Complex. 2004 photo by author



2004 photo by author

Inspection

- Is the door historic, i.e. original to the complex?
- Does the door match other doors being used for similar purposes. I.e. are all the doors on the south facade of the residential block alike?
- Note materials and their conditions at the door jams, sill and head.
- Are the door and door hardware aesthetically appropriate for the Painted Desert Community Complex?

Evaluation

- If the door is not historic, can the door be made to resemble historic doors being used for similar purposes?
- If the door is not aesthetically appropriate, will replacing the hardware be sufficient, or will the entire door need to be replaced?

Execution

- Non-historic solid wood doors can be painted to resemble historic metal doors, as long as the two doors are not adjacent. Portions of the door that come in contact with other painted surfaces should not be painted.
- Doors that are inappropriate aesthetically should be replaced by doors that match the original door in design and material as closely as possible.
- All door hardware at Painted Desert should be anodized aluminum.

Doors

Painted Desert



Since a strict restoration is not feasible for most of the Painted Desert residences, it is not necessary that all doors be of the original material. However, a sense of unity is not unachievable and should be strived for. These three doors along the south facade of residential block C vary greatly in materiality and appearance. All doors should be either screened or not screened, preferably using a lower profile screen door. Doors that are made from wood should be painted to match doors made of metal. All hardware should match. 2004 photo by author

Recognizing Historic Doors in the Painted Desert Community Complex Historic District

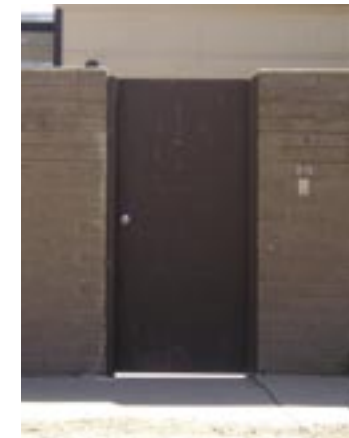
While several different types of doors are currently in use within the PDCCHD, there are three basic historic door types that can still be found in various locations throughout the complex. 2004 photos by author



Aluminum Frame-These doors are used in public buildings between interior and exterior spaces. The exception is the sliding walls used in residences, now only extant in PD208. 2004 photo by author



Natural Wood-These doors are used in all buildings between interior spaces. In most cases the door is associated with wood paneling. Careful attention should be paid to preserve these details when natural wood doors must be replaced. 2004 photo by author



Hollow Metal- These doors are used between interior and exterior spaces in residences, and administration spaces. 2004 photo by author

Doors

Rainbow Forest

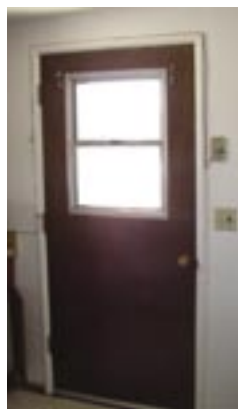
Residential Door Patterns

Solid wood panel doors are the most appropriate design for the residential buildings at Rainbow Forest. 1 and 2 panel doors should have flat panels, while 4 panel doors may have raised or flat panels. 8 and 10 lite doors were commonly used for exterior doors. Several of these historic multi-lite doors still exist and should be preserved.

When replacing non-historic doors in residential units, care should be taken to match other historic doors in the unit. For example, if 4 panel raised panel doors are present, it is best to use a similar design when replacing non-historic doors.

Inappropriate

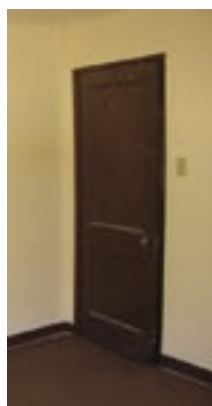
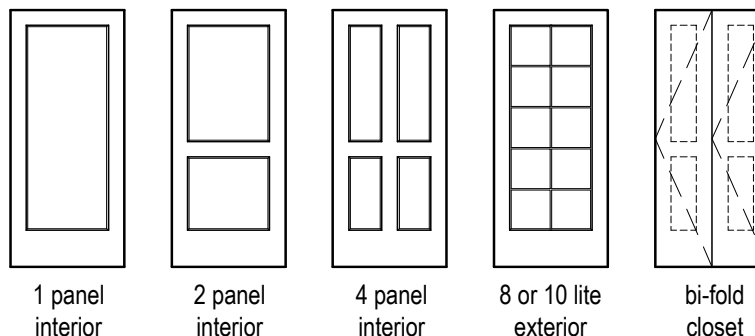
This exterior door at RF #53 is inappropriate because it does not have the same level of detail as a historic door. Specifically, the large glass opening and lack of a bottom panel, make this door too stark for historic buildings at Rainbow Forest. In general, doors having a flush appearance are inappropriate for Rainbow Forest.



Inappropriate door at RF #53 *Photo by author*

Screen Doors

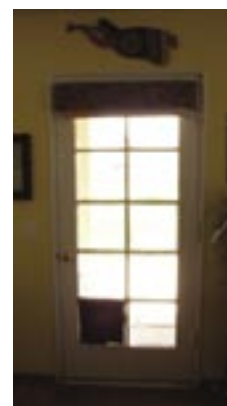
Screen doors should not obscure the historic doors they are covering. The design of the screen door should allow the lite pattern to be revealed completely.



Flat panel door at RF #52-B



Raised panel door at RF #52-C



10 lite door at RF #50



At #52-A, the screen door obscures the historic door. *Photo by author*



RF Employee Residence #52-A in 1938 showing a 8-lite exterior door. *PEFO Photo Archive #15678*

Inspection

- Are the doors historic? Are they solid wood panel doors?
- If the door being replaced is not historic, note features of any other doors that are historic.
- Note materials and their condition at door jambs, sill and head.

Evaluation

- If the door is historic, can it be preserved or modified to fit the new opening?
- Does the design of the new door match the appearance of any historic doors in the unit?

Execution

- Reuse historic door frames and trim.
- If required to replace the door frame, use a design similar to the one being replaced.
- Use appropriately designed hardware.
- When installing a screen door, be sure to allow the historic door to be clearly seen.

Doors

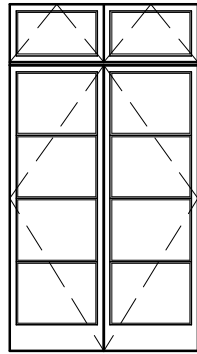
Rainbow Forest

Doors at the Rainbow Forest Museum

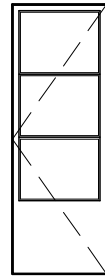
The doors at the Rainbow Forest Museum are historically important. The main entry doors were originally steel with glass panels and a glass transoms above. The interior doors, many of which are still in place, are multi-panel steel and wood doors.



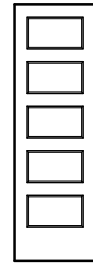
Rainbow Forest Museum original entry doors. PEFO Photo Archive #19097



Main entry doors



Secondary doors



Interior wood doors



Interior of Rainbow Forest Museum looking towards the original entry doors. PEFO Photo Archive #15765



Typical interior door frame at RF residential units. Photo by author

Hardware



Hardware suggestions

<http://www.crowncityhardware.com> DECO. Photo by author



Historic hardware, such as this art deco inspired knob and escutcheon in RF #52-C should be preserved. New hardware should be complimentary in design and finish. Many suppliers manufacture reproductions of historic styles, such as Craftsman and Art

Door Frames

When considering the replacement or resizing of a door, it is equally important to consider the design of the frame, including:

Use the appropriate frame material. Wood frames are typically used with wood doors while steel doors usually have steel frames.

Match the relationship between the frame and the wall. At Rainbow Forest, most frames are centered in the wall.

Trim details should be matched. What detail was used between the frame and plaster or drywall?

Drainage

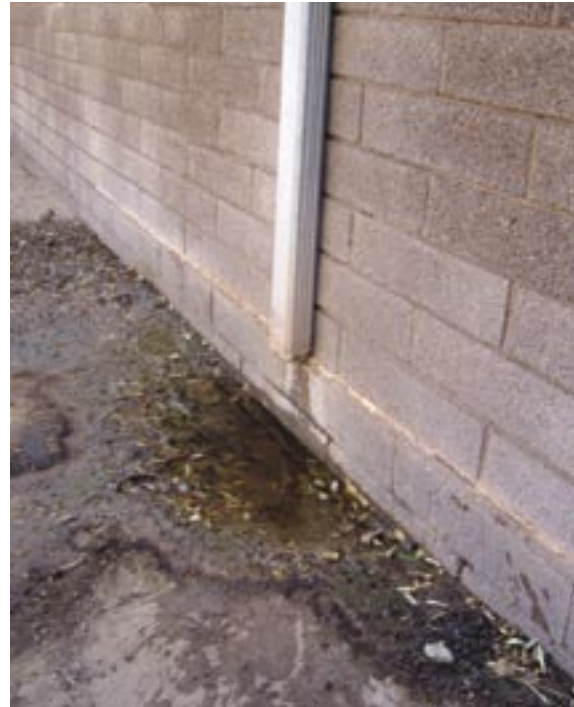
Identifying problem areas



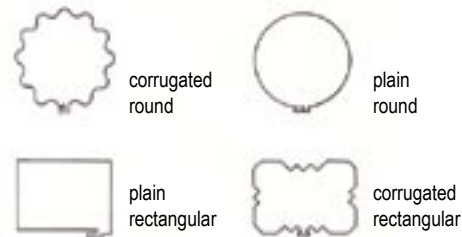
Because the Petrified Forest Community Complex was designed only using right angles, this downspout configuration looks especially out of place. 2004 photo by author



There are two problems with this downspout. One, it should be painted to better blend with the surrounding buildings. Two, there is an broken seal where the downspout leaves the roof that is causing damage to the wall beneath . 2004 photo by author



The damage that can be caused by a situation like this is enormous, and should be remedied immediately. 2004 photo by author



Various downspout sections. Any of these could be appropriate at Rainbow Forest. The plain round downspout is the most appropriate for Painted Desert as it compliments the aesthetics of the pipe columns used in the walkways and car ports. Drawing from Ramsey/Sleeper, *Architectural Graphic Standards*, 7th ed.

Inspection

- Is downspout / gutter still necessary?
- Does downspout transport water away from foundations?
- Is downspout / gutter damaging the wall it is attached to?
- Does downspout / gutter detract from the aesthetics of its surroundings?

Evaluation

- Can the downspout / gutter be removed?
- Can the downspout be altered to transport water an appropriate distance from building foundations?
- If the downspout is damaging the wall it is attached to, where is the damage originating? Is it a break in the downspout, or is it located where the downspout leaves the roof?
- Can the downspout be made to be less conspicuous?

Execution

- If downspout / gutter is removed, repair any holes / damage caused by its removal appropriately.
- Work towards a unified drainage system
- Downspouts should compliment the aesthetics of the buildings attached to.

Drainage

Identifying problem areas

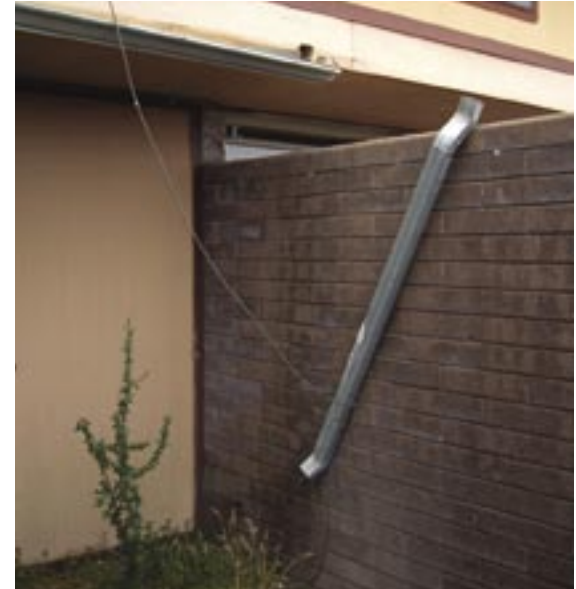
Drainage and water run off should be seriously studied at both ends of the park. At Painted Desert in particular, improper drainage can create serious damage by causing the bentonite clay underneath buildings to expand. Water should be transported as far away from building foundations as possible. At both ends of the park water has damaged the masonry. Water harvesting should be strongly considered to conserve as a way to conserve a scarce resource and as a way to keep water away from buildings. Any water harvesting system that is implemented should cause as little visible impact as possible.



This water removal system, implemented on the Maintenance building, is well designed. Unsightly downspouts have been eliminated, the materials and components are durable and handsome, and the system was carefully inserted into the building. *2004 photo by author*



Efflorescence and deterioration caused by a sprinkler. See National Park Service Preservation Brief 1 for efflorescence removal information. *2004 photo by Author*



This gutter and downspout are obviously not in use and should be removed. *2004 photo by author*



This downspout at Rainbow Forest complements the building it is serving well, but where is the water going? *2004 photo by author*

Electrical Retrofit

Considerations and Recommendations



This confluence of conduits mars this architecturally significant building intersection. Horizontal conduit should be enclosed in interior ceiling or floor spaces and only exposed when necessary. *2004 photo by author*



The insertion of this light switch at Rainbow Forest was carefully executed. But could it have been located less conspicuously? Also, the choice of a plastic switch and plate is out of character with the rest of the building. When an alteration to irreparable historic fabric is being considered, the greatest care should be taken to minimize its impact. *2004 photo by author*

Inspection

- Is existing conduit being used effectively?
- If a new retrofit is being planned, is it a permanent solution or a temporary fix?

Evaluation

- Is existing conduit still needed?
- Determine if conduit has been placed most effectively to minimize visual effect.
- Determine whether multiple conduits running in close proximity could not be combined.
- Does the problem call for a temporary solution that may be aesthetically unpleasing, or does the problem warrant a more in depth solution that is more appropriate and expected to be viable for many years?

Execution

- If existing conduit or other electrical devices are no longer being used, they should be removed, with any resulting damage repaired appropriately.
- Relocate obtrusive conduit
- Conduit should only be run on the surface of buildings or interior walls if the solution is temporary. If the solution is meant to be permanent, a solution that allows the electrical retrofit to be invisible should be investigated. If these means altering historic building fabric, the solution should be executed with the highest standard in craft, and should be versatile enough to be sufficient for many years.

Electrical Retrofit

Considerations and Recommendations



This conduit has been carefully placed along the top of the covered walkway at Painted Desert. Because it is raised off the roof it is protected from water damage, but still remains invisible from the ground. *2004 photo by author*



This conduit could have been run long the top of the overhang below, thus hiding it from view from the ground, as in the photograph below. *2004 photo by author*

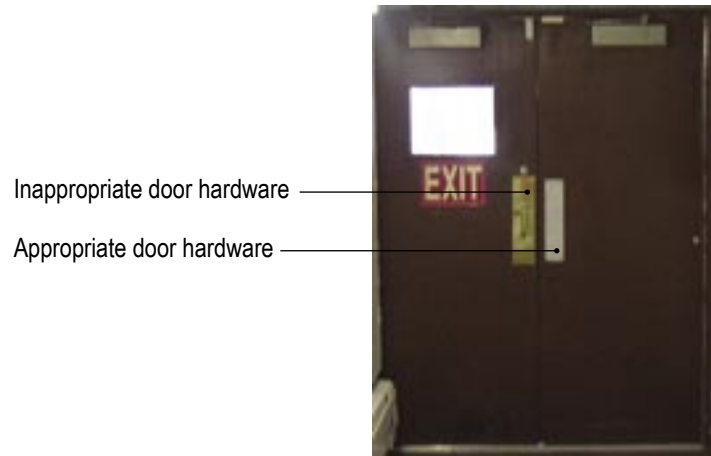


The insertion of this electrical equipment is unobtrusive in that it enters the building relatively low to the ground. However, much more of the masonry was removed than needed, then left exposed. This leaves the inside of the wall exposed to water damage. *2004 photo by author*

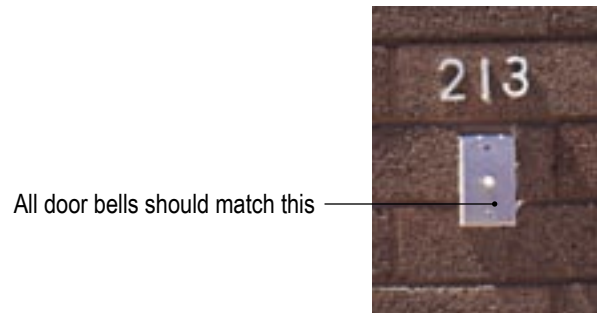
Exterior Finishes

Painted Desert Exterior Finishes

Door Hardware



Door Bells



Door Hardware

All door knobs, handles, and exposed hardware should have either a bright chromium finish (US26) or a satin aluminum, clear anodized (US28) finish. All door hardware should be alike for similar functions. (i.e. where door knobs are appropriate, all should be alike; where handles are appropriate, all should be alike)

Door Bells

All door bells should be alike. All should have a satin aluminum, clear anodized finish (US28). See illustration for precedent

Flashing and Coping

All flashing should be 3 1/4" in height. Coping, or parapet cap, should be 2 1/4" high. These dimensions should be consistent throughout the PDCCHD

Signage

All signage should be compatible with the aesthetics of the PDCCHD. No exposed wood grain, or any other type of decorative sign should be used. Apartment numbers should be designated by 2" aluminum characters similar to the original characters. The original font used was Bayer Standard Modern Narrow Face made by the now defunct Bayer Company

Exterior Finishes

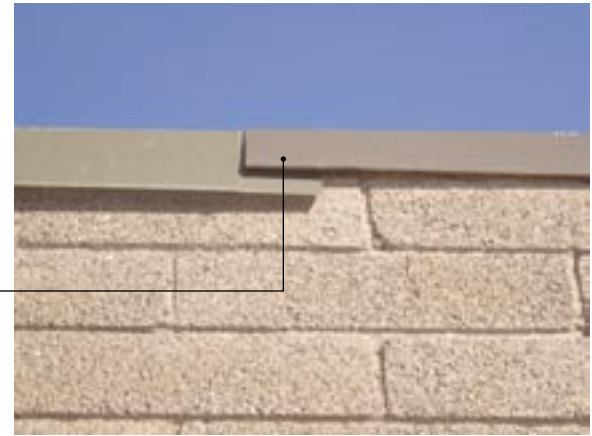
Painted Desert Exterior Finishes

Coping and Flashing

Coping should be 2 1/4"



Flashing should be 3 1/4"



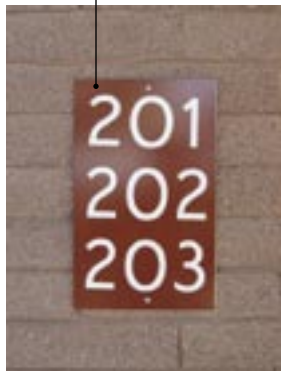
Inappropriate coping detail

Signage

Inappropriate signage



Appropriate signage



Original text signage design



Finish Recommendations

Painted Desert Employee Residences

The finishes and furnishings included here are only recommendations and should not be applied uniformly to all residential units at the Painted Desert Community Complex. Residents intending to occupy park housing for an indefinite extended period should be permitted to finish their unit however they see fit to make it "home". However, for housing intended for temporary residents, or for those permanent residents who wish to finish their housing in a manner complimentary to the architecture of the complex, these simple suggestions may be followed.

Light Fixtures

Light fixtures should be of simple geometric form with no decorative patterning. If an original light fixture is replaced, an effort should be made to acquire a similar fixture. If non-original fixture is replaced that is part of a larger lighting scheme still containing original fixtures, an effort should be made to select a comparable fixture.



Chateau 2 by Progress Lighting



9-3/4" Polish Brass Bevel by Hampton Bay

Furniture

Furniture should be simple in form. Ideally, sofas, love seats and recliners should be monochrome in color, or feature a basic geometric pattern. No floral pattern patterns should be used. If the furniture contains a metal finish, it should be chrome or a dull silver. Gold finish should be avoided.



Kawanee Sofa by the Flexsteel Corporation



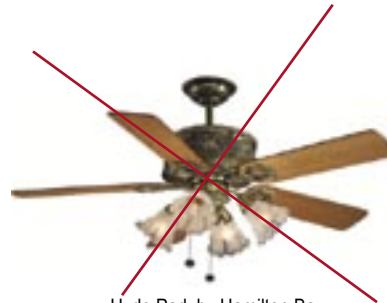
Country Casual Sofa by Olde Mill House

Ceiling Fans

Ceiling fans should lack any unnecessary ornamentation. Blades should be white or wood grain finish. If the fan has a metallic finish, it should be chrome or a dull silver. Gold or brass finishes should be avoided. Attached light fixtures should be simple geometric forms. Elaborate floral fixtures should be avoided.



Model #04345 by Hampton Bay



Hyde Park by Hamilton Bay

Finish Recommendations

Painted Desert Employee Residences

Cabinets and Counter Tops

Every effort should be made to maintain and preserve the original Youngstown™ kitchen cabinets. Not only do they add to the overall historic feeling of the Painted Desert Community Complex, but it is unlikely that any replacements currently within PEFO's budget will hold up as well as the original cabinets have for the last 40 years. If cabinets must be replaced, then a simple cabinet, either white or a solid, light color should be used. Wood cabinets with a light finish, similar to original wood doors used within the residences would also be appropriate. If a solid color cabinet is used, hardware from the original cabinets should be fitted to the new cabinets, as per PD205. Cabinets with a dark wood finish or with panels with decorative relief should be avoided. Counter tops should be of a solid, light color.



Alpine series by Mill's Pride



Monroe Maple Cider by Thomasville



Camden Maple Briarwood by Thomasville

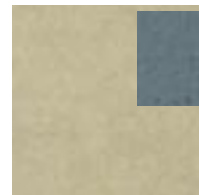


Original Youngstown Cabinets. PEFO Photo Archive photo by Stitt

Flooring

Note: Sheet vinyl flooring is an acceptable substitute for kitchen flooring. However, linoleum is preferred for being a more environmentally responsible product.

Kitchen

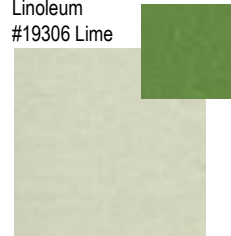


Field Color
Armstrong Marmorette
Linoleum
#19001 Pearl

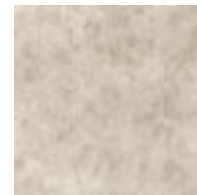
Field Color
Armstrong Uni Walton
Linoleum
#19259 White

Accent Color
Colorette
Linoleum
#19305 Seaberry

Accent Color
Armstrong Colorette
Linoleum
#19306 Lime



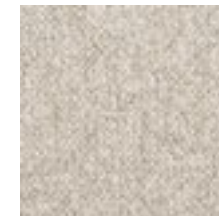
Bath



Armstrong Translations
Vinyl Sheet Flooring
#31735 Desert Sand

Note: Maintain existing ceramic tile surfaces at bathtub enclosures.

Living and Bed Rooms



Shaw Industries Carpet
Pueblo Classic 12' 52513
Color: Conch Shell 00101

Note: Carpet should be closed loop with a level surface. Patterns should be minimal. Maintain existing wood base when replacing carpets in living room, bedrooms and hall.

Finish Recommendations

Rainbow Forest Employee Residences

The finishes and furnishings included here are only recommendations and should not be applied uniformly to all residential units at Rainbow Forest. Residents intending to occupy park housing for an indefinite extended period should be permitted to finish their unit however they see fit to make it "home". However, for housing intended for temporary residents, or for those permanent residents who wish to finish their housing in a manner complimentary to the architecture of the complex, these simple suggestions may be followed.

Cabinets

Simple, wood cabinets are appropriate for the kitchens and bathrooms at Rainbow Forest. Flush panel cabinets are recommended over cabinets with flat or raised panels.



www.kraftmaid.com



Furniture

Furniture should have simple lines and be of a size and style that fits within the modestly designed spaces at Rainbow Forest. Wood furniture would be an appropriate choice.



Mission style sofa @ www.woodclassics.com



Ceiling Fans

There are a wide variety of residential ceiling fans available. Sticking with a simple design without a lot of embellishments will fit best with the natural feel of Rainbow Forest. Shiny metal surfaces would not be the best finish for ceiling fans at Rainbow Forest.



Hampton Bay Model YG032A-CB



Finish Recommendations

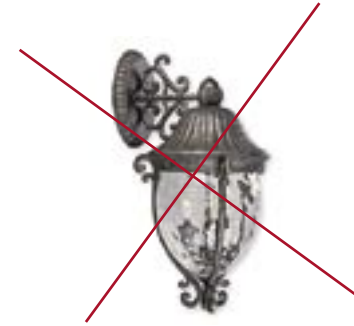
Rainbow Forest Employee Residences

Exterior lighting

Exterior lighting should be simple. A hand forged look would be appropriate. The placement and the size of the fixture are other factors that should be considered in selecting exterior lighting.



Hampton Bay Model THD14236A



Landscape lighting

If landscape lighting is desired, it be of a design that maintains a low profile in the landscape. There are a wide variety of low-voltage, as well as solar lights that are appropriate.



Site Lite Model K822BR



Roofing

Inspection and Maintenance

Inspection



Many of the roofs at the park have lots of equipment and roof penetrations where water can find its way into the building. Flashing and curbs should be inspected to insure they are sealed. Furthermore, joints between membrane should be inspected.

Photo by author



Inspecting roof drains should be completed each year to insure that they are working properly.

Photo by author

Evaluation



Some of the buildings in Rainbow Forest and along the park road have foam or built up roofs. The condition of roofs should be evaluated periodically. Roofs should be repaired before they reach the state of deterioration seen at Puerco Pueblo. Flashing is another critical component that should be inspected. At the Puerco Pump House, the copper flashing remains in excellent condition and has prevented water from entering this structure.

Photos by author

Summary

In the past, some of the park's buildings, particularly those at Painted Desert, were damaged from water entering through substandard roofs. In recent years, the park has applied new roofs, or will soon install new roofs to many of these structures. While the park hopes to receive many years of maintenance free roofs, periodic inspection of roofs should still be conducted. Inspecting roofs every year as part of a preventive maintenance program can help prolong the life of a roof and prevent costly repairs. This page presents some of the things that should be looked for when conducting periodic inspections of roofs.

Inspection

- Periodically inspect roofs looking for signs of damage, including low spots and ponding, loosened seams and loose and missing flashing.
- If gutters and downspouts are present, are they functioning correctly?

Evaluation

- What is the cause of the roof damage? Is the roofing material defective or is something else contributing to the damage?

Execution

- Consult manufacturer's recommendations before attempting to repair a damaged roof.
- Be careful not to damage adjacent surfaces and materials when repairing the roof, including parapet walls and flashings.
- Refer to project specifications and construction documents for more complete information

Roofing

Inspection and Maintenance

Roof Color



Because of the change in elevation at Rainbow Forest, many roof tops can be seen from public areas. New roofs should blend with the sandstone color of the walls and surrounding landscape, as best as possible. *Photo by author*



The glaring white color of this roof is inappropriate. A better color choice would be tan or a color that helps to blend the roof with the distant landscape

Photo by author

Removing Existing Roofing Material



Detail of foam roofing applied to parapet.

Photo by author



Foam roofing applied to the parapets and walls of buildings at Rainbow Forest should be removed carefully and with the assistance of an experienced professional. See Sandstone Masonry Cut Sheets for more info. *Photo by author*

Notes

Sandstone Masonry

Cleaning Historic Sandstone Masonry

Inspection



Stained areas of masonry walls should be identified. Taking note of what caused the staining is important to being able to remove the stains properly. *Photo by author*



Foam roofing has been applied over sandstone parapets and to vertical sandstone surfaces throughout the park. Care should be taken when removing. *Photo by author*

Evaluation

Before proceeding with the cleaning of sandstone masonry, it is good to ask the following questions:

1: Is the soiled appearance of the building worse than the cleaned appearance will be? Will the cleaning of a specific area create a “patchwork” of colors and textures on the elevation?

2: Are the methods and skills required for removing the sandstone available and economically feasible? If the removal of the dirt or a surface material is done carelessly, more damage to the sandstone could occur. Also, the removal of material from sandstone is a time consuming activity, where the financial cost could be great.

Summary

Because sandstone masonry is a relatively soft material, there are a limited number of techniques that can be used to safely remove dirt, surface colorations and applied materials. To avoid damage to the sandstone caused by inappropriate cleaning treatments, it is best to consult with an experienced conservator who can conduct special testing to determine if cleaning is possible. When conducting work under contract, it is important to select a contractor who is experienced with the recommended methods for removing material from sandstone.

Inspection

- Identify areas of staining and deposits and their possible causes.
- Determine if the material to be removed safely without invasive means

Evaluation

- Obtain technical data on the material to be removed to determine if there are any suggested methods for its removal.
- Begin testing with the gentlest and least invasive method. Proceed to more complicated methods, if necessary

Execution

- Allow tested portion to weather for some period of time to determine if the method selected is ideal.
- Do not add a waterproof coating to sandstone

References

NPS- Preservation Briefs #1
Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings.
<http://www.cr.nps.gov/hps/tps/briefs/brief01.htm>

* The cleaning of sandstone masonry is a specialized activity that may require special consultation with an expert conservator or historic architect who can create detailed specifications and provide on-site guidance.

Sandstone Masonry

Cleaning Historic Sandstone Masonry

Notes

Sandstone Masonry

Repair and Repointing of Historic Sandstone Masonry

Inspection



A periodic inspection of sandstone masonry should uncover missing masonry units and areas in need of repointing, such as those with loose and cracked mortar. The missing corner block shown in the above photo is allowing moisture to enter this building's corner.

Photo by author



Inspections should identify areas of missing or loose masonry.

Photo by author

Evaluation



Areas of spalled sandstone caused by water damage should be identified. This sandstone block, on the east side of RF 51-A, will need to be redressed. *Photo by author*

Summary

One of the most important elements to monitor on a masonry building is the deterioration of the stone and mortar joints. Damage to masonry that is detected before it becomes too severe can often be repaired. If the damaged area continues to deteriorate, more costly repairs may become necessary.

During the evaluation and execution* phases special consideration must be given to the mortar mix to assure that it has the correct physical and visual qualities. The mortar mix may need to be custom ordered to provide the proper color, permeability and strength. Inappropriate mortar is both visually obtrusive and can more serious problems in the masonry, including cracks and spalling.

Correcting problems that contribute to the damage, such as exposure of the masonry to water should be corrected before proceeding with repairs to the masonry or the repointing of mortar.

Inspection

- Identify loose or missing masonry.
- Identify areas of missing or disintegrating mortar.
- Identify areas of soft sandstone that are spalled and may need to be redressed.
- Identify root cause of damage, including standing water.

Evaluation

- Determine a mortar mix that is chemically and visually compatible with the building.
- Determine level of treatment necessary to repair severely damaged or spalled sandstone.

Execution

- Repair the source of the damage before repairing or repointing proceeds.
- Mortar joints should be tooled and detailed to match historic.

References

NPS- Preservation Briefs #2
Repointing Mortar Joints in Historic Masonry Buildings. <http://www.cr.nps.gov/hps/tps/briefs/brief02.htm>

* The repointing of sandstone masonry is a specialized activity that may require special consultation with an expert conservator or historic architect who can create detailed specifications and provide on-site guidance.

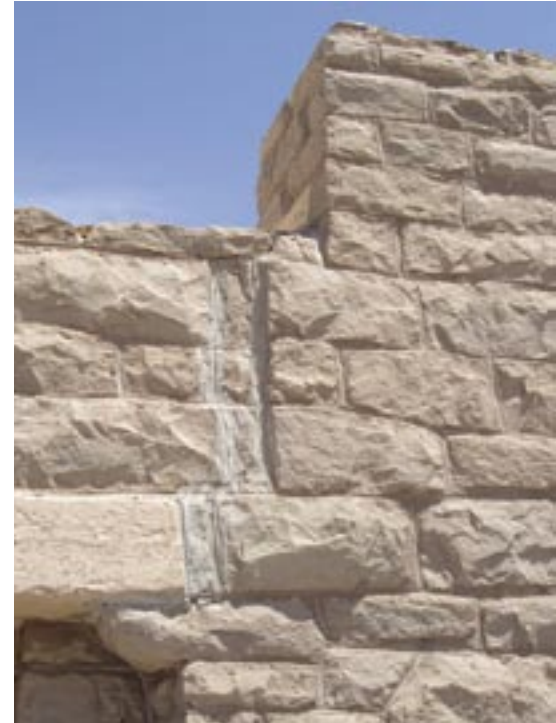
Sandstone Masonry

Repair and Repointing of Historic Sandstone Masonry



The color of the mortar should match the color of the original mortar. The use of gray mortar, as seen in the repointing of RF unit 52-C should be discontinued. *Photo by author*

Execution



Looking at the mortar in closer details reveals the contrast between the more tan mortar and the gray mortar used to repoint this area of RF 52-C. *Photo by author*

Steel Windows

Routine Maintenance and Repair

Inspection



Blown sand should be periodically removed from the exterior of windows in exposed areas of Rainbow Forest, like this one on the north elevation of building 51-E. Sand against the window may also cause water infiltration and rust. Once sand is removed, the steel window can be properly inspected for damage to the frame and sash. *Photo by author*

Evaluation



When deterioration is limited to surface rusting and flaking paint, simple techniques can be used to clean and preserve the steel. *Photo by author*

Inspection

- Remove surface dirt and grime and look for signs of damage and wear, including damage to window frames and sashes.
- What is the condition of the paint and is there rust or corrosion present? Were the windows finished with lead paint?
- Are the windows aligned correctly? Are sashes or frames bent or bowed?
- Does the glass or glazing compound need to be replaced?
- What condition is the hardware in?
- What is the condition of the surrounding masonry and sill?

Evaluation

- Historic steel windows shall be maintained whenever possible.
- What level of repair is needed? Basic maintenance, including removal of surface rust, repainting, glass replacement, repointing and lubrication of hinges and caulking may be completed in house.

Execution

- Remove light rust and flaking paint.
- Clean metal with a solvent

Steel Windows

Routine Maintenance and Repair

Routine Maintenance

Minor deterioration where removal of the sash and frame is unnecessary.

1. Removal of light rust, flaking and excessive paint.
2. Priming of exposed metal with a rust-inhibiting primer.
3. Replacement of cracked or broken glass and glazing compound.
4. Replacement of missing screws or fasteners
5. Clean and lubricate hinges
6. Repaint steel sections with two coats of finish paint compatible with the primer.
7. Caulk masonry surrounds with elastomeric caulk.

Notes

Window Replacement

Painted Desert

Inspection



In many cases, in areas where a section of aluminum sash windows have been removed, such as this section of the apartment building, many nearby examples still exist to guide the selection of replacement windows. If no precedents exist to guide window replacement the original architectural drawings and specifications should be consulted when replacing a historic window for finishing details and product information. *Photo by author*

Evaluation



When preparing to replace windows at PDCCHD special care should be given to window size and proportions, frame depth and thickness, finish, and what sections of the window being replaced are operable or non-operable. *Photo by author*

Inspection

- Measure existing openings
- Note materials and their condition at window jambs, sill and head.

Evaluation

- Determine the historically appropriate sash pattern and proportions to the window.
- Determine the need for fixed or operable units.
- Determine whether an existing window whether or not the window will be replaced with one in the park, or whether the window will have to be ordered.
- Investigate the use of double pane, insulated windows when executing an in-kind replacement.
- Prepare detailed drawings of jamb, head, sill details showing attachment of window frame to opening and flashing conditions.

Execution

- Replacement window shall be attached to a solid substrate.
- Window shall completely fill existing opening to within 1/2" tolerance
- Provide solid backer rod and caulk around window.

Window Replacement

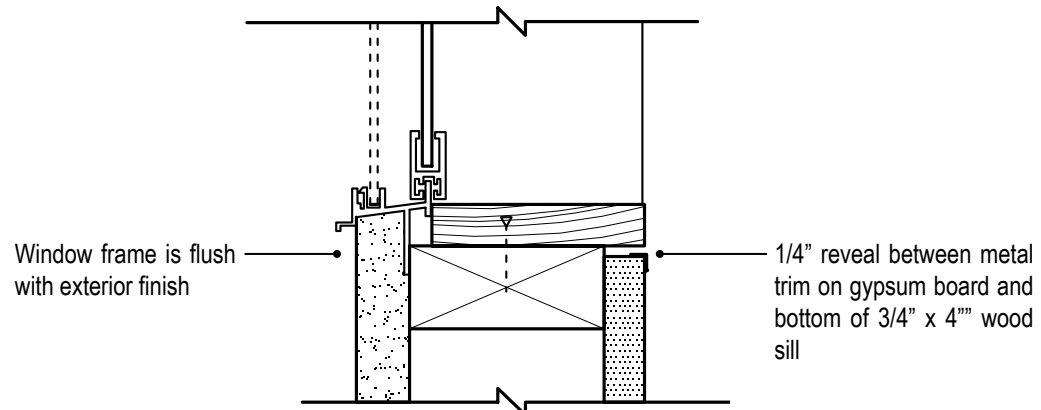
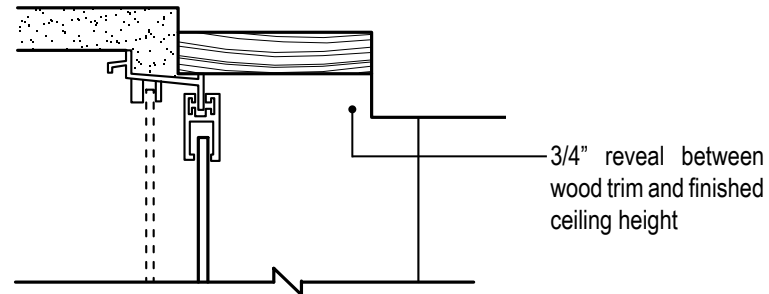
Painted Desert

Manufacturer

The only company that was originally specified to manufacture aluminum windows at the PDCCHD that is still in operation is the Kawneer North America™ company. It can be helpful to begin any window replacement investigation at Kawneer's web site. For past projects, such as the restoration of the Visitor Center entrance, the park has used the Amarlite Architectural Products company.

Finish

Historic aluminum windows and doors at the Painted Desert Community Complex employ an anodized or satin finish, according to Aluminum Company of America (Alcoa) specification 204-R1. Contemporary equivalents are Alumilite 204-A1 R1 or Satin 204-C3



Typical PDCCHD historic aluminum window section. Generated from original window details from bedrooms in residences PD201-218

Window Replacement

Rainbow Forest

Inspection

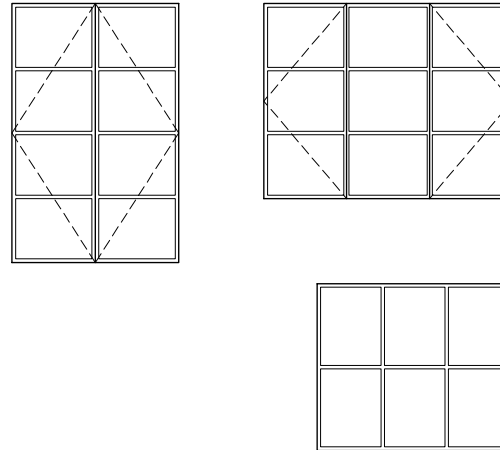


Original 9 pane window at Employee Residence #52-B.
Photo by author



Inappropriate replacement. This aluminum replacement window is too small for the existing masonry opening. Replacement windows shall fill existing masonry openings and infill around windows shall be avoided. *Photo by author*

Evaluation



Historic window proportions and muntin patterns for steel casement windows in the Rainbow Forest Historic District. Many of the original windows were 9 lite, with a 8 lite pattern at the RF Museum and 6 lite pattern at utility buildings.

Inspection

- Measure existing masonry openings
- Note materials and their condition at window jambs, sill and head.

Evaluation

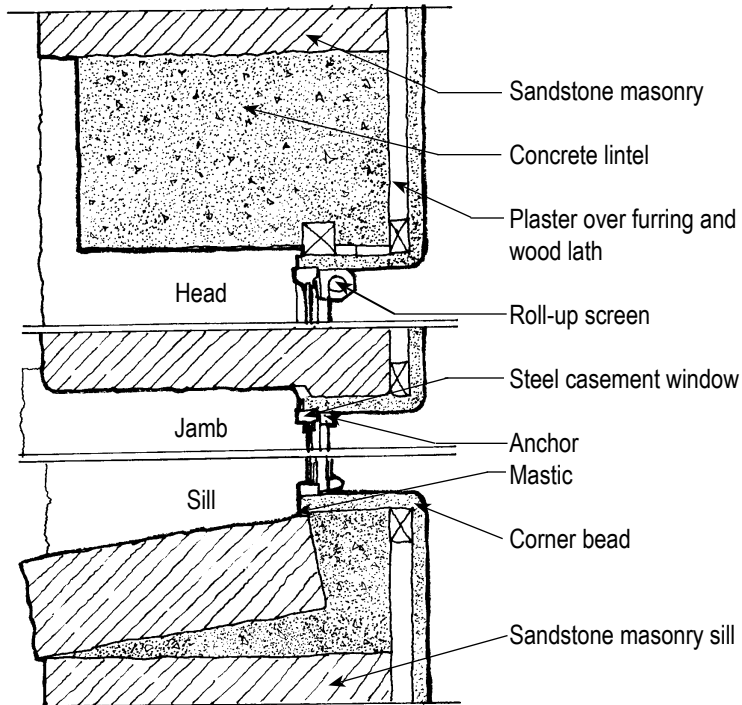
- Determine the historically appropriate muntin pattern and proportions to the window.
- Determine the need for fixed or operable units.
- Prepare detailed drawings of jamb, head, sill details showing attachment of window frame to opening and flashing conditions.

Execution

- Replacement window shall be attached to a solid substrate.
- Window shall completely fill existing masonry opening to within 1/2" tolerance
- Provide solid backer rod and caulk around window.

Window Replacement

Rainbow Forest



Detail of typical casement window at RF Museum. Note how window is recessed from exterior surface of sandstone masonry. Replacement windows should maintain placement and detailing of historic windows. Redrawn from original construction documents. Not to scale.

Notes



Historic photo of RF52-A showing original 9 lite windows. PEFO Photo Archive #15675

Wood Vigas

Rehabilitation and Replacement

Inspection



Existing viga end, with integrated canales, at Rio Puerco Comfort Station. *Photo by author*

Evaluation



Damaged viga ends at Rio Puerco. *Photo by author*



Measuring existing viga for correct diameter and length. *Photo courtesy Jake Barrow, NPS*

Inspection

- Periodically inspect viga ends for dry rot and water damage.
- Note special construction details inherent to the viga, such as the integrated canales.
- Determine if damage is limited to the viga ends or if the damage has penetrated the interior of the building

Evaluation

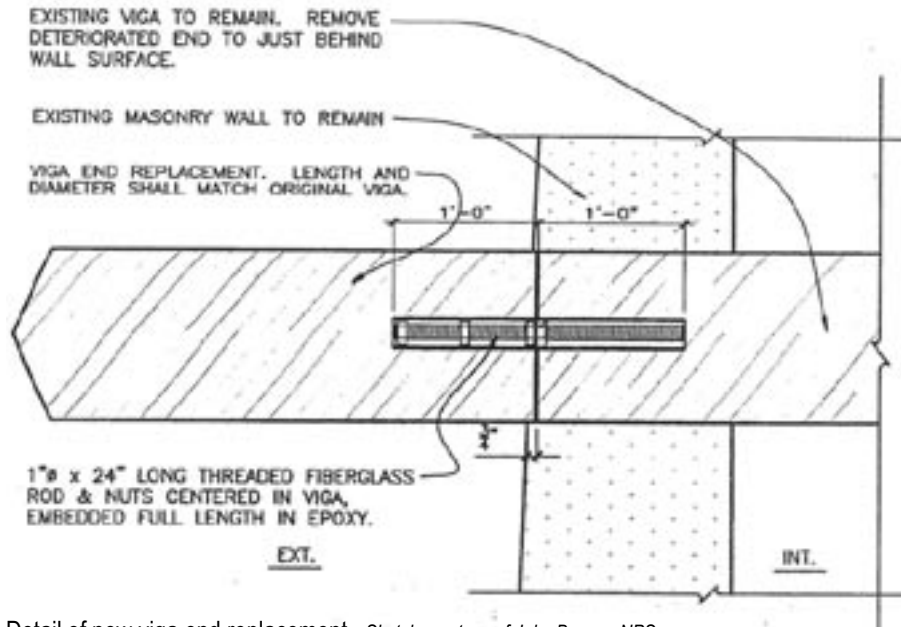
- Measure and record diameters and projection from face of wall of viga to be replaced

Execution

- If damage on viga is restricted to the exposed ends, remove viga approximately 4" inside of wall
- Set threaded rod into existing viga with epoxy. Verify details with a structural engineer
- Set receptacle in new viga end with epoxy. Align receptacle with threaded rod
- Set new viga in place
- Seal viga end. Paint, as required

Wood Vigas

Rehabilitation and Replacement



Detail of new viga end replacement. Sketch courtesy of Jake Barrow, NPS



The viga end has been removed and a threaded rod has been set with epoxy into the existing viga. Note how viga end was removed just below the surface of the wall.

Photo courtesy Jake Barrow, NPS



Surface prepared to receive new viga end. Photo by author

Execution



New viga end showing receptacle for receiving threaded rod. In this case, receptacle is being protected from damage with a bolt before installation. Photo by author

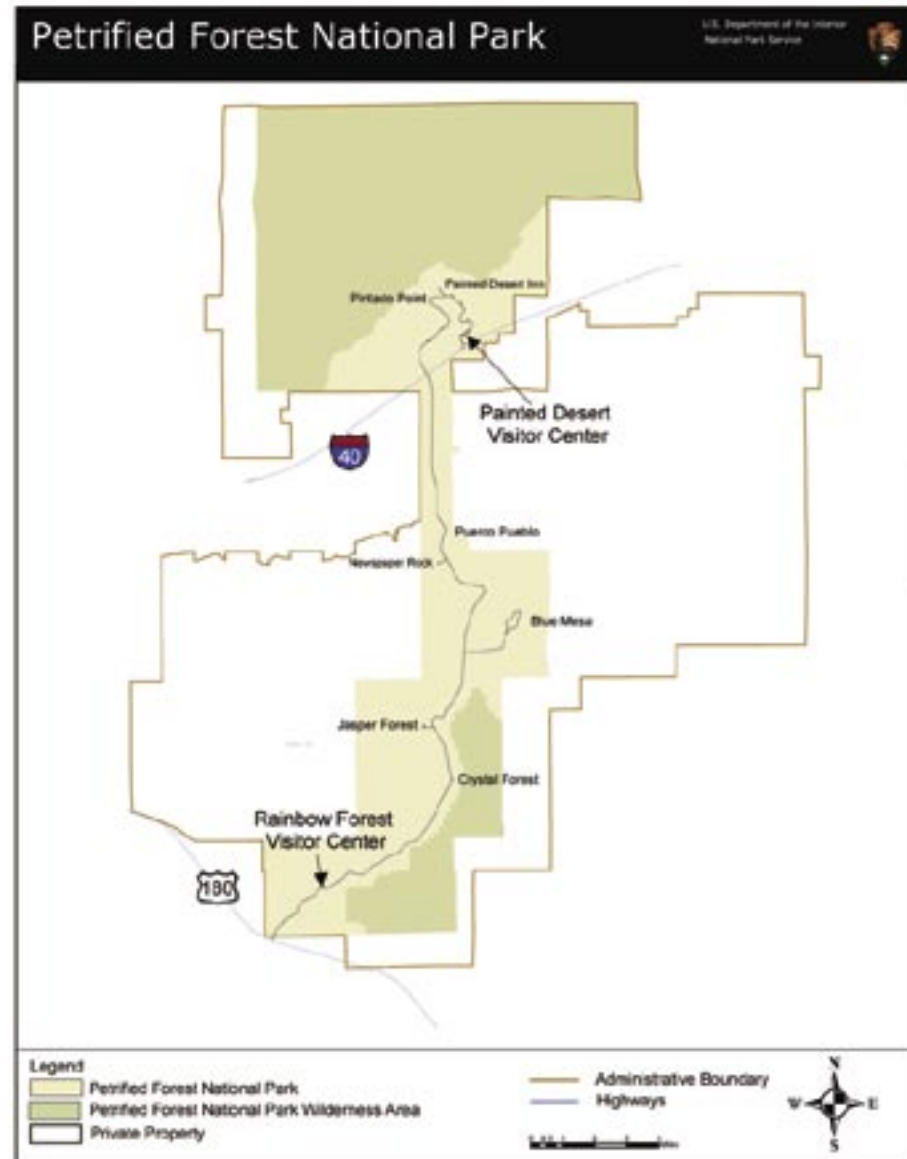
Boundary Expansion

Summary

On December 3, 2004, President George W. Bush signed a bill authorizing an expanded boundary for Petrified Forest National Park. The expansion increases park acreage from 93,533 acres to approximately 218,533 acres and includes land in both Apache and Navajo Counties. This is an increase of 125,000 acres, more than doubling the size of Petrified Forest National Park.

The Petrified Forest National Park 1993 General Management Plan proposed adding 97,800 acres to the park to protect internationally significant paleontological deposits, nationally significant archeological sites, and the view shed as seen from the Painted Desert and Southern Wilderness Areas. The existing park boundaries were based primarily on survey lines rather than resource boundaries. The proposed expansion would incorporate, for protection, preservation, and study, fragile resources which are as significant as those already protected within current park boundaries.

The proposed expansion area is a checkerboard of federal, state, and private lands. Several private land owners in the area have indicated their desire to sell, and the Bureau of Land Management, as well as the State of Arizona is supportive of the park's expansion. As the land acquisition process continues, Petrified Forest National Park will obtain additional historic properties that will need to be evaluated for their significance, usefulness, and value to park operations. Nevertheless, the park will gain an increased historic resource base, to which some of the general principles outlined in the Maintenance Guidelines will be applicable.



Map showing an outline of where the proposed expansion land lies in relation to current park boundaries. *Map courtesy of PEFO*

Items Requiring Additional Consultation

Resources and Materials Requiring Additional Consultation, Include:

- ① **Removing Spray Foam Roofing from Sandstone Masonry at the Rainbow Forest Historic District**
Additional testing is necessary to determine the feasibility of removing spray foam roofing from sandstone masonry parapets. The testing should consider the most appropriate method for removing the spray foam roofing and what precautions are necessary for removing this product without damaging the sandstone.
- ② **Removing Paint from Interior Sandstone Masonry Surfaces at the Rainbow Forest Historic District**
Additional testing is necessary to determine the feasibility of removing paint from interior sandstone masonry, such as fireplaces at Rainbow Forest Employee Residence #52-B and #52-C. The testing should consider the most appropriate method for removing the paint and what precautions are necessary for removing this product without damaging the sandstone.
- ③ **Structural Testing of Cantilevers at Painted Desert Community Complex**
Test to determine if remainder of the support posts can be removed from the Residential Blocks at the Painted Desert Community Complex to restore this important character defining feature.

Summary

Several very unique situations were encountered while researching and assembling these guidelines. In many cases, providing a complete design or maintenance strategy for these conditions was beyond the scope of this project due to a lack of time, experience or resources. The Park should seek consultation from qualified professionals when performing maintenance or design work in these areas to insure that a more complete understanding of the condition and its treatment can be attained.

Selected References

Published Sources

- Allaback, Sarah. *Mission 66 Visitor Centers: The History of a Building Type*. Washington, DC: U.S. Department of the Interior, National Park Service, 2000.
- Chambers, Henry J. *Cyclical Maintenance for Historic Buildings*. Washington, D.C.: U.S. Department of the Interior, National Park Service, 1976.
- Department of the Interior. *The Preservation of Historic Architecture: The U.S. Government's Official Guidelines for Preserving Historic Homes*. Guilford, CT.: The Lyons Press, 2004.
- Hines, Thomas S. *Richard Neutra and the Search for Modern Architecture*. New York: Oxford University Press, 1982.
- Jester, Thomas C. ed. *Twentieth-Century Building Materials; History and Conservation*. McGraw Hill, 1995.
- Jester, Thomas C. and Sharon C. Park. *Preservation Brief 32: Making Historic Properties Accessible*. Washington D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1993.
- Mack, Robert C. *Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings*. Washington D.C.: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1976.
- Morton, Brown W. III and Gary L. Hume, Kay D. Weeks and H. Ward Jandl. *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings*. Washington D.C.: U.S. Department of the Interior, National Park Service, 1992.
- National Park Service. *Cultural Resource Management Guideline, NPS-28*. Washington D.C.: U.S. Department of the Interior, National Park Service, 1998.
- National Park Service. *Final General Management Plan, Development Concept Plans, Environmental Impact Statement, Petrified Forest National Park*. Government Printing Office, 1993.
- National Park Service. *Visual Quality of Built Environments in National Parks*. Washington D.C.: U.S. Department of the Interior, National Park Service, 1993.
- National Park Service and National Recreation and Park Association. *Design for Maintenance: A Park Management Aid*.

Swanke Hayden Connell Architects. *Historic Preservation: Project Planning & Estimating*. Kingston, MA.: R.S.Means Company, Inc., 2000.

Weeks, Kay D. and Anne E. Grimmer. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. Washington D.C.: U.S. Department of the Interior, National Park Service, 1995.

Unpublished Materials

Cultural Landscape Inventory for Rainbow Forest District, 1999.

Petrified Forest List of Classified Structures, 2003 Update

U.S. Department of the Interior *Painted Desert Community Complex Historic District National Register of Historic Places Registration Form*

U.S. Department of the Interior *Painted Desert Community Complex Historic District Historic Structures Report*

U.S. Department of the Interior *Painted Desert Community Complex Historic District List of Classified Structures*

Plans and Drawings

Rainbow Forest

0321d Administration and Exhibit Building, 1931
2047c Administration – Museum Building, 1957
2212 Building Rehabilitation, 1963
8001 Rainbow Forest Lodge Alterations, 1957

Painted Desert

03208 Employee Residences Drawings, 1957
03222e Administration Building, Apartments, Entrance Station Drawings, 1967
03227a Painted Desert Developments, 1969
03234a Community Building Drawings, 1967

03236 Proposed School Drawings, 1962
03241a Employee Residences Drawings, 1965
03243 Trailer Site Development Drawings, 1962
03300 General Plan, Painted Desert Plaza Drawings, 1962
8100 Fred Harvey Concession Building, 1962
08102a School Teachers Residence Drawings, 1963
80005 Alterations to the Lobby, Visitor Center (proposed), 1975
80011 Visitor Center alterations (proposed), 1988

Transportation Features

3035a landscape plans / parking area –second forest, 1934
3036a landscape plans / parking area –first forest, 1934
3037a landscape plans / parking area –rio puerco, 1934
3038a landscape plans / parking area –third forest, 1934
3039a landscape plans / parking area –agate bridge, 1934