

National Park Service
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Intermountain Support Office
Santa Fe, New Mexico

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PARASHANT NATIONAL MONUMENT

Historic Preservation Report

*Condition Assessment and Preservation Recommendations –
Grand Gulch Mine and Pine Well Ranch*

SEPTEMBER 30, 2003

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Mark L. Mortier
Architect

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Introduction

Executive Summary

This document has been produced by the *Intermountain Support Office of the National Park Service, Division of Facility Management – Historic Preservation Projects* (IMSO-DFM-HPP), to assist Grand Canyon - Parashant National Monument with the preservation of historic structures at two sites within the Monument: the Grand Gulch Mine and the Pine Well Ranch.

Grand Canyon - Parashant National Monument is jointly managed by the Bureau of Land Management, and the National Park Service. The sites discussed in this document are open to the public, with minimal interpretation and Monument staff presence.

This document provides general background information about the sites, information concerning the preservation process, brief descriptions of the structures, their construction and condition, and makes general and specific recommendations for their preservation. This document focuses on buildings and other structures – it does not address features of a more archeological nature.

The structures described in this report were visited by the NPS Historical Architect, along with an architectural intern, during the first week of June, 2003. The structures and features were inspected and documented, using non-destructive methods including visual observation and measurement, photography, hand written notes, and drawings. In addition, extant documentation on file with the managing agencies was reviewed.

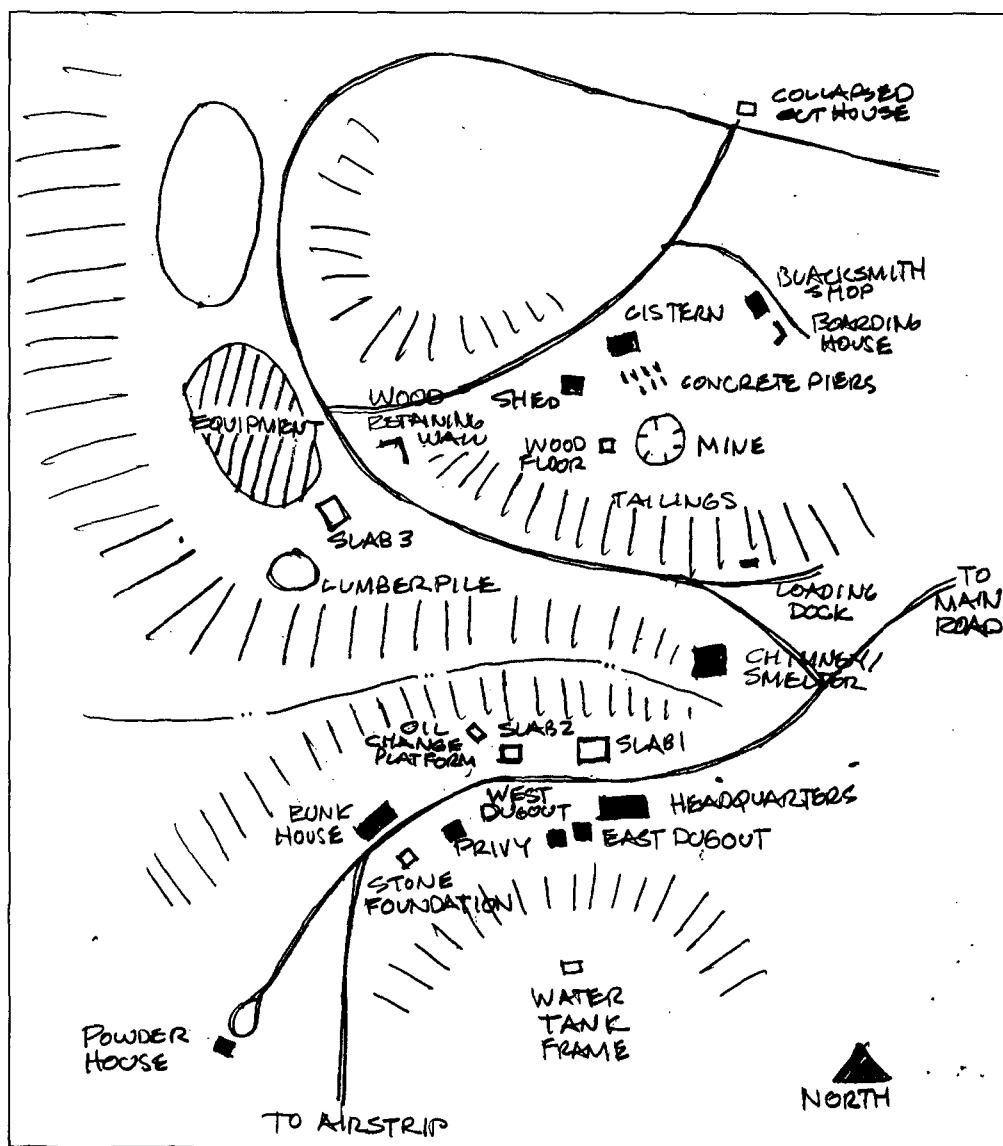
Many of the structures in this document are listed in the *Shadow Database* of the National Park Service's List of Classified Structures (LCS). Structure names used in this report were obtained from LCS listings, as well as Bureau of Land Management Cultural Resource Site records and maps of the sites done by field personnel of the managing agencies.

Grand Gulch Mine

The Grand Gulch Mine was once considered one of the richest copper mines in Arizona. It is one of two mines that comprised the Bently Mining District in the Grand Canyon area. Originally recorded in Washington County, Utah, as the Bently Mine, the Grand Gulch Mine was reassigned to Mohave County, Arizona on June 23, 1873. The mine was in operation intermittently from that time until 1958. Later mining campaigns were undertaken in the 1970's and 1990's.

The first mention of the copper prospect in the area was in 1853. An adobe smelter had been built by 1870. In the early 1900's, buildings on site included a 3 room rock bunkhouse, and a house with three main rooms – one for the office, one for dining, and one for womens's quarters. In 1917, there were 75 or 80 people living at the site.

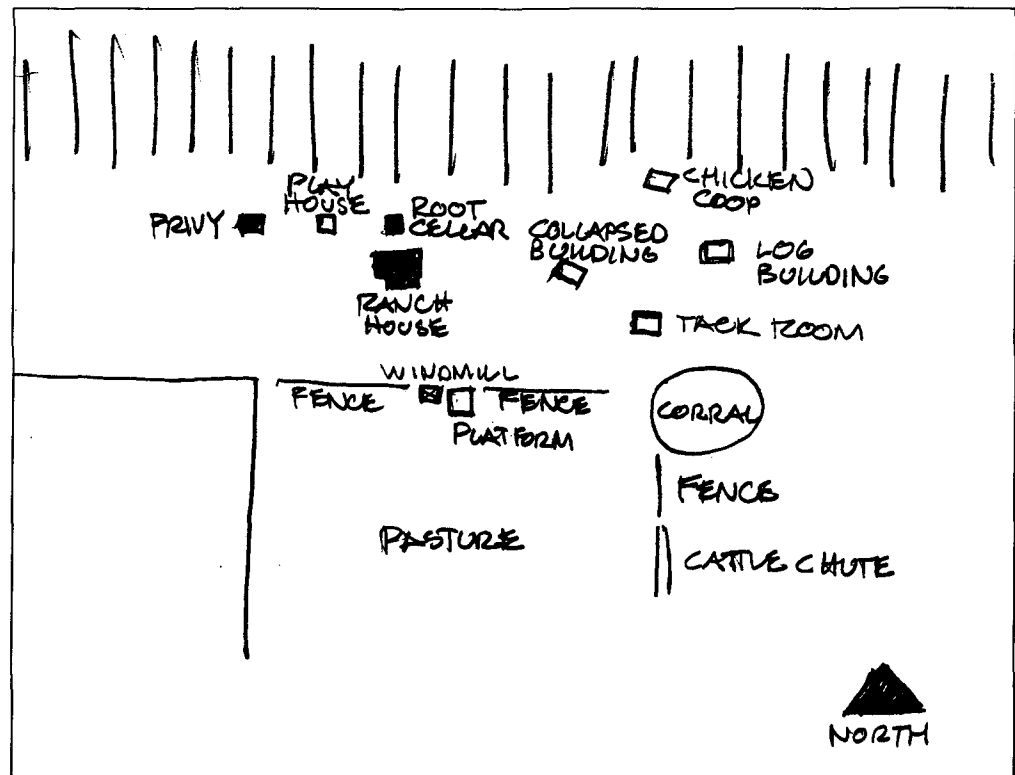
The main buildings burned down in 1955, and by 1958 the mine had been abandoned, although it was reworked in the early 1960's, and again during the uranium boom in the 1970's. Today, there are a couple of relatively complete buildings and structures still standing, including the Bunkhouse, as well as the adobe smelter, and the ruins of several other buildings and structures. Some of the property, and some of the structures, are actually on private land, but the structures have been included in this report in the event that the Monument acquires them in the future.



Grand Gulch Mine Site Plan

Pine Well Ranch

Little documentation exists for the Pine Well Ranch. It was homesteaded in the early 20th century. Apparently, the main structure, the house, was moved to the site around 1917. This house is still standing, as are the windmill and some of the site features (fences, corrals, gates, cattle chutes). Most of the other buildings and structures are collapsed or in ruins. Access to the site is through private land.



Pine Well Ranch Site Plan

Hazardous Materials

The milling and processing of ore often times involved the use of hazardous materials or chemicals, which were not properly handled or disposed. This in turn often led to contamination of the site. No documentation of the use of hazardous materials or chemicals exists for this site, nor has any testing been conducted.

Definition of Terms

Certain terms are used throughout this document, which require some definition, to avoid confusion. These include the descriptive terms "good," "fair," or "poor." These descriptions are applied to the structures with the assumption that all of them are

already considered to be ruins. Therefore, a condition of *good* means that the structure is stable, and may only need minor repair, maintenance, and monitoring. *Fair* means that the structure is deteriorating, but is still relatively stable. It is in need of stabilization, repair, or maintenance, to avoid further deterioration, or the loss of historic fabric. *Poor* means that the structure or feature has deteriorated enough that it is unstable or collapsed, and in need of immediate or major stabilization, repair, or reconstruction.

Preservation Background and Philosophy

Recommendations made in this document are based on *the National Park Service Directors Order 28 – Cultural Resource Management Guide (NPS 28)*. This guide refers to and incorporates *The Secretary of the Interior's Standards for the Treatment of Historic Buildings*, and the associated *Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*. These standards and guidelines serve as the philosophical and practical basis guiding the management and treatment of historic structures, and aid in defining and understanding the terms and nomenclature associated with this work.

NPS 28 provides general background and guidance on the management of historic structures. In the section on program objectives, it states: “...every structure is to receive full consideration for its historical values whenever a decision is made that might affect its integrity,” and: “...preservation of historic structures involves two basic concerns: slowing the rate at which historic material is lost, and maintaining historic character,” and finally: “research is a pre-requisite for treatment and provides a basis for decision making by managers.”

NPS 28 then discusses the research process: “Research is typically concentrated on three broad aspects of a historic structure: its historical, technical, aesthetic, or scientific associations; its developmental history or evolution; and the nature, performance, and capability of its materials and systems. This information is collected, analyzed, and organized through a variety of means...”

The primary research document to identify and manage historic resources is the Historic Resource Study (HRS). This is supplemented with National Register nominations and/or determinations of eligibility; inclusion of the resource(s) in the List of Classified Structures (LCS), and determination of categories of Significance. Thorough documentation and investigation of the resource(s) is then provided by an Historic Structures Report, which serves as a research, planning, and record keeping document. The HSR may be supplemented with additional graphic documentation.

NPS 28 goes on to discuss planning, and states: “treatment and use are the central issues.” It describes three steps involved in treatment planning: “determination of the ‘Ultimate Treatment,’ resolution of conflicts inherent in the treatment, and preparation of plans and specifications for implementation of the treatment.” The categories of ultimate treatment are Preservation, Rehabilitation, Restoration, and Reconstruction. Finally, NPS 28 states that: “Pending ultimate treatment, a structure is stabilized and protected in its existing condition.”

Given that the recommended research and planning has not been completed, and no ultimate treatment has been determined, the philosophical basis for the recommendations made in this document is based on the last sentence in the paragraph above. In order to implement this objective, *Preservation* is the most appropriate treatment.

Preservation maintains the existing integrity and character of a historic structure by arresting or retarding deterioration caused by natural forces and normal use. It includes both maintenance and stabilization. Maintenance is a systematic activity mitigating wear and deterioration of a structure by protecting its condition. Stabilization involves reestablishing the stability of an unsafe, damaged, or deteriorating structure, which maintaining its historic character.

The *Secretary of the Interior's Standards for the Treatment of Historic Buildings* and the associated *Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* provide the following standards to guide preservation activities:

The following standards apply to all treatments:

Use is monitored and regulated to minimize both immediate and long-term damage.

Use of destructive techniques, such as archeological excavation, is limited to providing sufficient information for research, interpretation, and management needs.

All other work that may affect resources is evaluated by an historical architect and other professionals, as appropriate.

All modification, repair, or replacement of materials and features is preceded by a sufficient study and recording to protect research and interpretive values.

New work, materials, and replacement features are identified, documented, or permanently marked in an unobtrusive manner to distinguish them from original work, materials, and features.

A proposed treatment project is initiated by the appropriate programming document, including a scope of work and cost estimate. Such projects include preservation maintenance as well as major treatment. No treatment is undertaken without an approved HSR or work procedure documenting the work, and Section 106 compliance.

A treatment project is directed by an historical architect and performed by qualified technicians.

Representative features salvaged from a historic structure are accessioned and cataloged.

All changes made during treatment are graphically documented with drawings and photographs.

The following standards apply to Preservation treatments:

A historic structure is used as it was historically, or is given a new or adaptive use that maximizes the retention of historic materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a structure is protected and, if necessary, stabilized until additional work may be undertaken. Adaptive use of prehistoric structures is prohibited.

The historic character of a historic structure is retained and preserved. The replacement or removal of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a structure is avoided.

Each historic structure is recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve historic materials and features is physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

Changes to a historic structure that have acquired historical significance in their own right are retained and preserved.

Historic materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a historic structure are preserved.

The existing condition of historic features is evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a historic feature, the new work matches the old in design, color, texture, and where possible, materials. Repair or replacement of features is substantiated by archeological, documentary, or physical evidence.

Chemical or physical treatments that cause damage to historic materials are not used.

Archeological and landscape resources are protected and preserved in place. If such resources must be disturbed, mitigation measures are undertaken including recovery, curation, and documentation.

The following additional standards apply:

Stabilization detracts as little as possible from a historic structure's appearance and significance.

Reinforcement is concealed wherever possible so as not to intrude upon or detract from the aesthetic, historical, or archeological quality of the structure, except where concealment would result in the alteration or destruction of historically or archeologically significant features, materials, or physical or visual

relationships. Accurate documentation of stabilization procedures is kept and made available for future needs.

Maintenance is executed by qualified technicians in accordance with approved work procedures. Where such procedures are nonexistent or incomplete, a historical architect provides technical guidance.

All features of a historic structure are inspected on a scheduled basis and information about their condition is recorded.

Implementation of Preservation Activities

Recommended treatments and preservation activities are discussed on a case by case basis for each individual structure or feature, throughout this document. However, these recommendations are general in nature, meant to convey the general scope of recommended work. They do not discuss site wide recommendations. And, they do not prioritize the treatment of one structure or feature over another.

To supplement the general recommendations included in the discussion of each structure or feature, a series of Outline Specifications are included in Appendix A. These are meant to provide more detailed information on materials and methods for preservation treatment activities, and should be used within the context of the standards and guidelines discussed above.

Many of the structures discussed in this document are stone masonry, built from native sandstone set in earthen mortar. They are exposed to the elements, and do not receive much maintenance. Oftentimes, the mortar has eroded from the joints, allowing the stones to come loose, shift, or fall out of the wall. And, many of the walls are not protected by a roof, allowing moisture a direct path into the wall through the top. When re-pointing, repairing or rebuilding this type of construction, the temptation is to use Portland cement based mortar, to prevent this type of failure in the future. However, this is discouraged, for several reasons. First of all, the use of Portland cement mortar changes the visual appearance of the masonry. And it introduces a new element into the construction, which may create other problems, such as being harder and more resistant to freeze-thaw than the stone. Therefore, the recommendations in this document emphasize the use of earthen mortar for the re-pointing, repair, and rebuilding of masonry walls, except in special circumstances, such as discussed below.

Two recommendations may help to slow down the effects of weathering. The first is the use of an acrylic polymer admixture, to provide more moisture resistance for the mortar. The second recommendation is to use soil cement for capping the walls, which do not have roofs over them. Soil cement is a mixture of native soil and Portland cement, which takes on the color of the soil, and results in a cement that is not excessively strong. If done properly, capping is an effective way to prevent rain water from penetrating through the tops of the walls. Proper technique results in capping that provides a crowned surface that sheds water off the top of the walls, but does not become a strong visual element.

Another recommendation discussed in this report is to re-point the masonry walls. Again, the use of an acrylic polymer admixture is recommended. When re-pointing the walls, care must be taken to use a light touch, and to keep the mortar held back from the surface of the walls, in order to maintain their appearance. (Too often re-pointing is done too heavily, and changes the appearance of the wall).

There are several recommendations that should be applied to both sites in a general way. These include removing fire pits that visitors have built near the structures. Fire pits not only threaten the structures directly with destruction by fire (in the case of structures that contain wood), they also contribute to the destruction of the structures and site features because visitors tend to burn wood from the structures, features, and vegetation that make up the site.

Removal of modern trash left by visitors is another recommended action. Modern trash detracts from the site, makes the site look neglected, and encourages visitors to leave more.

One last recommendation is to provide some interpretive signage at each of the sites. This signage would not only serve to educate visitors about the significance of the sites and activities that were conducted there, but they could be used as a way to educate visitors about the consequences of their actions on site (and the effects on the structures and features). Signage also provides a good way to post the rules of the use of the site, as well as list prohibited activities.

The recommendations made in this document are intended as suggested methods to approach the preservation, repair, modification, or maintenance of the building. No doubt conditions will be found which will make modification of these methods necessary. Consultation with an historical architect is recommended during implementation of preservation activities, and may help to clarify recommendations, resolve conflicts and provide solutions to changed conditions.

Finally, it is important to emphasize that any stabilization or repair work described in the document is not intended to provide permanent solutions or result in maintenance free structures. All structures continue to age and weather, especially those exposed to the elements, as they are on this site. Therefore, all of the structures which will be treated as a result of this report will need regular maintenance and repair in the future.

Preservation Priorities

Where possible within the discussion of each structure, preservation activities are prioritized according to that structure's needs. However, priorities should be assigned to the structures themselves, in the context of preservation of each site as a whole. To that end, the following lists are meant to prioritize the structures within each site, without prioritizing one site over the other:

Grand Gulch Mine

Highest Priority:

Headquarters (Mill)
East Dugout
West Dugout
Privy
Bunkhouse
Chimney/Smelter
Shed
Cistern
Blacksmith Shop

Medium Priority:

Dock (Oil Change)
Water Tank Frame
Loading Dock
Wood Retaining Wall
Boarding House

Lowest Priority:

Concrete Slab 1
Concrete Slab 2
Stone Foundation
Concrete Slab 3
Concrete Piers

No Treatment Necessary:

Wood Floor
Collapsed Privy

Pine Well Ranch

Highest Priority:

Ranch House
Root Cellar
Privy
Windmill
Corrals/Gates/Cattle Chute/Picket Fence

No Treatment Necessary:

Play House
Collapsed Building
Tack Room
Log Building

Chicken Coop Platform

Documentation of Preservation Activities

During the course of preservation activities, many changes will occur to a structure. New adobe, stone, mortar, wood, fasteners, and finishes may be applied, and non-historic features may be added to improve structural stability and longevity. Existing features (historic and non-historic) may be removed, in the interests of stabilization.

It is very important to document, utilizing written, graphic, and photographic means the nature, locations, and dates of these changes. By identifying locations, details and dates of preservation activities and modifications, future managers and preservation professionals will be able to identify the extent of previous preservation work and identify non-historic fabric (which tends to become confused with historic fabric over time), and will be able to evaluate the successes and failures of previous preservation activities. This will serve as an aid in the decision making and design process for future preservation work.

During implementation activities, daily logs should be kept, describing activities, personnel, and materials and methods employed. Product information should be retained as a part of the record, as should contact information for suppliers of any materials, products, or fabrications. Graphic materials would include drawings or sketches. Finally, photography should be used to record the structure before, during, and after implementation of preservation activities. All photography should be accompanied a photo log, describing what is shown on each photo.

Ideally, all this information would be assembled into a Record of Treatment, which would also include a narrative summarizing preservation activities, copies of all correspondence, and a summary of costs.

Monitoring and Maintenance

As discussed above, all of the structures discussed in this report will require on-going regular maintenance and repair. Maintenance of any structure begins with scheduled inspections, which are supplemented with cyclical maintenance activities.

Scheduled inspections are the most basic form of maintenance and are critical in the long term preservation of a structure. The inspection process is a method for identification of maintenance issues and should be carried out on a regular basis, especially for structures or features exposed to harsh environments.

At minimum, comprehensive inspections should be scheduled on an annual basis. More frequent visual inspections would also be recommended, as well as inspections after major weather events. A beneficial aspect of this procedure is that problems identified during an inspection can be scheduled for treatment during the next maintenance cycle.

If recommended preservation treatments are carried out, the annual maintenance will be routine in nature. Cyclical maintenance planning would allow for 3 to 5 year and 10 year cycles for recording maintenance activities.

The regularly scheduled inspection is also a tool for monitoring implemented treatments and for creating a record of the changes to the structure. It is also the primary means for monitoring during the post construction phase of a project.

Field checklist forms should be developed to facilitate this process, and to suggest problem areas to look for during an inspection. (The IMSO-DFM-HPP staff can assist in generating these forms.) The following items will contribute towards the preservation of the structures discussed in this report. These activities do not require the use of skilled preservation craftspeople, but rather may be carried out by those with solid backgrounds in routine and cyclic maintenance activities.

Inspect and repair roofing, flashings, and accessories, including fasteners.

Inspect and repair exterior woodwork.

Inspect and repair exterior wall finishes and structural features.

Inspect and repair foundations.

Inspect and repair doors and windows.

Inspect and correct site drainage problems.

Remove accumulated trash, fire pits and vegetation near buildings.

Inspect interiors for vermin and rodent infestation, treat if necessary.

Inspect for vandalism damage, and mitigate if necessary.

Recommendations for Future Management Actions

Ideally, after the stabilization work discussed in this report is implemented, some of the research, planning and stewardship activities discussed in NPS 28 could be completed. Research activities would include the completion of a Historic Resource Study (HRS), determination of eligibility for, and/or nomination to the National Register of Historic Places, inclusion of the remaining structures in the LCS, and determination of Significance. Consideration should be given to the completion of a Cultural Landscape Inventory (CLI). And, while a Historic Structures Report would also be advisable, as would more thorough documentation of the structures and the site, these are a lower priority. Planning activities would include a determination of the Ultimate Treatment and Use. Completion of these activities would allow for the implementation of stewardship activities discussed in NPS 28.

One other activity to be considered, is to test the site for hazardous materials.

Grand Gulch Mine

Headquarters (Mill)



View from northeast, addition in foreground.



View from southeast, addition in foreground. Note walls rising to peak in center.



View from southwest. Note south wall extending out past corner.



View from northwest (room 1).



Close-up of north wall of addition. Note mortar joints.



Interior of addition. Note plaster on walls, and beam pockets in south wall.



Interior of room 3. Note walls rising to peak in center.



Detail of typical wall construction, showing interlocking "wthes."



Detail of arch in wall between room 1 and room 2 (from room 2).



Detail at collapse of base of wall below arched opening.



Detail of wall at southwest corner of room 1.

LCS Shadow ID: 244247

Description:

This structure is referred to by various names. It is called the “Headquarters” building in several documents, and is referred to as the “Mill” in the original LCS listing, and the “Office” in the revised LCS listing.

This structure is the remains of a single story stone building, which appears to have had three original rooms oriented in an east/west direction, with a one room addition on the east. The three original rooms measure approximately 60 feet by 24 feet, and the addition measures approximately 16 feet by 20 feet.

No traces of the roof or ceiling structure remain. The construction of the north/south walls, which rise to a peak in the center, suggests that the building had a pitched, gabled roof; while the construction of the walls at the addition suggest that it had a shed roof.

The walls are approximately two feet thick, built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. The stone is laid up in two partially interlocked “wythes,” with smaller stones and rubble used to fill some of the center voids. The mortar mix may be mixed with mine

tailings, as evidenced by the particle size and character of the aggregate. There are traces of whitewash and plaster in several of the rooms, especially in the addition, which appears to have a more weather resistant plaster.

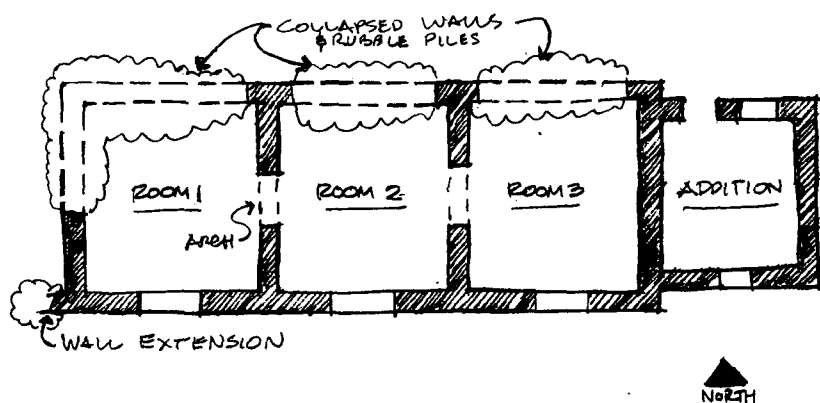
The walls of the addition are of similar construction, but the stones used are generally larger, and some of the mortar joints appear to have been pointed with a more resistant material – possibly utilizing lime in the mixture.

There are no obvious foundations. The walls appear to have been built directly on grade, or in shallow trenches.

There are no obvious floor structures or finishes. The floors are earthen, and covered with rubble from the collapsed portions of the walls.

The south wall of the building is built into the hillside, and the exterior grade is approximately three feet above the interior floor level. There is an arched opening in the wall between the westernmost room (room 1), and the center room (room 2), which is built from 4 header courses of fire brick. There are several door and window openings in each room, but only one window opening, in the north wall of the addition, has a wood lintel. The south wall of the addition appears to have two beam pockets, which reinforce the suggestion of a shed roof over this room.

The west end of the south wall appears to extend out to the west, beyond the obvious corner, but it is not obvious what purpose this served – there may have been another room at one time.



Condition:

This building is in poor condition – it is basically a ruin. The roof is missing, and the walls are in a state of partial collapse. Many of the stones at the tops of the walls are

loose. The mortar is eroding from the joints, especially at the tops and bottoms of the walls. (Some of the walls appear to have been re-pointed, but these areas still suffer from erosion of the mortar). The wall finishes are mostly gone, and the remaining areas of plaster and whitewash are weathered, spalling, and eroding.

Several areas of wall are in danger of further collapse – especially around door and window openings. One critical area is the wall below the arched opening, which has lost several stones and is partially displaced.

The one remaining window header (in the north wall of the addition), is charred from a previous fire – although there does not appear to be any other obvious fire damage in the structure.

The interior floors are covered with rubble from the collapsed walls, as well as some sediment from erosion. The site surrounding the structure is covered with rubble from collapsed walls, and there are several piles of lumber on the southeast. Vegetation is encroaching on the site and the interior of the building, and the footing is difficult due to the roughness of the ground.

Preservation Recommendations:

Stabilization of this structure would involve an emphasis on stabilizing the stone walls, and cleaning up the site.

Stabilizing the walls would require several steps. Work would include stabilizing, repairing or rebuilding those portions of the walls in danger of further collapse, such as the door and window openings (especially the arched opening mentioned above), the tops of the walls, and the standing ends of walls which have already collapsed, using earthen mortar, amended with an acrylic polymer admixture. The mortar joints should be re-pointed with earthen mortar, amended with an acrylic polymer admixture; and the tops of the walls should be capped with soil cement, in a manner that helps to hold the top stones in place, as well as aids in shedding water from the top of the walls.

Note that if during the course of the work, it can be confirmed that the walls of the addition do indeed have lime in the mortar, then a similar mixture should be used on those walls for repairs and re-pointing.

Although not as critical, the plaster and whitewash could be stabilized with careful application of sealants and adhesives (behind the surface).

The site should be cleaned up and re-graded. Vegetation which is encroaching on the structure should be removed, including the roots. The lumber piles should be moved away from the building. Re-grading of the site should be done to smooth out the roughness, and provide proper drainage away from the structure. (Some of the rubble from the collapsed walls could be left in place, but definite circulation areas should be established, with a level, granular surface).

East Dugout



View from northeast. Note metal clad addition on top of stone walls.



View from northwest. See note above.



View from southwest.



View from southeast.



Detail of south end of roof. Note missing end trim piece, and pieces of wood boards jammed under ridge cap.



Detail of northeast corner of building. Note eroded wall at lower corner.



Detail of northwest corner of building. Note eroded wall, and missing stones.



Detail of interior. Note gypsum board walls on furring, and trussed/framed roof structure.

LCS Shadow ID: 246246

Description:

The east dugout is a small, one room stone building, built into a hillside. It measures approximately 12 feet by 18 feet. It has a pitched, gabled roof, which appears to have been added, along with wood framed knee walls, on top of the existing structure. The building appears to have been modified in the recent past, utilizing relatively modern materials and techniques.

The roof is wood framed, with 2x4 rafters and blocking. It is covered with galvanized "5 v crimp" metal roofing, attached with lead head nails. There is a galvanized metal ridge cap, which originally had trim pieces on each end – now there is only one, on the north end. Pieces of boards are jammed into the space between the ridge cap and the top surface of the roofing (presumably to fill the spaces left between the ridges of the crimp pattern on the roofing). There is also a wood fascia.

The roof structure is supported on knee walls, which are framed with 2x4 studs, and built on top of the stone walls. These walls also form gable ends on the north and the south. On the exterior, these walls are covered with the same materials as the roof. On the interior, they are covered with gypsum board, which was never painted.

The ceiling is framed with 2x4 joists, and was covered with gypsum board –which was never painted.

The walls are built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. They are approximately 18 inches thick. The tops of the stone walls have been parged with a Portland cement mortar, as have the sides of the doorway. The interiors have been furred out, presumably with 2x4 studs, and covered with gypsum board, which has never been painted.

The floor is poured concrete, as is a small stoop in front of the door.

The windows have manufactured wood sashes, set in wood frames, with 1 inch wood trim. The sashes on the east are missing. There is a wood door frame, with a concrete sill, but no door.

There are a couple of traces of a modern electrical system.

Condition:

This building is in poor condition. It is showing the effects of weathering and neglect, and has some developing problems that could lead to failure of the structure.

The roofing is weathered and deteriorated, and there are a few small holes in the panels. There is some rusting visible. Many of the fasteners have come loose, resulting in some of the roofing panels being loose, and susceptible to wind damage. The end

cap on the south end of the ridge is missing. All of the exposed wood is weathered and deteriorated, and one piece of fascia is hanging loose.

The metal covering on the knee walls has the same problems as the roof.

The stone walls are also showing signs of weathering and deterioration. The mortar is eroding from between the stones, and some of the stones have fallen out at the base of the northeast and northwest building corners, threatening their stability. The parging and pointing on the top of the stone walls is poorly done, and is cracking and breaking off.

The gypsum board on the interior has been damaged by water (presumably from roof leaks and because of missing doors and windows), and vandalism. Most of the ceiling covering is gone.

The windows are very weathered and deteriorated. Both sashes are missing from the east wall, and the glass is broken out of the remaining sashes in the west wall. And, as noted above, the door is missing.

The interior is covered with trash and debris from collapsed construction, as well as rodent nests and droppings.

The site surrounding the building is somewhat rough, and there are a couple of large shrubs growing near the building. There is some erosion around the building, and some sedimentation at low areas, and against the south wall.

Preservation Recommendations:

Stabilization activities for this building should emphasize weatherproofing, cleaning and re-grading of the site, stabilization of the stone walls, and cleanup of the interior of the building.

The roofing and siding should be carefully inspected, and repaired or replaced as necessary. Work should include reattaching loose panels, replacing loose, damaged, or missing nails, and patching small holes. Panels with severe deterioration, large holes, or severe damage should probably be replaced. The end cap in the ridge should be replaced. Any other obvious leaks should be dealt with. Loose wood trim and fascia should be reattached.

Vegetation close to the building should be removed. The site should be re-graded, to provide positive drainage around and away from the building, and to remove the sediment that has built up against the south wall, as well as from other areas adjacent to the building.

The stone walls should be repaired and stabilized. Work should include repairing or rebuilding the areas that have begun to collapse (notably at the northeast and northwest corners), using earthen mortar, amended with an acrylic polymer admixture. The mortar joints should be re-pointed with earthen mortar, amended

with an acrylic polymer admixture. The parging at the tops of the walls should be repaired in a manner that matches the existing parging.

Finally, the interior of the building should be cleaned up. This would include removal of loose or severely deteriorated gypsum board from the ceiling and walls, as well as removal of all trash, debris, rodent nests, and rodent droppings. (Precautions should be taken during this work to avoid exposure to Hantavirus).

West Dugout



View from northeast.



View from northwest.



View from southwest.



View from southeast.



Detail of southwest corner. Note corner separation, collapsed roof structure, and "orrilas" in roof below.



Detail of roof. Note original roof under collapsed secondary roof and earth covering.



Detail of northeast corner of building. Note erosion and missing stones.



Detail of northwest corner of building. Note erosion and collapsing wall (outer wythe”).



Detail of interior. Note collapsing roof and walls.

LCS Shadow ID: 244253

Description:

The west dugout is a small, one room stone building, built into a hillside, measuring approximately 13 feet by 18 feet. It has a collapsed pitched, gabled roof, which appears to have been added, built on top of a lower pitched original roof.

The secondary roof, although partially collapsed, appears to have been crudely built with a wood frame, and covered with wood boards. It appears to sit over another roof, built with a log beam in the center of the building, covered with wood boards and "orillas" (the waste product from the first slices taken off a log in a sawmill, usually one side is straight, and the other is curved with the bark still on), and earth. There is no separate ceiling.

The walls are built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. They are approximately 18 inches thick. The stone is laid up in two partially interlocked "wythes," with smaller stones and rubble used to fill some of the center voids.

The floor is earth – there is no evidence of any other flooring or floor structure.

There are no windows or doors – only a wood framed doorway in the north wall.

Condition

This building is in poor condition. It is showing the effects of weathering and neglect, and collapse of the structure is imminent.

The secondary roof is partially collapsed, and the boards and framing are very weathered and deteriorated. Many pieces are missing. The original roof is also partially collapsed, although the west side is more intact than the east. All of the wood members are very weathered and deteriorated, although the center beam appears to be reasonably sound. Some of the earth covering is still present.

The stone walls are also showing signs of weathering and deterioration. The mortar is eroding from between the stones, and stones have fallen out at the base in several places. In addition, the outer wythe has separated or slumped off in several places, notably on the west wall and at the southwest corner.

The door frame is very weathered and deteriorated, and the door is missing.

The interior is filled with debris from the collapsed roof, sediment from erosion, and rodent nests and droppings.

The site surrounding the building is somewhat rough and overgrown. There is some debris from collapsed construction lying on the ground around the building. There is some erosion around the building, and some sedimentation at low areas, and against the south wall.

Preservation Recommendations

Stabilization activities for this building should emphasize rebuilding the roof, re-grading of the site, stabilization of the stone walls, and cleanup of the interior of the building.

The secondary roof should probably be documented and removed, as it is probably too far gone to save. The original roof should be repaired or rebuilt, using materials and techniques matching the existing construction, and could be treated with a preservative. (An alternative would be to go ahead and reconstruct the secondary roof after the original roof has been repaired).

Covering the roof with earth, while recreating the historic appearance of the structure, may not be such a good idea in terms of stabilization, as the earth sitting on top of the wood structure contributes to its deterioration. Using a protective membrane, such as 90 pound mineral surfaced asphalt rolled roofing, and treating the wood with a preservative would help. This decision will require consideration of the value of the historic appearance versus the reality of the deterioration of the replacement wood.

Vegetation close to the building should be removed. The site should be re-graded, to provide positive drainage around and away from the building, and to remove the sediment that has built up against the south wall, as well as from other areas adjacent to the building.

The stone walls should be repaired and stabilized. Work should include repairing or rebuilding the areas that have begun to separate or collapse, using earthen mortar, amended with an acrylic polymer admixture. The mortar joints should be re-pointed with earthen mortar, amended with an acrylic polymer admixture. The parging at the tops of the walls should be repaired in a manner that matches the existing parging.

Finally, the interior of the building should be cleaned up. (Precautions should be taken during this work to avoid exposure to Hantavirus).

Concrete Slab 1



View from southwest.



View from southeast.



Detail of east edge. Note deterioration of concrete at edge.



Detail of northeast corner. Note deterioration of concrete at edge.

Description:

Slab 1 is a large concrete slab that sits on the edge of the headquarters area of the site. It measures approximately 25 feet by 50 feet. It is not known what function this slab served. It appears to have been poured in multiple lifts, with the top lift indented approximately 6 inches from the outside edge of the lift(s) below. It is not obvious if there are stem walls or a foundation, nor is there any reinforcing visible. The south side of the slab is at grade level. The grade drops away to the north, where the top of the slab is approximately 3 feet above grade. There are some anchor bolts cast into the slab; possibly there were some walls attached to these. Presently, two large steel hoppers, and a large steel and brick furnace are sitting on the slab.

Condition:

This slab is in fair condition. It is weathered and deteriorated, and has some cracking and spalling. Many of the edges are broken or chipped. There are also several stained areas – possibly from rusted equipment.

There are some trees, large shrubs, and other vegetation growing against the north side of the slab.

Preservation Recommendations:

Little needs to be done to this structure, nor is much possible, as concrete is very difficult to repair. If concrete repair is desired, refer to the section on this subject in the outline specifications, in Appendix A.

However, the trees and other vegetation which are growing against the slab should be removed. Not only should the vegetation be removed, but the roots should be removed, as well. If the roots from the trees and large shrubs cannot be removed, they could be treated with an herbicide.

Concrete Slab 2



View from southeast.



View from northwest.

Description:

This structure is a concrete slab that probably had a building standing on it, as evidenced by ghosting on the surface, wood plates, and anchor bolts still in place. It measures approximately 20 feet by 28 feet.

There is a wood and metal structure sitting on the slab, but it appears to have been put there, and is not connected in any way to the slab. There is also a pile of the "5 v crimp" metal roofing used on other buildings on site.

Condition

The concrete is in fair condition. It is weathered and deteriorated, and has some cracking.

There is some vegetation growing in the cracks and joints of the slab, as well as against its edges.

Preservation Recommendations

Little needs to be done to this structure, nor is much possible, as concrete is very difficult to repair.

However, the vegetation growing in the cracks and joints of the slab, as well as against its edges, should be removed. Not only should the vegetation be removed, but the roots should be removed, as well.

Oil Change Ramp



View from east.



View from northwest.



View from southwest.

Description:

This is a small heavy timber structure, which appears to have been a vehicle oil change ramp.

It is built with 6x6 posts and beams, with double 2x12 ramps – open in the center. All of the connections are nailed. Some of the posts sit on 2x12 plates; others are partially buried in the ground. There are also 6x6 braces on the west end, but these are propped loosely in place and may not be original.

There is no shear bracing, except for the two braces noted above.

Condition:

This structure is in fair condition. The wood is very weathered and deteriorated, and the structure itself is rickety – due to loose connections. The ramp boards are warped and split, and have pulled loose from the frame.

There is some sedimentation around the base of the structure.

Preservation Recommendations:

Several things could be done to stabilize this structure. First of all, any severely deteriorated or damaged members should be replaced. Next, all of the connections should be secured, either by re-nailing them, and/or adding new connectors.

Finally, the structure could be treated with a preservative, to arrest the deterioration from weathering.

Privy



View from northeast.



View from northwest.



View from south.



Detail of floor.

Description:

This structure is a small, wood framed privy. It shows evidence of recent use.

The walls and roof are built from 2x4's with 1 inch thick wood siding. There are traces of mineral surfaced 90 pound asphalt felt on the south end of the roof.

The floor is built from flat 2x4's laid over wood beams, over the pit. There are traces of mineral surfaced 90 pound asphalt felt on the floor.

The bench/seat is also built from 2x4 framing, with 1 inch thick wood boards.

Condition:

This structure is in poor condition. It is beginning to collapse, and poses a safety hazard to anybody who tries to use it.

The roofing has virtually disappeared. Many of the roof and siding boards are missing, the remainder are very weathered and deteriorated, damaged, warped and/or loose. The framing is also very weathered and deteriorated, and the connections are loose. The 2x4 flooring is rotten, and is easily broken when weight is put on it. (Several of the floor boards are already broken). The beams holding up the floor are weathered and deteriorated, but appear to be solid.

The pit has started to collapse, notably on the west side.

Preservation Recommendations:

Stabilization activities should emphasize stabilization of the pit, the floor and the structure, as well as weatherization and repair of the exterior skin. The pit could be shored or modified to prevent further collapse, but for safety reasons, it would be better to fill it in. The floor structure and floor boards should be closely inspected, and any severely deteriorated or damaged members should be repaired or replaced. The same should be done for the framing, wall siding and roof boards. Work should include reattaching loose connections, and replacing severely damaged, deteriorated, or missing members. Finally, the roof should be replaced, with new 90 pound mineral surfaced asphalt rolled roofing.

If this structure is not stabilized, it would be a good idea to post it with a sign indicating the danger of using it.

Bunkhouse



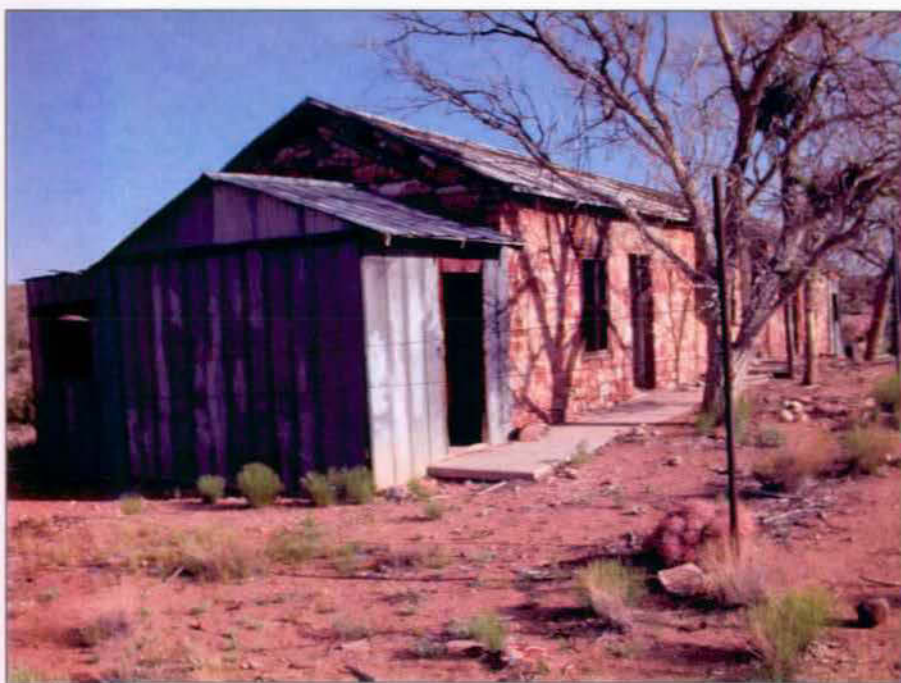
View from northeast.



View from Northwest.



View from southwest.



View from southeast.



Detail of south gable end. Note stones piled between beams, on top of plate.



Close-up of east elevation. Note partially collapsed porch roof, and deteriorated porch floor.



Detail of roof covering, sheathing, and collapsed porch roof.



Detail of addition on north.



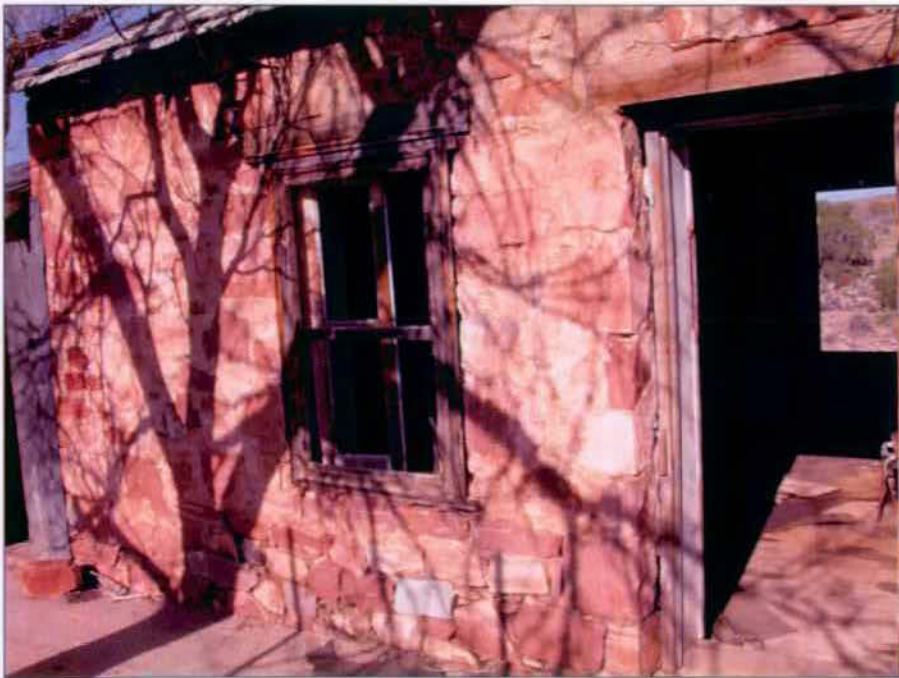
Detail of north gable end and roof of north addition.



Detail of cracking and eroded mortar joints in east wall.



Detail of mortar joints in east wall. Note eroded and re-pointed mortar joints.



Detail of window in east wall. Note eroded and re-pointed mortar joints.



Detail of east wall. Note eroded mortar joints.



View of west wall. Note unsupported roof over window, and partially collapsed roof over porch.



Detail of west wall and partially collapsed roof and porch floor.



Detail of "water table" at bottom of west wall.



Detail of east wall. Note eroded mortar joints and missing stones over window.



Detail of eroded mortar joints in east wall.



Interior of center room (room 2) looking southwest



Detail of center room (room 2) roof/ceiling structure, looking south.



Detail of interior gable wall and roof/ceiling structure in center room (room 2), looking south.



View of room 3 (north room), looking northwest.



View of room 1 (south room), looking southeast.



Detail of window in east wall, in room 3 (north room).

LCS Shadow ID: 244186

Description:

This building is reported to have been a bunk house or dormitory. It is a large, three room structure, with a pitched, gabled roof. It measures approximately 60 feet by 16 feet. There are two covered porches on the longitudinal walls, and small additions on each end. The interiors have been remodeled – including the addition of a kitchen in the center room (room 2), adding walls and closets, and changing interior finishes.

The roof construction is unusual. There is a rough sawn heavy timber ridge beam (in the center of the building), with two rough sawn heavy timber beams, approximately 8 inches by 18 inches, running parallel to the ridge, on each side. These are sheathed with 1x10 wood boards running from ridge to eave. The boards were covered with 90

pound mineral surfaced asphalt felt, with wood battens. Most of the covering is gone – only traces remain.

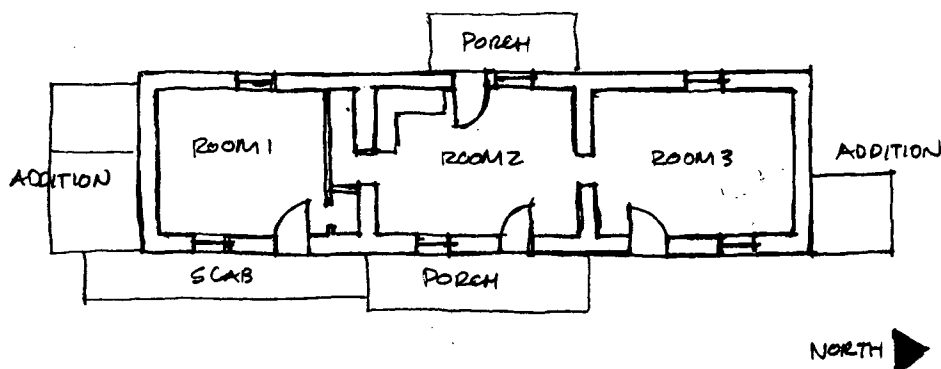
The ends of the roof beams are visible at the exterior gable ends, where they are bearing on 2 inch thick wood plates set into the walls. There are also 2 inch thick wood plates on the tops of the longitudinal walls, which the roof sheathing is attached to.

The ceiling is more conventionally framed, with 2x4 joists and blocking. The ceilings are covered with wood fiberboard.

The walls are approximately 18 inches thick, built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. The stone is laid up in two partially interlocked “wythes,” with smaller stones and rubble used to fill some of the center voids. There are timber lintels over the door and window openings. The mortar mix may be mixed with mine tailings, as evidenced by the particle size and character of the aggregate. The mortar appears to have great variation of mix and technique, and some of the mortar joints have been repaired or re-pointed with what appears to be lime mortar or Portland cement/lime mortar.

The stone interior cross walls run up to the level of the roof boards. The roof beams appear to be bearing on wood plates in these walls, similar to the plates at the exterior gable ends.

There are no obvious foundations. It is assumed that the walls were built directly on grade, or in shallow trenches with rubble footings. There is a “water table” (a small projecting shelf in the base of the stone wall, created by thickening up the wall) on the west wall, but this is not apparent on the other walls.



There are a couple of interior walls which have been added to the south room (room 1) to create closets. These are built from 2x4 studs, and covered with wood fiberboard.

The interior of the stone walls are covered with painted plaster, which runs up to the level of the roof boards at the cross walls. At one point, all of them appear to have been furred out and covered with wood fiberboard or hardboard paneling – but much of this has been removed, except in the kitchen.

The floors appear to be built with wood joists, probably over a shallow crawl space, with wood plank flooring. In most places the floor is covered with asphalt felt and plywood, which was probably covered with resilient flooring or carpeting (none of which remains, except for traces of resilient flooring in the kitchen).

The center room (room 2), contains the kitchen. There are wood cabinets in the southwest corner of the room, along with a sink and faucet, and a gas range. Traces of piping suggest that this room had propane gas service as well as running water, and a waste system. This room also has some remains of a modern electrical system, including plastic covered wire, armored cable, and metal boxes. There is a wood stove built from a 55 gallon drum, with a metal flue, in the southeast corner.

The exterior doors are manufactured wood frame and panel doors, with hand built wood frames, and 1x6 interior trim. Most of the doors are missing. The interior doors are all missing, but the hand built wood frames remain in the walls.

The windows are manufactured wood double casement sashes, with screens. The openings are splayed on the inside, with wood liners and 1x6 trim.

The porch on the east is built with 2x4 posts and beams, and roofed with the same 1x10 sheathing as the main structure. The floor is built with wood planks set on top of 2x4 sleepers, which are laid directly on grade. On the north end is a row of 2x4's set on edge.

The porch on the west is of similar construction as the porch on the east, except that the floor is elevated above grade, and the joists sit on the "water table" discussed above.

There is also a small roof overhang over the south window in the west wall – this is constructed similar to the other porch roofs – although only the sheathing boards remain. (This suggests that perhaps the porch on the west wall once extended the whole length of this elevation).

The additions on the north and south are built with 2x4 framing. The roofs have wood sheathing. The roof on the south is covered with corrugated "5 v crimp" metal panels, while the roof on the north is covered with 90 pound mineral surfaced asphalt felt. The walls are covered with either galvanized "5 v crimp" metal panels, corrugated metal, or wood boards. The floor of the south addition is poured concrete, and the floor of the north addition is wood boards over 2x4 joists.

There is a poured concrete slab along the east wall, connecting the south addition to the south room (room1).

Finally, there are three large trees along the east side of the building, which appear to be dead.

Condition:

This building is in poor condition. It is showing the effects of weathering and neglect, and has some problems that are threatening its stability and integrity. The primary effects are from water – primarily from failure of the roofing system, as well as erosion. All of the exposed wood is very weathered and deteriorated.

The 90 pound felt roofing is almost completely gone. This has exposed the roof sheathing and structure, as well as the interiors, and the walls, to the damaging effects of rain water. The roof sheathing is very weathered and deteriorated. Some of the boards have come loose, and many are warped or cracked. The roof beams are also weathered and deteriorated, but still appear to be sound.

The stone walls are also very deteriorated. The mortar joints in many places are eroded, allowing some of the stones to become loose or to sluff out of the walls. This is especially noticeable at the north end of the west wall, where a large section of wall has fallen out, and at the tops of the gable ends. In addition, there are several large cracks in the exterior walls. Some attempts appear to have been made to re-point the walls, but these were poorly executed, and only occur in a couple of places.

The ceilings and ceiling structure have been damaged by rain water – especially the wood fiberboard ceilings. These are stained, sagging, and falling off of the joists. (Vandalism may be responsible for some of this damage, but the majority appears to be moisture related).

The interior walls, finishes, and features, including the framing, furring, paneling, cabinets, and appliances have also been extensively damaged by water. Most of the modern finishes and furring have been removed from the south and north rooms (rooms 1 and 3), leaving behind damaged plaster and nail holes.

The floors, while the structure still appears to be reasonably sound, show quite a bit of water damage. The plywood on the floors is delaminating, warped, and loose. Some of the floor boards that are visible underneath (or exposed), are soft, warped, split, broken, or missing. In addition, they are covered with trash and debris, including rodent nests and droppings.

The remaining doors and windows are all extensively damaged. Most of the glass is broken out, and most of the screens are destroyed. Some of the openings are partially covered with boards or plywood.

All of the porches are collapsing, and the framing, roof sheathing, and flooring are all very weathered, deteriorated, or damaged. Some of the porch roofs, notably the roof over the south window in the west wall, are almost completely unsupported.

The framing of the north addition is deteriorated, the connections are loose, and the building is coming apart. In addition, it is pulling away from the north wall of the main building.

The metal roofing and siding panels at the additions are weathered and deteriorated, and many of them are damaged or loose.

Finally, the trees near the building all appear to be dead, as well as having branches in contact with the building.

Preservation Recommendations:

Stabilization activities for this building should emphasize weatherproofing, stabilization of the roof structure, stone walls, and flooring, elimination of safety hazards, and interior cleanup. Also, a decision will need to be made whether to rebuild the porches, or remove them. Stabilization of the additions, the doors and windows, and the interiors is of a lower priority.

The first priority should be the repair of the roof system. Work should include repair or removal of all severely deteriorated or damaged roof sheathing. At the same time, the roof beams and bearing conditions should be closely examined, and repairs or replacements made. Once the roof sheathing and structure is stabilized, new roofing should be installed, to match the roofing that exists now.

Stabilization of the roof structure will affect the porches, as they are continuations of the roofs. If the decision is made to remove them, this should be done during the roof work, after documenting them. If the decision is to rebuild them, this should probably be started prior to the roof work, so the support structure can be in place when the roof sheathing work is being done. The roof should be covered with 90 pound mineral surfaced asphalt rolled roofing, matching the color of the existing roofing. Special care should be taken to be sure that the roof is sufficiently attached.

Once the roof is stabilized, work can focus on the stone walls. Areas which have sluffed off or collapsed should be rebuilt. In addition, the walls should be examined for loose stones, and those areas repaired. Then, the mortar joints should be re-pointed. All of this work should be done using earthen mortar, amended with an acrylic polymer admixture.

Next, the interior of the building should be cleaned out. In addition to removing all trash and debris, all severely deteriorated interior framing, furring, finishes, and fixtures should be documented and removed. (There is no compelling reason to remove the modern materials which have been added simply because they are modern. They should only be removed if they meet the criteria above). The wood stove should also be removed, as well as the fluë.

After the interiors have been cleaned up, the floors can be stabilized. At a minimum, damaged or deteriorated flooring should be repaired or replaced, with materials

matching those that exist now. If possible, the area under the floor should be examined, and the floor joists or other supports should be repaired or replaced.

Precautions should be taken during the interior cleanup and stabilization work to avoid exposure to Hantavirus.

Some exterior cleanup should be undertaken, to remove hazards such as broken glass, rotten wood, or sharp metal. The screen door which has fallen out of the doorway into the kitchen should be stored in the kitchen. The trees near the building should be trimmed back or removed.

If stabilization of the additions is undertaken, work should include repair or replacement of the metal roofing and siding, as well as the framing. If necessary, the structures should be pushed back into square, and all structural connections should be securely fastened.

Water Tank Frame



View from east.



View from north.



Detail of connection at top. Note nailed lap joints.



Detail of connection at bottom. Note bolted joints, and posts sitting on 2x12 plate.

Description:

The Water Tank Frame is a timber framed structure, which appears to have supported a water tank (which is no longer present). It sits at the high point of the hill above the site. This structure measures approximately 8 feet by 12 feet, and is approximately 6 feet tall.

This structure has a water tank cradle built from 6x6 timbers, supported by canted 6x6 posts, which sit on 2x12 plates, which are laid on the ground. There are also some 2x4 and 2x6 diagonal braces.

The connections between the members are either bolted or nailed (or both), and the top members are lapped.

Condition:

This structure is in fair condition. The wood members, including the plates, are weathered and deteriorated. Some of the braces are split or broken. The connections between members are loose, and the structure is somewhat rickety.

Preservation Recommendations:

Several things could be done to stabilize this structure. First of all, any severely deteriorated or damaged members should be replaced. Next, all of the connections should be secured, either by tightening the bolts, or adding new connectors, using materials in keeping with the character of the existing connectors.

Finally, the structure could be treated with a preservative, to arrest the deterioration from weathering.

Stone Foundation



View from northeast.

Description:

This structure is what appears to be a small stone foundation, set on a level area above the Bunkhouse. It is built from large, rectangular shaped stones, set level with the grade. No other traces of a structure remain.

Condition:

This structure is in fair condition. Some of the stones have been covered up by sedimentation from erosion of the hillside above, and there is vegetation growing inside and adjacent to the structure.

Preservation Recommendations:

Treatment for this structure would include the removal of the sedimentation which is covering the structure up, as well as removal of the vegetation, including the roots, which is growing inside and adjacent to the structure. In addition, some minor re-grading of the site surrounding the structure would prevent further sedimentation.

Powder House



View from north.



View from northeast.



View from southeast. Note collapsed roof



View from northwest. Note collapsed roof.



Detail of east wall. Note how roof collapse has rotated framing and associated construction up off of top of wall.



View if interior. Note collapsed roof and sediment on floor.

Description:

The Powder House is a small one room structure, built into a rocky hillside, measuring approximately 15 feet by 20 feet. It had a wood framed roof, which appears to have been rebuilt in the recent past, and was covered with earth. Reportedly, it was used to store explosives, and the roof collapsed when a truck was driven across it.

The roof was built from 4x6 joists, with 2x12 sheathing. This was covered with 90 pound mineral surfaced asphalt felt, which was covered with several inches of earth. The roof structure and sheathing appears to be relatively modern material – some of the members even have grade stamps visible on them.

The stone wall facing northeast is built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. It is approximately 18 inches thick. There is a built up wood lintel over the doorway, made from 4x6's, and a door frame built from 2-2x12's. The other three sides of the building are cut into the hillside – there are no actual walls.

The roof joists sat on a 2x12 wood plate on top of the stone wall, and there was poured concrete between the ends. The joists extended a couple of inches beyond the wall.

There is some “5 v crimp” roofing inside of the building –it is not obvious if this was a part of the roof.

Condition:

This building is in poor condition. The roof has collapsed, and the walls are showing evidence of weathering and neglect.

The roof joists are broken in the center, and have fallen into the building. Many of the sheathing boards are broken or displaced, and have fallen into the building as well. Very little remains of the asphalt roof covering, and most of the earth has sluffed off.

When the roof collapsed, the ends of the joists over the stone wall rotated up, and pulled the top of the wall along with them, including the concrete between the joists, the 2x12 plate, and some of the stones. This has also exposed the top of the stone wall to the elements.

The stone wall itself is showing signs of weathering and deterioration. The mortar is eroding from between the stones, and the north end of the wall is starting to collapse

There is some evidence of termite damage in the wood parts of the structure.

The interior of the building is filled with debris from the collapsed roof, as well as a small amount of other trash.

Preservation Recommendations:

There are two ways stabilization of this building can be handled. One way would be to rebuild the roof structure; the other would be to remove it. This decision will have a profound effect on the building. In either case however, stabilization of the stone walls should be completed.

If the decision is made to rebuild the roof, work should include the documentation and removal of the existing roof structure, as well as the debris inside of the building. Then the roof can be rebuilt to match the existing (pre-collapse) construction.

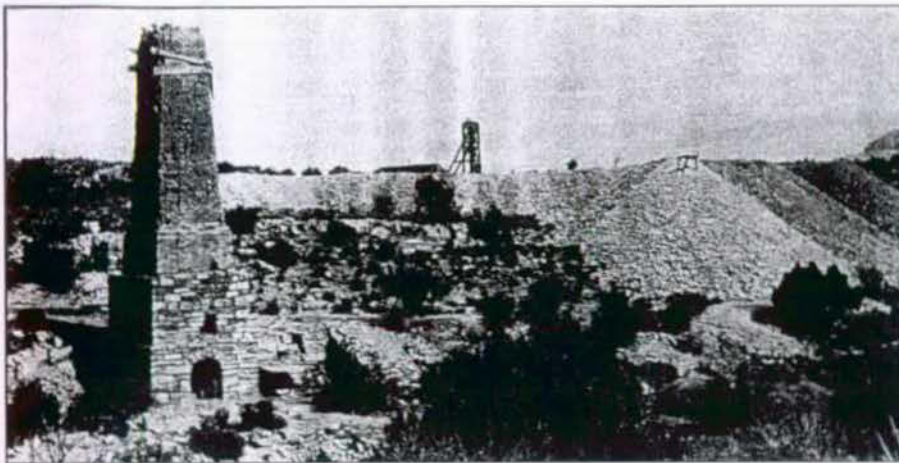
If the decision is to remove the roof, work obviously should include the documentation and removal of the existing roof structure, followed by removal of the debris inside of the building.

Some of the stabilization work for the stone wall will be the same in either case. This would include rebuilding the north end of the wall, as well as repairing any loose stones, and re-pointing of the mortar joints. Finally, the mortar joints should be re-pointed. All of this work should be done using earthen mortar, amended with an acrylic polymer admixture.

If the roof is not rebuilt, then the top of the stone wall should be capped with soil cement, in a manner that helps to hold the top stones in place, as well as aids in shedding water from the top of the walls.

Finally, the site surrounding the building, as well as the interior, should be re-graded to allow for rain water to drain away from the building.

Chimney/Smelter



View from southwest, circa 1904. Note holes in masonry above arch and in adobe above stone base, and visible step in adobe chimney.



View from southwest. Note holes in masonry above arch and in adobe above stone base, and erosion of step in adobe chimney.



View from southeast.



View from north.



View from northwest.



View from southwest.



Detail of south elevation. Note hole in masonry above arch, deterioration at top of first tier, and loose stone in arch.



Detail of west elevation.



Detail of north elevation. Note adobe arch and missing stone arch.



Detail of west elevation.



Looking down into chimney from platform on north.



Looking up the chimney from platform on north.

Description:

This structure is the ruin of a large three tiered chimney or smelter. It is assumed to have been a part of the ore processing process, although it does not appear to have had much use. Historic photographs exist for this structure, circa 1904.

The first tier is built from roughly coursed native stone, cut into rough rectangular shapes, and set with earthen mortar. It measures approximately 16 feet square, and is approximately 6 feet tall. There appears to be a stone base underneath, visible only on the north side. There are arched openings on all four sides, leading into a chamber in the bottom of the chimney/structure. The openings on the east, north, and west have been closed off, from the inside. The interior of this structure is lined with adobe bricks.

The first tier steps back into another stone tier, approximately 8 feet tall, constructed in the same manner as the base, and lined with adobe bricks. There is a large opening on the north, where the adobe lining is exposed. The stonework around this opening suggests that a stone arch was planned for this opening, and never completed, or that it has collapsed. This opening connects into the interior of the structure, above the level of the chamber in the base. This opening is accessed by a stone bridge, that spans from the top of the first tier to a stone retaining wall built against the slope to the north.

Above the second tier is a tapered adobe chimney, approximately 20 feet tall, built up of multiple courses of bricks. The chimney is the extension of the adobe liner inside of the stone tiers. The adobe chimney steps back a little in width approximately a third of the way from the top of the second stone tier (see photographs). The chimney appears to be reinforced with metal bars. (These may have connected to timbers or scaffolding on the outside of the chimney, some of which may be visible on the historic photographs, near the top of the structure). The interior of the chimney (and the liner) is finished with a fairly smooth surface, and shows some signs of use. The adobe liner has an arched opening on the north side, at the level of the second tier (noted above).

There is a wood post attached to the northwest corner of the structure at this level.

Condition:

This structure is in poor condition. It is showing the effects of weathering and neglect, but it does appear to be stable.

The chimney is much shorter than in the historic photographs. The exposed adobe is very eroded. Some of the outer courses of bricks appear to have fallen off, as have some of the bricks on the interior – especially the adobe liner in the first two tiers. There are a couple of holes, and several large cracks, most notably on the north side.

The mortar is eroding from the stone tiers, and there is a large hole punched through the top of the second tier. (However, this hole appears in the historic photographs). One of the stones in the arch on the south appears to be falling out of the arch – which could lead to its collapse.

It is not obvious if a stone arch over the opening on the north was never completed, or if it has fallen off.

There is quite a bit of sediment and debris from fallen adobe surrounding the base of the structure. The earth bank on the northeast is sluffing down towards the structure.

Preservation Recommendations:

Stabilization of this structure should focus primarily on the adobe portions, followed by the stone portions, and some site work.

The first priority should be stabilization of the adobe chimney and liner. The emphasis should be on stabilization and repair of the existing construction – not trying to rebuild the entire structure. Damaged or seriously eroded adobe bricks should be replaced. The step back in width should be re-defined. Cracks and holes should be filled with adobe mud, and sculpted to match the coursing of the surrounding adobe bricks. Finally, the top of the chimney should be capped. This can be done in two ways. One way would be to simply cap the top of the wall with adobe mud. An alternative would be to remove several courses of the deteriorated adobe and bricks from the top, install several courses of new adobe brick, and cap that with adobe mud. In either case, the mud used for the capping should be amended with an acrylic polymer admixture.

The adobe stabilization should be followed by stabilization of the stone base tiers. Work should include repair of the arch on the south, as well as the tops of each tier. In addition, any other loose stones should be reset. If further investigation reveals that there was an arch over the opening on the north, this could be rebuilt, too. After the repairs are made, the stone should be re-pointed. The mortar for all of these repairs should be earthen mortar, amended with an acrylic polymer admixture.

Finally, the site should be re-graded to remove the sedimentation that has occurred against the base of the structure, to remove the sluffing from the northeast corner, and to provide positive drainage.

Loading Dock



View from southeast.

Description:

This is a small stone structure, built into a hillside. Its purpose is not obvious, although it may have been a loading dock. The south wall has a rectangular indentation in the stone work.

The structure is built from roughly coursed native stone, some of which have been shaped into rough rectangular shapes, and set with earthen mortar.

There are a couple of wood posts nearby – it is not apparent if these were a part of the structure.

The structure is partially buried under a pile of tailings, making it difficult to know how large it really is.

Condition:

It is difficult to tell the condition of this structure, as it is partially buried; although by the nature of the burial, it could be said that the structure is in poor condition.

The mortar is eroding from the stone walls that are exposed.

Preservation Recommendations:

It is hard to know what this structure needs, given its burial. It would be a good idea to do some investigative excavation around it, to try and better determine its size and condition.

In addition, stabilization of the tailings pile above would prevent any further burial.

Concrete Slab 3



View from south.

Description:

This is a thick, poured concrete slab. Its purpose is unknown. There are several steel anchor bolts cast into the concrete. There are three wood planks attached to the west side. And, there is a small poured concrete pier adjoining the east side of the slab. There is no obvious foundation – but the base of the concrete is flared out in a couple of places

Condition:

This structure is in fair condition. The concrete is weathered and deteriorated, and some of the edges have been damaged or chipped off. The anchor bolts are rusty, but sound. The three wood planks are weathered and deteriorated.

Site vegetation is encroaching on the structure.

Preservation Recommendations:

Little needs to be done to this structure, nor is much possible, as concrete is very difficult to repair. If concrete repair is desired, refer to the section on this subject in the outline specifications, in Appendix A.

However, the vegetation which is growing against the slab should be removed. Not only should the vegetation be removed, but the roots should be removed, as well. If the roots from the large shrubs cannot be removed, they could be treated with an herbicide.

Wood Retaining Wall



View from southwest.



Close-up from southwest.

Description:

This structure is what appears to be a wood retaining wall. It is built from heavy timbers stacked on top of each other, and held in place with vertical pieces of relatively modern angle iron. The wall appears to be backfilled with stone and soil.

Condition:

This structure is in poor condition. The angle iron support on the west is no longer holding up the timbers, and the north wall has collapsed. Portions of the east wall have also collapsed. The wood itself is very weathered and deteriorated.

Vegetation is encroaching on the structure, and the earth in front is covered with timbers and rubble from the collapsed portions.

Preservation Recommendations:

This wall could be rebuilt. The first step would be to remove the collapsed portions of the structure, as well as the stones which have fallen out, from the area in front of the wall. Vegetation encroaching on the structure could also be removed.

Next, the angle iron on the west (which held up the north wall), could be reinstalled, followed by reinstalling the timbers which have displaced or fallen out. Finally, the wall could be backfilled with earth and stone.

Shed



View from southeast.



View from northeast.



View from northwest.



Detail of roof. Note board and batten structure.



View of interior.

Description:

This is a small wood shed with a pitched, gabled roof. It measures approximately 11 feet by 18 feet.

The roof is built with widely spaced 2x4 rafters – one at each end, and one in the middle, with a 2x6 ridge, and covered with 1x10 boards with 1x4 battens.

The walls are frameless, with horizontal 2x4's at the top and bottom, and 1x10 boards with 1x4 battens.

There are 1x6 trim pieces at the ridge, rakes, and the tops of the walls. There is a wood framed doorway, but no door.

The floor is built from 2x14 planks. There is no obvious foundation.

There is a pile of lumber on the north, which may be the remains of a collapsed shed.

Condition:

This building is in poor condition, but it is still solid. The wood is very weathered and deteriorated, and the boards are warped, split, and loose. Some of the battens are missing.

There is some sedimentation on the floor and along the north and west walls.

Preservation Recommendations:

Stabilization for this building would primarily involve stabilization of the wood elements, as well as removal of the sedimentation, and re-grading of the site.

The sedimentation which has built up against the walls, as well as on the floor, should be removed, and the site immediately around the building should be re-graded to provide positive drainage away from the building.

The roofing and siding should be carefully inspected, and repaired or replaced as is necessary. Work should include reattaching loose boards, and replacing severely damaged or deteriorated boards. The same should be done for the roof and wall structural members, and the floor.

Cistern



View from southwest.



View from southeast.



View from northeast.



View from northwest.

Description:

This structure is a two compartment tank or cistern, built in a leveled pad cut into a rocky hillside. It measures approximately 12 feet by 22 feet.

The shed roof is built from 2x6 framing, with 1x12 sheathing. There are two side walls, built with vertical 1x12 siding boards nailed to the outside roof framing, and to a 2x12 sill attached to the top of the side wall of the tank.

The cistern is built from poured concrete. The rear (north) wall is poured directly against the bank, and is taller than the other walls, to support the high side of the roof. The structure is divided into two compartments. The interior of the structure is covered with a bituminous coating, and the exterior has been covered with cement stucco. The top of the rear wall is parged with cement mortar/stucco.

There are several pipes and valves inside, as well as penetrating the south wall.

Condition:

This structure is in poor condition. It is showing the effects of weathering and neglect.

The roof is very deteriorated, and partially collapsed. The framing and the roof deck boards are very weathered and deteriorated, cracked, warped, loose, and displaced. Many of the deck boards are missing. The boards on the wood side walls are in similar condition.

The concrete structure is in fair condition. The concrete is weathered, but appears to be sound. The stucco is weathered, crazed, and cracked, but still appears to be attached to the concrete structure. There are a couple of large cracks, most notably on the base of the south wall. (This may be a seam between the floor and the walls).

The interior of the cistern is filled with trash and debris. The site is rough and overgrown, and there has been some erosion and sedimentation around the structure. There is some vegetation encroaching on the building, with one large shrub on the north.

Preservation Recommendations:

Stabilization of this structure would focus primarily on the roof, and cleaning up the site.

The roof should be carefully inspected, and repaired or replaced as necessary. Work would include repair or replacement of damaged or missing framing and roof sheathing, and reattachment of loose connections. Displaced members should be returned to their original positions.

Vegetation which is encroaching on the structure should be removed. The site should be cleaned up and re-graded, to smooth out the eroded or sedimented areas, and to

provide positive drainage away from the structure. The interior of the structure should also be cleaned up.

Although not as high of a priority, the stucco could be repaired and recoated with a new finish coat.

Concrete Piers



View from northwest.



View from southwest.

Description:

These are several concrete piers that appear to have supported mining equipment. They are poured from multiple lifts, with varying textures and surfaces; and they have steel anchor bolts cast into them.

Condition:

These piers are in poor condition. The concrete is very weathered and deteriorated. The surfacing is cracking and spalling, and much of it is missing. Many of the piers are damaged as well – most notably there are a lot of edges and corners that have been knocked off.

Preservation Recommendations:

Little needs to be done to these piers, nor is much possible, as concrete is very difficult to repair. If concrete repair is desired, refer to the section on this subject in the outline specifications, in Appendix A.

Wood Floor Structure



View from north.

Description:

This structure is what appears to be the remains of a wood floor. It is built from heavy timber sleepers, with wood flooring.

Condition:

This structure is a ruin.

Preservation Recommendations:

No treatment is recommended for this structure.

Blacksmith Shop



View from southeast.



View from southwest, showing doorway.



View from northwest.



View from northeast.



View of interior of east wall. Note header/bond course which runs at eave height.



Stone hearth at base of east wall.



Forge on west side of room.



Detail of cracked wall at southeast corner.



Detail of south wall showing doorway. Note charred jamb.



Detail of stone wall, showing header/bond course at top.

Description:

This structure appears to have been a blacksmith shop. It is the remains of a one room stone building, which appears to have had a pitched roof. It is built into the hillside to the north. It measures approximately 20 feet by 20 feet.

No traces of the roof or ceiling structure remain. The construction of the east and west walls, which rise to peaks in the centers, suggests that the building had a pitched, gabled roof.

The walls are approximately 16 inches thick, built from a single with of roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar. There is a header or bond course of larger stones, built into the walls at the level of the ceiling or eve line.

There are no obvious foundations. The walls appear to have been built directly on grade, or in shallow trenches.

There is no obvious floor structure or finish. The floor is earth, and covered with rubble from the collapsed portions of the walls.

There are two window openings, one on the north and one on the west. There is a large door opening on the south, which has a log lintel and the remains of a 2x12 frame.

There is a stone hearth at the base of the east wall, and what appears to be a forge in the west end of the room.

Condition:

This building is in poor condition – it is basically a ruin. The roof is missing, and portions of the stone walls have collapsed or fallen out.

Many of the stones at the tops of the walls are loose. The mortar is eroding from the joints, especially at the tops of the walls. In several places, the mortar has eroded all the way through.

The southeast corner of the building is tipping out, and there is a large crack in the south end of the east wall.

The lintel over the door frame is rotten and loose, and the door frame is very deteriorated. It is loose and distorted, and one of the jambs is charred.

The floor is covered with rubble from the collapsed walls, as well as sediment from erosion.

The site surrounding the building is rough and is also covered with rubble. There is some vegetation encroaching on the building, but this is a minor problem.

Preservation Recommendations:

Stabilization activities for this building should emphasize stabilization of the stone walls and remaining wood features, and cleanup of the interior and the site.

Stabilizing the walls would require several steps. Work would include stabilizing, repairing or rebuilding those portions of the walls that have loose stones or are in danger of further collapse, such as the tops of the walls, the southeast corner, the window openings and the gable ends, using earthen mortar, amended with an acrylic polymer admixture. The mortar joints should be re-pointed with earthen mortar, amended with an acrylic polymer admixture; and the tops of the walls should be capped with soil cement, in a manner that helps to hold the top stones in place, as well as aids in shedding water from the top of the walls.

The wood lintels and door frame should also be carefully inspected. The wood members should be repaired or replaced as necessary, and the door frame should be straightened out and re-anchored to the walls.

Vegetation which is encroaching on the structure should be removed. The interior of the building, and the site should be cleaned up and re-graded. Re-grading of the interior and the site should be done to smooth out the roughness, and provide proper drainage away from the structure. (Some of the rubble from the collapsed walls could be left in place, but definite circulation areas should be established, with a level, granular surface).

Boarding House



View from southwest.

Description:

This structure is the remains of a building, reportedly a boarding house. All that is left are two stone walls. No other traces of the building remain.

The walls are approximately two feet thick, built from roughly coursed native stone, which has been shaped into rough rectangular shapes, and set with earthen mortar.

Condition:

This structure is a ruin. Many of the stones at the tops of the walls are loose, and the mortar is eroding from the joints.

Preservation Recommendations:

Work would include stabilizing the remaining walls. Any loose stones should be re-set using earthen mortar, amended with an acrylic polymer admixture. The mortar joints should be re-pointed with earthen mortar, amended with an acrylic polymer admixture; and the tops of the walls should be capped with soil cement, in a manner that helps to hold the top stones in place, as well as aids in shedding water from the top of the walls.

Collapsed Privy



View from southwest.

Description:

This structure is a collapsed wood framed privy. It had a pitched, gabled roof.

Condition:

This structure is a ruin.

Preservation Recommendations:

No treatment recommended.

Pine Well Ranch

Ranch House



View from southeast.



View from northeast.



View from northwest.



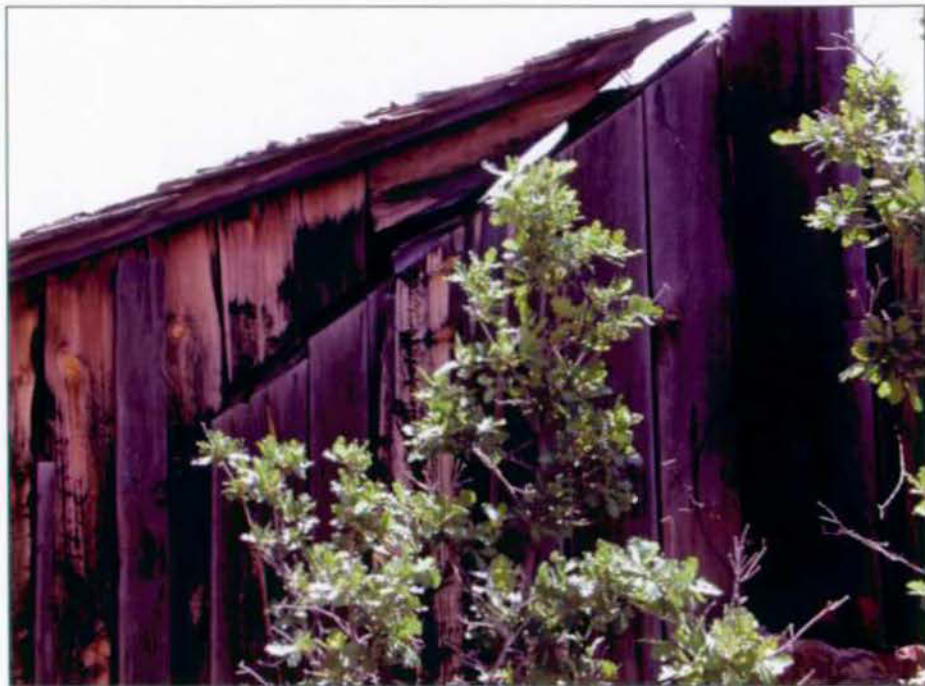
View from southwest.



View from south.



Close-up of north end of west elevation. Note siding.



Detail of west elevation. Note seam where addition is separating from original building, and siding.



Detail of fireplace on west elevation. Note transition from stone to metal flue.



Detail of west end of south elevation. Note siding



Detail of west end of south elevation. Note log skirting.



Detail of west end of porch, and south wall. Note posts and beams supporting floors and walls, displaced framing, and skirting at original cabin.



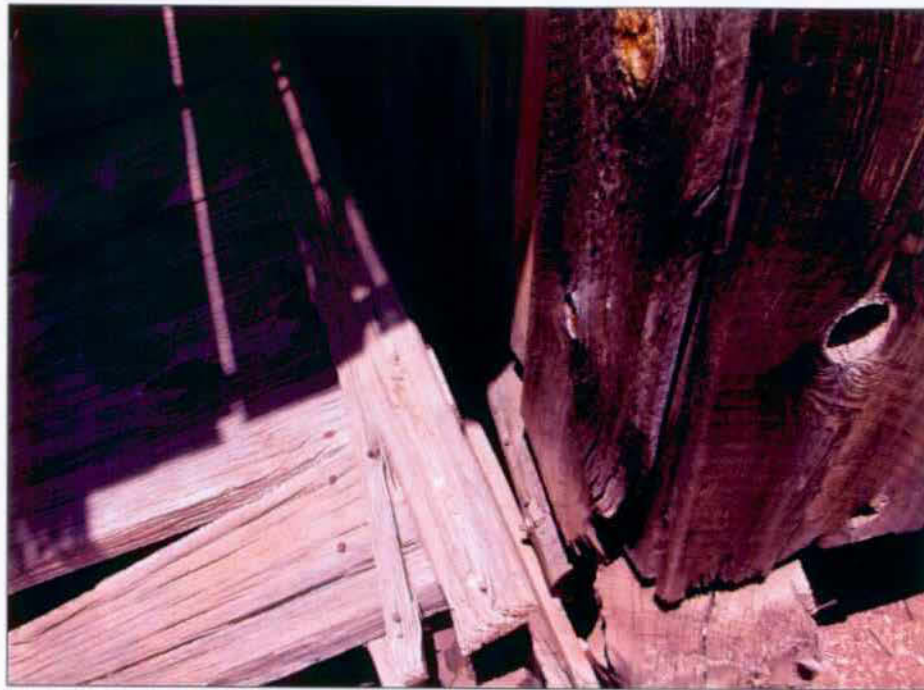
Detail of west end of south wall. Note posts and beams supporting floors and walls, and skirting at original cabin.



Detail of east end of porch.



Detail of west end of porch. Note deteriorated steps and flooring, and displaced framing.



Detail of joint between porch and wall. Note separation and displacement of structure.



Detail of northeast corner. Note sedimentation along north wall.



Detail of deteriorated roofing.



Detail of deteriorated flooring and door sill at north end of east elevation.



Detail of door sill at north wall (room 3). Note sedimentation, and board to prevent sediment from entering building.



Detail of north wall. Note sedimentation, and protection boards at base of wall.



Interior of room 3, looking west



Interior of room 3, looking east.



Interior of room2, looking west.



Interior of room 2, looking east.



Interior of room 1, looking west. Note fireplace.



Interior of room 1, looking northwest, at door into northwest room.



Interior of room 4, looking northwest through door from southwest room.



Interior of room 1, looking northeast towards room 3.



Interior of room 1, looking south from room 3.

LCS Shadow ID: 247460

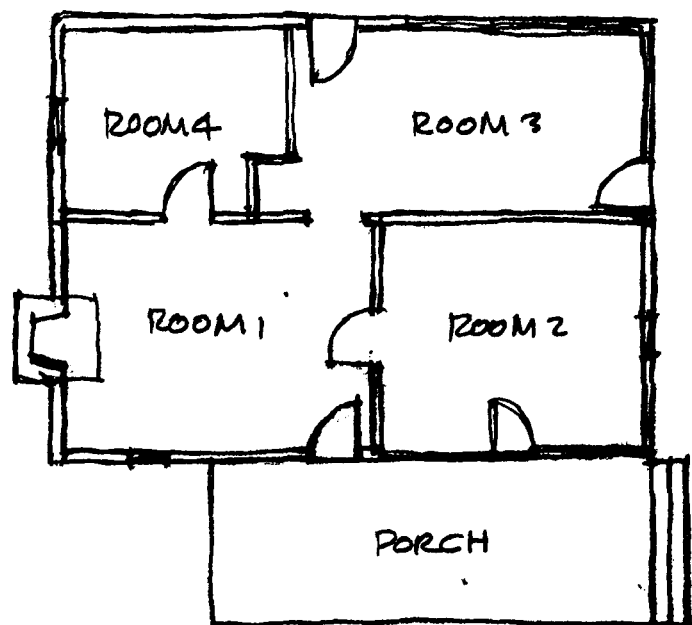
Description

This building is a cabin with four rooms and a porch. It measures approximately 20 feet by 30 feet, and the porch projects another 8 feet to the south. Reportedly, this building was originally a two room cabin that was moved to the site in 1917 or 1918. At some point, two rooms were added to the rear (north side), and the porch was added to the front (south side). The original cabin had a pitched, gabled roof (which is still visible). The addition on the rear is covered with a shed roof that meets the ridge of the original cabin, and the porch has a shed roof that comes off of the line on the front.

The roof over the original cabin is built with widely spaced 2x4 rafters, and is sheathed with wide (up to 18 inches) 1 inch thick wood boards. The roof over the north addition is of similar construction. The porch roof is also of similar construction, with the north end of the rafters supported on blocks nailed to the wall siding. On the south end, the porch rafters are supported on a 2x4 beam, which is in turn supported on irregularly spaced 2x4 posts. The roofing over the original cabin and the north addition consists of wood shingles, with asphalt shingles (which may contain asbestos) visible on the north. The roofing over the porch is 90 pound mineral surfaced asphalt rolled roofing (which may contain asbestos).

The ceiling in the original cabin is built with widely spaced 2x4 joists, with an original ceiling of wide (up to 18 inches) 1 inch thick wood boards. These boards are in turn covered with fabric, and/or painted wood fiberboard with wood battens at the joints. The ceilings in the addition on the north are of similar construction.

The walls of the original cabin are frameless, wide 1 inch thick boards (similar to those used in the ceilings), nailed to a 2x4 ribbon at the top, and nailed to the rim joist at the bottom. The addition on the north appears to be of similar construction, but also appears to have some flat studs. Many of the joints between the boards have 1 inch thick wood battens, especially on the addition. In some places, most notably on the west end of the original cabin, there are two layers of wide boards – with the second layer covering the joints of the first layer. The interior walls are covered with painted wood fiberboard, with wood battens over some of the joints. In some places, it appears that corrugated cardboard was used as insulation or sheathing.



The floor of the original cabin is built from widely spaced 2x6 joists, supported on wood "kickers", posts, or blocks; or sitting directly on grade. The joists run north south at room 1, east west at room 2. The floor is covered with 1 inch thick wood boards, which are in turn covered with several layers of sheet linoleum (which may

contain asbestos). In some places at the base of the walls, wood boards and logs have been used to make a crude skirting.

The floor of the addition is assumed to have wood joists, which appear to sit directly on grade, and are covered with 3/4 inch tongue and groove wood flooring.

The floor of the porch is built from wide (up to 16 inches) 2 inch thick wood planks, set on 2x8 ribbon joists, which are supported on wood posts set into grade. There are steps built from 2 inch thick planks on the east end of the porch.

There is a stone fireplace on the west end of room 1, which appears to be added. The opening is approximately 3 feet by 3 feet. It has a very crude poured concrete hearth, and the flue is actually built from steel pipe, which appears to have been salvaged from another place.

The windows appear to have been built using a mixture of manufactured components and assembled on site. The doors are manufactured panel and screen doors, in wood frames. Some of the doors and windows have 1x6 and 1x8 trim, especially on the interior.

Condition

This building is in poor condition. It is suffering from the effects of weathering and neglect. There are some serious structural problems, and several portions appear to be in danger of collapse.

The roofing is very weathered and deteriorated, and does not keep rain water out of the building. All of the wood is very weathered and deteriorated. The siding and exterior trim is warped, cracked, loose, and/or displaced. Many pieces are missing.

Most of the windows are missing – there is only one sash left.

The interior of the building is filthy. It is filled with debris from collapsed construction and finishes, as well as furnishings and trash. In addition, it has been over-run by rodents, birds, bats, bees, and other pests, and is covered with droppings. The exterior has some trash, and is quite overgrown with shrubs and trees.

Preservation Recommendations

This will be a difficult structure to stabilize. There is a lot to do, and the work is inter-related and hard to prioritize or separate out into individual tasks. Stabilization activities should emphasize structural stabilization, weatherproofing, cleanup and vegetation removal. However, in order to fully understand the work that will be necessary, a more detailed investigation of the condition of the building will need to be completed.

Vegetation removal is probably the first activity which will need to be completed, to allow better access to the building. Trees and shrubs that are growing near the

building should be removed, along with their roots, if possible. The large trees on the north should be trimmed.

In addition, the site should be re-graded to remove the sedimentation that has built up against the north elevation, and to provide positive drainage away from the building.

Cleanup should be next. The exterior of the building should be cleaned up, removing trash and debris. The roofing, including the wood shingles should be removed and disposed (bearing in mind that the shingles or rolled roofing may contain asbestos). All of the trash, furniture, and debris should be removed from the interior, and disposed. Next all of the deteriorated wood fiberboard and battens should be removed and disposed; as should any deteriorated linoleum floor coverings (bearing in mind the linoleum may contain asbestos). Monument staff should probably be present during the cleanup in order to document materials, furnishings, and artifacts which may be found.

Once the cleanup is completed, the building and structure can be fully inspected, and conditions such as the separation of the addition can be investigated. The structure should be investigated for undersized structural members or unsupported conditions. All wood members should be carefully inspected for damage or deterioration, as should all connections.

Presuming that there are no un-repairable conditions, the structural stabilization work would include repair of the conditions leading to the separation of the addition, shoring and re-supporting the porch, repairing or replacing the foundation/support systems under the floors, as well as the flooring, repairing the wall structural system and siding, and repairing or replacing the roof structure and sheathing. Severely deteriorated or damaged wood members would be replaced, and all connections would be secured.

Next, new roofing should be installed. Ideally, this would be the installation of new wood shingles, which would match the existing shingles. An alternative would be to install 90 pound mineral surfaced asphalt rolled roofing.

Finally, the door and window openings should be protected. There are a number of ways to do this. Probably the best way would be to install screened, louvered wood coverings over the windows, and provide closeable exterior doors. (The doors could be lockable, but locking buildings in remote locations such as this seems to offer little security).

Precautions should be taken during the cleanup and stabilization activities to avoid exposure to Hantavirus or other diseases which may be present in the trash and droppings inside of the building.

Root Cellar



View from south. Note bracing holding up south wall.



Detail of roof. Note center beam and collapsed roof poles.



View from southwest.



Detail of interior from doorway on south.

Description:

This structure is a log building dug into the hillside north of the ranch house. It measures approximately 10 feet by 15 feet. The sides of the excavation serve as the walls, except as discussed below. The front of the building has a wall built from logs set on the ground at the top of the excavation, which supports the roof. It is not obvious if this same condition exists in the rear, or if the roof sits directly on the top of the excavation at the rear. There is a log beam in the center, which supports a wood pole roof, which was covered with earth.

There is a small doorway on the south, reached by a ramp cut into the earth, and shored with wood framing.

Condition:

This building is in poor condition. It is almost a ruin. The roof and walls are partially collapsed. The front wall is shored up with wood braces, but is still failing. Much of the earth covering the roof has fallen through into the inside of the structure.

The interior is covered with trash and debris from the collapsing roof, as well as rodent droppings and leaves.

Preservation Recommendations:

Stabilization activities for this building will border on reconstructing it. Activities should focus on the log roof and wall structure, as well as the entrance.

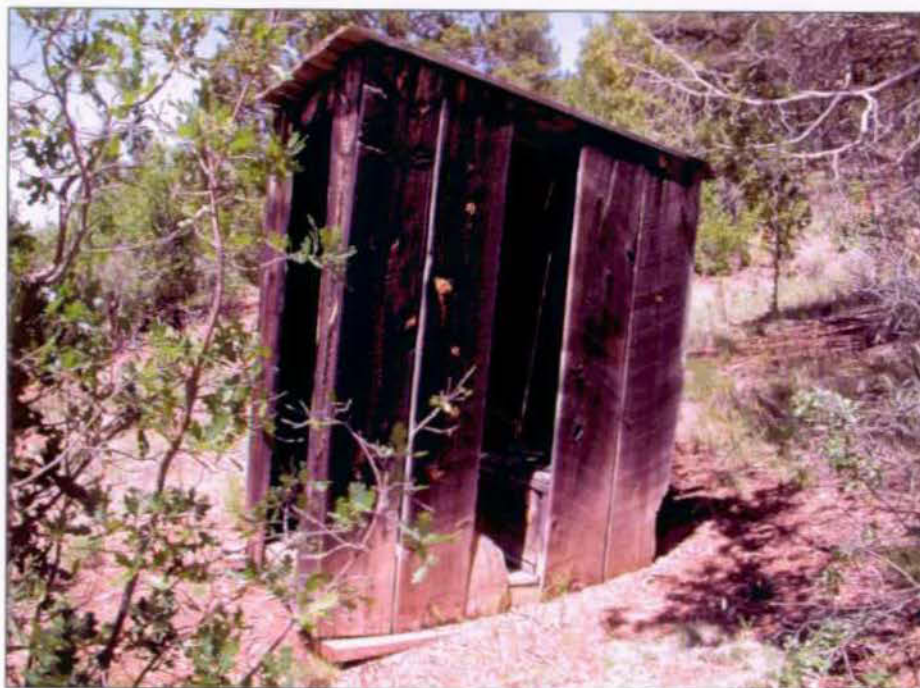
First of all, the earth covering (and other debris) should be removed from the entire roof. The wood roof and wall members (logs and poles) should be carefully inspected for damage or deterioration. Any severely damaged or deteriorated members should be replaced. Although it is difficult to discern, if it can be determined that the front wall was self supporting, then it should be rebuilt in the same way. If not, then it should be rebuilt with shoring, to resemble its current appearance. All of the wood should be treated with a preservative.

Covering the roof with earth, while recreating the historic appearance of the structure, may not be such a good idea in terms of stabilization, as the earth sitting on top of the wood logs and poles contributes to their deterioration. Using a protective membrane, such as 90 pound mineral surfaced asphalt rolled roofing, would help. This decision will require consideration of the value of the historic appearance versus the reality of the deterioration of the replacement wood.

The entrance ramp should be cleaned out, and the wood shoring should be repaired or replaced as is necessary. This wood should also be treated with a preservative.

The interior of the structure should be cleaned out, as well.

Privy



View from southeast. Note how structure is settling.



View from southwest. Note how structure is settling.



View from northwest.



View of interior.

LCS Shadow ID: 247480

Description:

This structure is a small two seat privy, measuring approximately 4 feet by 6 feet.

The roof is built from 1x12 boards, attached to the tops of the walls. It is covered with traces of 90 pound mineral surfaced asphalt rolled roofing. The walls are frameless, built from 1x12 boards with a 2x6 ribbon at the top, and nailed into the edge of the floor structure. The floor appears to be built from 1x12 flooring over a wood frame, which is further supported by wood planks around the pit. The seat is built from 1 inch thick wood boards.

There is a door opening, but no door.

Condition:

This structure is in poor condition. It appears to be steeling into the pit, especially on the north side. All of the wood is weathered and deteriorated, and the structure is rickety. The floor is soft, and the roof is sagging. One of the siding boards is missing on the east, and the door is no longer in place.

Preservation Recommendations:

If this structure is not stabilized, collapse is inevitable. Activities should emphasize stabilization of the structure, as well as weatherization and repair of the exterior skin. Work should include shoring up the entire structure (or possibly even temporarily lifting or moving it), to inspect the flooring and support conditions. At a minimum, the pit should be modified to prevent further collapse, but for safety reasons, the pit should probably be filled in. Then the floor structure should be repaired as is necessary. The floor, siding, and roof boards should be carefully inspected, and repaired or replaced as necessary. Work should include reattaching loose connections, and replacing severely damaged, deteriorated, or missing members. Finally, the roof should be replaced, with new 90 pound mineral surfaced asphalt rolled roofing.

Play House



View from south.

LCS Shadow ID: 247516

Description:

This structure is a small, collapsed, wood framed building. It measures approximately 6 feet by 6 feet. It is referred to as the playhouse. It appears to have been built from 2x4 and 2x6 framing, with 1 inch thick rough sawn boards used for the floors, walls, and roof.

Condition:

This building is a ruin. It is completely collapsed. The structure and other wood members are very weathered and deteriorated.

Preservation Recommendations:

No treatment is recommended for this structure.

Collapsed Building



View from southwest.



View from southwest.

LCS Shadow ID: 247520

Description:

This structure, referred to as the "Barn Ruin" in the LCS listing, is a collapsed wood framed building, east of the ranch house. It appears to have been one room. The structure appears to have had a shed roof, with 2x6 framing and 1x12 roof boards, that may have been roofed with mineral surfaced 90 pound asphalt rolled roofing. The walls and floors appear to have been wood framed with 1x12 boards, and the floor appears to have been 1x12's.

Condition:

This building is a ruin. It is completely collapsed. The structure and other wood members are very weathered and deteriorated.

Preservation Recommendations:

No treatment is recommended for this structure.

Tack Room



View from southwest.



View from southeast.



View from northeast. Note wall fragment.

LCS Shadow ID: 247510

Description:

This structure is a collapsed wood framed building, which measured approximately 10 feet by 20 feet. It is referred to as a tack room. It had a pitched, gabled roof, which is still partially intact. The roof was built with widely spaced 2x4 rafters and 1 inch thick sheathing boards, and was covered with mineral surfaced 90 pound asphalt rolled roofing. The walls were framed with 2x4 framing, and covered with 1 inch thick wood boards. There is one large fragment of a wood framed wall still recognizable. No flooring or foundation is obvious.

There is a piece of 36 inch corrugated steel culvert at the east end of the building.

Condition:

This structure is a ruin. It is almost completely collapsed. All of the wood is very weathered and deteriorated.

Preservation Recommendations:

No treatment is recommended for this structure.

Log Building



View from southeast.



View from northeast.



View from northwest.

LCS Shadow ID: 247504

Description:

This structure, referred to as the "Large Log Cabin Ruin" in the LCS listing, is a collapsed log building, that measured approximately 20 feet by 30 feet. Not much is left of the building. The wall logs are around 12 inches in diameter. There are traces of what appear to be a ridge beam, log rafters, 1 inch thick wood roof boards, and asphalt shingles.

Condition:

This building is a ruin. It is completely collapsed, and all of the remaining wood is very weathered and deteriorated. There is also some sedimentation on the north side of the structure, from soil washed down the hillside above.

Preservation Recommendations:

No treatment is recommended for this structure.

Chicken Coop



View from southeast.



View from northeast.



View from northwest.

LCS Shadow ID: 294861

Description:

This structure, referred to as the "Small Log Cabin Ruin" in the LCS listing, is a small, collapsed wood building, reportedly a chicken coop. It measured approximately 10 feet by 20 feet. It appears to have had a rough, dry stacked stone foundation, and hand hewn log walls.

Condition:

This structure is a ruin. It is completely collapsed, and all of the remaining wood is very weathered and deteriorated. There is also some sedimentation on the north side of the structure, from soil washed down the hillside above.

Preservation Recommendations:

No treatment is recommended for this structure.

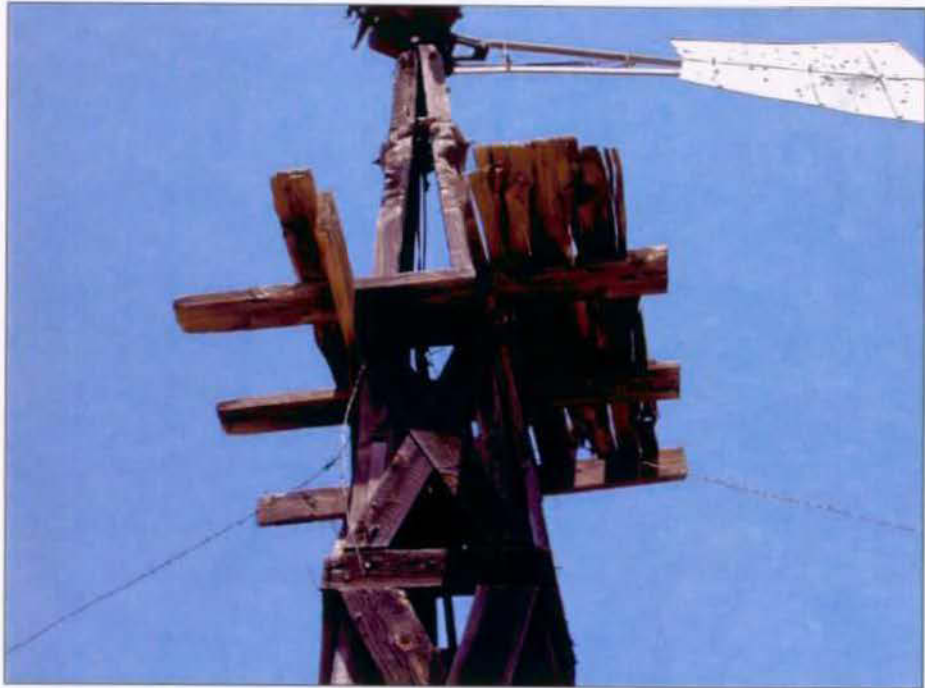
Windmill



View from southeast.



View from southwest.



Detail of top portion of structure.



Detail of middle portion of structure.



Detail of base of structure. Note well below.



Detail of well underneath windmill. Note concrete enclosure, and wood cover.



Detail of well below windmill. Note deteriorated concrete enclosure and deteriorated wood cover.



Detail of well below windmill. Note concrete enclosure and deteriorated wood cover.



Detail of interior of well. Note log liner.



Detail of underside of platform near top of windmill.



Detail of windmill structure.



Detail of base of windmill structure. Note well below.

Description

This structure is a wood windmill, with a metal "Aeromotor," and a well below.

The windmill is built from various sizes of light wood framing, with 4x4 corner posts, and a mixture of 2x4's, 2x6's, 2x8's, 1x4's, 1x6's, and 1x8's., with nailed and bolted connections. There are pieces of angle iron at the base of the corner posts – presumably to anchor them into the ground. It is approximately 20 feet tall. Features include a wood ladder built onto the north side of the structure, and a platform located near the top, to access the motor.

The well is located directly below the windmill. It is approximately 4 feet square, and it appears to be approximately 20 feet to the level of the water. The well is lined with horizontal wood poles. At the top, an enclosure of short vertical wood poles is surrounded by a poured concrete collar, which is capped with a wood frame and wood planks.

Three guy wires are attached to the structure, and anchored into the earth nearby. There is a fourth guy wire that has become detached.

Condition

This structure is in poor condition, and appears to be dangerous.

The wood windmill is very weathered and deteriorated, and the structure is quite rickety, but stable. It appears to be leaning slightly to the south. The guy wires that remain are poorly attached and anchored, not tight, and do not seem to be doing much good.

The concrete collar is weathered and deteriorated. It is cracked into several pieces, and several pieces are missing. The wood frame and planks are also very weathered and deteriorated, and several pieces are missing.

The wood poles lining the well are very deteriorated, but most of them are still in place. The vertical wood poles, at the top, are all very weathered and deteriorated, and many of them are missing. The well is filled with water.

The rotor blades are missing from the motor.

Preservation Recommendations

Several things could be done to stabilize the windmill. First of all, all of the wood members and connections should be closely inspected. Any severely deteriorated or damaged members should be replaced. Next, all of the connections between members should be secured, either by re-nailing, tightening bolted connections, and replacing or adding new connectors. The angle iron supports at the base should be

inspected, and replaced (if necessary), re-anchored, and securely reconnected to the corner posts.

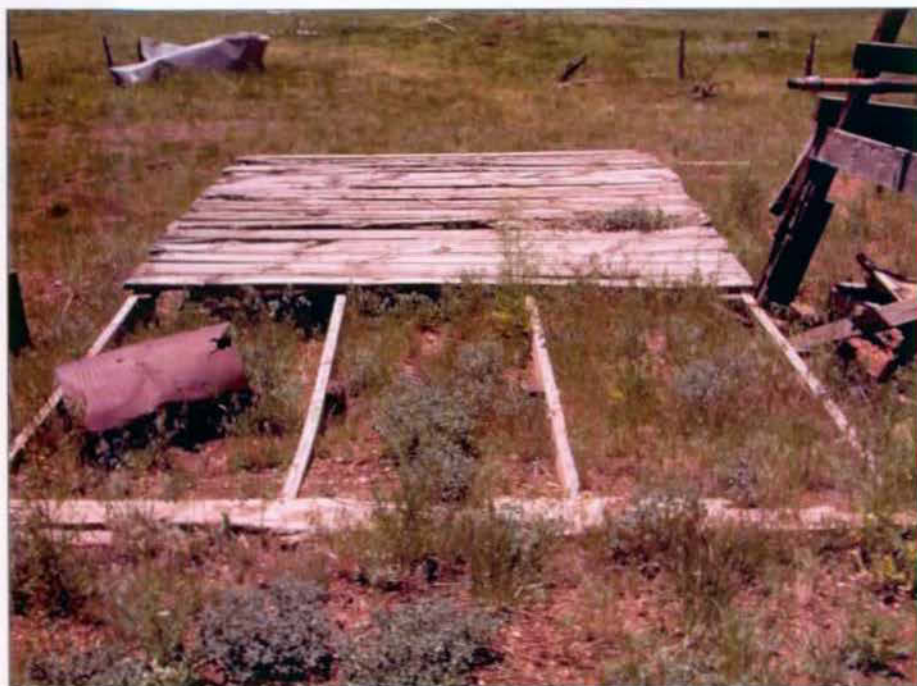
During the course of the work, it might be possible to push the structure back into a more vertical alignment. Otherwise, new guy lines should be installed, using aircraft cable with turnbuckles, attached to eye bolts on the structure, and securely anchored into the ground.

Finally, the structure could be treated with a preservative, to arrest the deterioration from weathering.

The well is a little more difficult to deal with. The safest treatment would be to fill it in – however, this is not the best alternative from a preservation standpoint (nor from the point of view of providing a water source for wildlife such as birds and small climbing animals). A better alternative would be to remove the concrete collar and wood cover that is in place now, and build a new collar and cover that allows access for birds and small animals, but prevents large animals (and people) from falling in. This does not solve the problems of the deterioration of the wood poles lining the well, or the vertical poles at the top, but it does deal with the safety concerns.

As far as the wood poles are concerned, if the decision is made to keep the well as a well, they should all probably be replaced, possibly with a species more resistant to rotting from contact with water. (The use of treated wood would not be recommended in this case, as this would be a potential source of water contamination).

Platform



View from north.



View from south.

Description:

This structure is a small wood platform. Its purpose is not obvious – nor is it obvious if this was a building, or just a platform.

It is built from 2x8 joists, with a wood floor built from 2 inch thick boards. The joists are sitting directly on grade on the north, and are supported by wood posts on the south.

Condition:

This structure is in poor condition. It is very weathered and deteriorated, and many of the floor boards are missing. The structure that remains is somewhat rickety, and may not be safe.

Preservation Recommendations:

Short of rebuilding the structure in its entirety, little can be done to stabilize it. Therefore, no treatment is recommended.

Corrals/Gates/Cattle Chute/Fences



View of corral near loading ram, from west.



Fence and gate near loading ramp.



Loading ramp from west.



Gate near loading ramp.



East portion of picket fence from northeast.



East portion of picket fence from northwest.



West portion of picket fence from northeast.

LCS Shadow ID: 247487

Description:

This is a collection of features related to the activities that were conducted on site. These features include a corral and fencing built from wood poles and wire, several gates built from milled lumber, a cattle chute built from milled lumber, and a picket fence, built from milled lumber as well as wood poles.

Condition:

All of these features are in poor condition. The wood members are very weathered and deteriorated, and many pieces are missing. Many of the posts and poles set into the earth are rotten, and many of the features are leaning or falling over.

Preservation Recommendations:

Preservation of these features would be difficult, without reconstructing them. Temporary bracing would help to keep these features from falling over, but replacement of the vertical supports, with supports which would resist rotting (either a rot resistant species or treated wood), would be necessary for a more long lasting solution. Sound wood members should be reattached to each other, and severely

deteriorated, damaged, or missing members should be replaced. The wood could also be treated with a preservative, which would slow down the weathering and deterioration.

Bibliography

QUEST FOR THE PILLAR OF GOLD, The Mines and Miners of the Grand Canyon; by George H. Billingsley, US geological Service, Flagstaff, AZ; Earl E. Spamer, Academy of Natural Sciences, Philadelphia, PA.; and Dove Menkes, Fullerton, CA. Undated manuscript on file with Arizona Field Office, Bureau of Land management, St. George, U.

Appendix A – Outline Specifications

The following are some general guidelines and rules of thumb for implementation of the preservation work discussed in this document.

General:

1. Practice and use safe construction procedures.
2. Provide barricades or other means to keep non-authorized persons from entering the project site.
3. Use skilled maintenance staff or craftspeople to perform preservation work.
4. Store products to avoid moisture contamination or damage, and to prevent leakage, contamination, or littering of site.
5. Protect adjacent surfaces and construction from damage or contamination.
6. Do not attach scaffolding to structures. Set legs on planks or padding where appropriate to protect ground or floor.
7. Do not apply sensitive materials in conditions that are too hot or cold, or during inclement weather.
8. Date stamp or otherwise mark all new construction, in an inconspicuous place.
9. Use hand tools only when working on historic structures – do not use power tools such as chipping hammers or masonry saws, pneumatic tools, torches, or vibratory equipment.
10. Provide test patches, samples or mock ups of unusual or custom finishes, materials, or techniques, especially when matching historic fabric.
11. New construction materials and methods to match existing construction as closely as possible, unless specified otherwise.
12. Clean up after completion of all activities.
13. Hanta virus may be present in these structures. Take appropriate precautions when performing work that may expose workers, including providing worker protection and training, and sanitizing suspect areas before and during work.

Site Work:

1. Preserve existing site features such as roadways, archeological features, and vegetation.
2. Remove modern garbage and trash from the site.
3. Dismantle or remove modern fire rings and pits from the site. Scatter stones, ashes, and charred wood.
4. Where specified, remove existing vegetation, including roots, if possible, when vegetation is encroaching on, or growing inside of a structure. This is especially important for trees and shrubs.
5. Existing vegetation should be controlled in a manner that does not cause damage to historic site features or structures. Herbicides should only be used if specified.
6. Obtain appropriate archeological clearance prior to excavation. Monitor excavation if necessary.
7. Fill eroded areas adjacent to foundations with soil to match existing.

8. Provide adequate slope at grade to provide positive drainage away from foundation. Minimal banking of soil against foundations may be necessary, to avoid excavation. However, avoid creating conditions of differential fill heights on each side of a wall.
9. If required for stabilization, contemporary landscaping materials should be allowed only where they are concealed or not visible.

Demolition:

1. During demolition, keep dirt and dust pollution to a minimum.
2. Ensure safety of personnel in the demolition area. Provide temporary barricades or other controls as required.
3. Be alert for hazardous materials or unstable construction. Stop work if these conditions are encountered, until mitigation measures can be taken.
4. Provide adequate temporary support for portions of the structure to remain.
5. Cap or disconnect utilities, if appropriate.
6. Remove items in inverse order of installation.
7. Carefully cut and remove fabric. Take precautions to avoid damage to existing construction to remain.
8. As previously hidden areas are exposed, it may be necessary to stop work to investigate or document existing conditions, or to alter procedures.
9. Save representative samples of historic fabric, character defining features, and materials to be used as templates for replication.
10. Items to be salvaged and/or reused should be cleaned and stored in a safe location.
11. Promptly remove all materials to be disposed.
12. Clean adjacent surfaces after completion of demolition activities.

Concrete:

1. Preserve existing concrete. If stabilization or repairs are needed, follow procedures outlined below.
2. If the concrete needs to be consolidated, consider the following: There have been some attempts to consolidate deteriorating concrete with ethyl silicate consolidation treatments (which are actually meant for masonry or plaster consolidation), but it is not known if these will be long term solutions. Any treatment using these materials should be considered experimental. Suggested products are listed in Appendix B.
3. Repair chipped, broken, or spalled concrete by patching. All deteriorated concrete should be removed from the area to be repaired, and the surface of the remaining concrete left sufficiently rough to provide a good bonding surface for the patching. If there is any reinforcing in these areas, it should be carefully inspected and cleaned to remove all corrosion or replaced. Replacement reinforcing should be designed by a civil engineer, and should be fabricated from stainless steel.
4. For large patches, provide some sort of keying to accept the patching, either by chipping keyways into the existing concrete, or by imbedding short pieces of reinforcing into the existing concrete, and attaching them with epoxy.

5. The new concrete mix should match the existing concrete mix (as determined by a laboratory analysis), with aggregate size appropriate to the size of the repair, and to minimize shrinkage. Admixtures should be avoided, although a bonding agent may be used on the surface of the existing concrete.
6. The patches should match the color and surface texture of the existing concrete, and should be damp cured for at least a week.

Foundations:

1. Preserve existing foundations.
2. See Stonework, below, for stabilization or repairs to existing stone walls.

Adobe:

1. Preserve existing adobe walls. If stabilization or repairs are needed, follow procedures outlined below.
2. New adobe mud mortar to match existing mortar as closely as possible in composition, color, texture. Materials should be well mixed, without lumps or foreign material.
3. New adobe bricks to match existing bricks as closely as possible in composition, color, texture, and size. New adobe batts to be similar, cut from whole bricks, or fabricated in appropriate sizes. Fabricate new bricks using wood forms, and allow to cure for at least 2 weeks before using.
4. Repair small holes, cracks, and gaps with adobe mud mortar. Clean out loose or damaged adobe. Dampen surfaces to receive repair. Tightly pack area with well mixed but stiff adobe mud mortar. Build up with successive applications, allowing each to dry, until slightly below surface. If necessary, sculpt surface of repair to match pattern of existing adobe bricks and mortar.
5. Repair deteriorated, eroded, or otherwise damaged areas of adobe walls with adobe bats or bricks, and adobe mud mortar. Remove damaged adobe bricks to sound substrate, or to maximum of one half of wall thickness, and length of 4 feet, if portions of existing wall is to remain above repair. Provide horizontal surface for new adobe work. Dampen surfaces to receive repair. Lay new adobe batts or bricks in adobe mud mortar, matching existing coursing. Pack voids too small to use batts with well mixed but stiff adobe mud mortar. Build up with successive applications, allowing each to dry, until slightly below surface. If necessary, sculpt surface of repair to match pattern of existing adobe bricks and mortar.
6. Rebuild adobe walls, with new adobe batts or bricks and adobe mud mortar. Remove loose deteriorated, eroded or otherwise damaged adobes to course lines and full block sizes. Provide horizontal surface for new adobe work. Dampen surfaces to receive repair. Lay new adobe bats or bricks in mud mortar, matching existing coursing, and mortar joint detail.
7. Where specified, cap exposed adobe walls with new adobe mud mortar. Remove deteriorated or loose material from top of wall. Dampen surfaces to receive repair. Build cap in several applications, allowing each to dry, until total thickness of cap is 2 to 3 inches. Round or slope top to allow rain water to flow off. Use admixtures or water repellants only if specified.

- 8 Shrinkage cracks in all surfaces can be repaired by lightly dampening the surfaces to be repaired and rubbing with hands or sheepskin. If necessary, small shrinkage cracks can be filled with well mixed but stiff adobe mud mortar, then repeat the above procedure.

Stonework:

1. Preserve existing stone walls. If stabilization or repairs are needed, follow procedures outlined below.
2. New earthen mortar to match existing mortar as closely as possible in composition, color, and texture. Use well graded native soil (containing sand and gravel up to 1/8 inch diameter). Provide test samples to determine optimum mix for strength and workability, as well as crack resistance. Use admixtures or water repellants only if specified.
3. "Soil Cement" to be a mixture of well graded native soil (containing sand and gravel up to 1/8 inch diameter). A suggested mix is 1 part Portland cement to 4 ½ to 6 parts soil. Provide test samples to determine optimum mix for strength and workability, as well as crack resistance.
4. New stone to match existing as closely as possible in type, color, texture, shape, and size. Existing stone may be reused provided it is clean and undamaged.
5. Repair or rebuild portions of existing stone walls using new or existing stone, set in earthen mortar. (Only use soil cement where specified). Remove loose stones or damaged section(s) of wall. If necessary, rake out adjacent mortar joints for re-pointing. Clean stonework to remain in place. Clean and dampen new stone. Flush void behind stone with mortar, if appropriate. Set stone in full bed of mortar, with vertical and top joints full. Match existing coursing. Point new stone work, and re-point adjacent stonework, to match existing.
6. Re-point existing mortar joints with earthen mortar. Rake out loose or damaged mortar, to a depth of 2 inches maximum. Dampen surfaces to receive repair. Use pointing tools slightly narrower than joints. Tightly pack area with well mixed but stiff earthen mortar mixture. Build up with successive applications of approximately ½ inch thickness, allowing each to dry. Match existing mortar finish and tooling, or finish as specified. Remove any excess mortar. Use admixtures or water repellants only if specified.
7. Where specified, cap exposed stone walls with soil cement. Remove deteriorated or loose material from top of wall. Dampen surfaces to receive repair. Build cap in several applications, allowing each to dry, until total thickness of cap is a maximum of 2 to 3 inches. Round or slope top to allow rain water to flow off. Use admixtures or water repellants only if specified.

Rough Carpentry (Wood Structural System):

1. Preserve existing wood structural system. If stabilization or repairs are needed; follow procedures outlined below, as well as in the section on Wood Component Repairs.
2. Reattach loose components or connections to be secure.

3. Structural wood replacement members to match existing size, species, grade, and character as closely as possible, unless specified otherwise.
4. Do not replace structural elements unless severely damaged or deteriorated.
5. Consider repair techniques such as Dutchman repairs, sistering, and other techniques discussed in the section on Wood Component Repairs, below.
6. Care should be taken to match the way original woods were milled. This should include attempting to match saw patterns (circular or band sawn), surfacing, and the way the board was cut from the tree. Resawn lumber may be used in lieu of circular sawn lumber, if necessary.
7. New lumber intended for replacement in kind should have a moisture content of less than 15 percent. Lumber used to add new elements, or not intended to be replacement in kind, may have moisture content above 15 percent.
8. Rough lumber exposed to the weather, or to moisture from other sources, may be treated with a wood preservative. If pests such as termites are a problem, lumber should be treated with borates.

Finish Carpentry:

1. In general, the same rules apply to finish carpentry, as for rough carpentry. However, finish carpentry contributes more visibly to the character defining features of the structure, and so the visual quality and appearance of finish carpentry becomes more important.
2. Maximum moisture content of lumber to be used for finish carpentry to be 12%.

Fasteners:

1. In general, the fasteners used throughout the structures covered in this document included plain steel slotted wood screws, plain steel bolts and nuts, plain steel cut wire nails, plain steel cut nails (square), and galvanized cut wire nails.
2. When fasteners are replaced or supplemented, except for bolts and nuts, care should be taken to match the type of fastener in shape only. For example, common cut wire nails should be replaced with hot-dipped galvanized cut wire nails and plain steel cut nails (square) should be replaced with hot-dipped galvanized cut nails (square). For plain steel slotted screws, stainless steel is a suitable alternative. The purpose of these substitutions is to provide greater longevity to wood to wood and wood to steel connections. The substitutions in most cases will result in very minor appearance changes that are only visible upon close scrutiny; therefore, they will not have an adverse affect on the overall integrity of the structure. The exception to this rule, however, is for bolts and nuts. These should be replaced in kind.

Wood Component Repairs:

1. If wood component repairs are needed, follow procedures outlined below.
2. Inspect wood components for damage or deterioration, to determine if repairs can be made.

3. Remove all extraneous hardware, finishes, or patches which may get in the way of repair work.
4. Where specified, use synthetic wood fillers to fill cracks, gouges, holes, and depressions. Products include epoxy filler, used to fill large areas, silicone or latex caulk for smaller areas, joints, or gaps between pieces or dissimilar materials, and painter's putty to fill nail holes.
5. Where specified, use liquid epoxy consolidant to repair rotten wood.
6. Where larger areas are to be repaired, use the following techniques:

Dutchman Repairs: Used to make patches in wood members. Remove deteriorated wood to sound substrate. Form a prismatic void in the existing wood, with square corners and edges. Cut Dutchman to exactly fill void, with exposed portion matching profile of original woodwork, and grain of Dutchman inserted parallel to grain direction of original woodwork. Secure Dutchman with waterproof adhesive, and clamp in place until set. Sand surface flush with surrounding surface.

Scarf Joints: Used to splice new wood members to existing wood members. Form matching angular cuts on existing member and new member. Join members together at matching faces, and fasten through joint in several places. Use longer joints, or add backing pieces for stronger joints. Repaired component retains original dimensions throughout length, unless backing pieces are used.

Lap Joints: Used to splice new wood members to existing wood members. Form matching overlapping parallel faces on existing and new members (may be splayed for stronger joint), join members together at matching faces; fasten through joint in several places. Repaired component retains original dimensions throughout length.

Butt Joints with Concealed Tenons: Used to splice new wood members to existing wood members. Form matching butt joint ends on existing and new members, form tenon and pocket on matching faces, glue joint together.

Sistering: Used to strengthen or support an existing wood member. Add a new similar sized member to one or both sides of existing member, fasten through overlapping faces. Repaired component does not retain original dimensions.

90 Pound Asphalt Roofing:

1. Remove existing roofing.
2. Ensure that roof sheathing, deck or other substrate provides a suitable surface for roofing. Complete repairs or replacement, if required. See the section on Rough Carpentry, above.
3. Provide new fiberglass reinforced or modified bitumen roofing, with mineral surfacing color and texture to match existing.
4. Provide underlayment of 15 pound fiberglass reinforced asphalt roofing felt, nailed with galvanized roofing nails.
5. Begin by nailing one continuous course of roofing in all valleys. Then, beginning at the low sides of the roof planes, install roofing horizontally, lapping each layer 3 to 4 inches. At the top, apply a strip of roofing, extending a minimum of 12 inches down each roof plane.

6. Nail roofing with galvanized roofing nails, spaced approximately 9 inches on center at the laps, and place two additional rows of nails down the longitudinal center of the roofing, with the rows approximately 11 inches apart, and the nails staggered on 18 inch centers.
7. Seal all of the seams with plastic asphalt cement, being careful to be neat. Laps and perimeter edges should be sealed before being nailed, and sealed again after nailing, if necessary. Seal all perimeter edges, flashings, penetrations, and intersections with other construction with plastic asphalt cement, using fabric reinforcing mesh if necessary, or if specified.

Metal Roofing:

1. Conserve existing metal roofing. If repair or replacement is needed, follow procedures outlined below.
2. Use replacement fasteners to match existing, or as are appropriate for roofing and substrate.
3. Remove any metal roofing that is too deteriorated or damaged to repair. Remove full panels, or partial panels, as is appropriate to damage.
4. Where possible, ensure that roof sheathing, deck or other substrate provides a suitable surface for roofing. Complete repairs or replacement, if required. See the section on Rough Carpentry, above.
5. Provide replacement roofing to match existing roofing. Use full size panels or partial panels, as is appropriate to size of repair. Lap upper edge under roofing or flashing above, and lap lower edge over roofing or flashing below. Match existing side laps. Fasten securely to substrate.
6. Repair roofing to remain by bending distorted panels back into shape, and patching small holes with auto body filler, selected for color match. Use filler sparingly, apply just enough to fill hole, squeegee flat, and remove excess from surface of panel. Use small pieces of plastic or fiberglass screen, imbedded in filler as reinforcing, if required. Paint filler, if necessary for better color match.
7. Securely re-fasten all roofing to substrate.
8. Provide appropriate flashings at ridge, and other locations, securely fastened to substrate.

Doors and Windows:

1. Preserve existing doors and windows. If repairs are needed, follow procedures outlined below, as well as in the section on Wood Component Repairs, above.
2. Where possible, stabilize and/or repair door and window components, using techniques referenced above.
3. When replacement of door and window components is necessary, use replacement elements based on existing and/or historical components, fabricated from visually compatible materials. Match existing size, scale, color, composition, and design, including trim and hardware. Replace rotten or unsound components. Replace missing components if enough evidence exists as to their design.

4. Repair mortise and tenon joints by drilling out tenons (dowels) and replacing with new tenons (dowels).
5. If reglazing of doors and/or windows is specified, use appropriate glazing and glazing compound – do not use caulk.

Wood Preservatives:

1. If specified, apply wood preservative to wood components.
2. Wood preservative should be for exterior use, and should not cause any changes to visual appearance of the wood.
3. Perform any necessary repairs, and clean wood surface to remove dirt, dust, oils, and other contaminants.
4. Apply preservative with brush only – do not spray. Apply evenly, free from sags, runs, etc. Allow to dry before applying additional coats.

Mud Plaster:

1. If specified, apply a protective coating of mud plaster to adobe walls.
2. Stabilize or repair adobe substrates, as discussed above. Remove loose or deteriorated material.
3. Mud plaster should be a mix of adobe mud, sand, and water – proportioned so that the dried plaster is firm and hard, but does not show shrinkage cracking. Too much mud, or a mixture that is too wet, will end to cause shrinkage cracking. Too much sand will lessen shrinkage cracking, but will produce a plaster which is too soft or erodable. Provide test samples to determine optimum mix for strength and workability, as well as crack resistance. Use admixtures or water repellants only if specified.
4. Dampen surface to be plastered.
5. Apply plaster from the bottom of the wall, working up to the top. Apply plaster in approximately ¼ inch thick layers, allowing to dry completely between successive applications, but protecting from rapid drying. Build up to a thickness of approximately ¾ inch.
6. Shrinkage cracks in all surfaces can be repaired by lightly dampening the surfaces to be repaired and rubbing with hands or sheepskin. If necessary, small shrinkage cracks can be filled with well mixed but stiff mud plaster mixture, then repeat the above procedure.

Appendix B – Suggested Products

Concrete Consolidation Treatment:

Prosoco Conservare OH100, manufactured by Prosoco Corporation, Lawrence, Kansas. www.prosoco.com

Acrylic Polymer Admixture (For Earthen Mortar):

El Rey Superior Additive 200, manufactured by El Rey Stucco Company, Inc., Albuquerque, New Mexico. www.Elrey.com

Epoxy Consolidant (For Repair of Rotten Wood):

JP-146, two part, low viscosity, manufactured by Preservation Resource Group, Rockville, Maryland.

Epoxy Filler (For Filling Cracks and Holes in Sound Wood):

JP-146, two part, low viscosity, manufactured by Preservation Resource Group, Rockville, Maryland.

Appendix C – Estimated Costs

Estimated costs for preservation work are very difficult to determine, due to the uncertainties in the nature of the work. Therefore, the costs presented here are to be considered as “ballpark” estimates only, to give an idea of the magnitude of the costs. These costs should be used as an aid in planning, and refined as appropriate for actual proposed preservation campaigns. They are based on labor and materials, as well as costs associated with the remote locations, including travel and living expenses for preservation workers.

Grand Gulch Mine:

Headquarters (Mill): \$50,000

East Dugout: \$25,000

West Dugout: \$35,000

Concrete Slab 1: \$1,000

Concrete Slab 2: \$1,000

Oil Change Ramp: \$2,000

Privy: \$3,000

Bunkhouse: \$100,000

Water Tank Frame: \$1,000

Stone Foundation: \$1,000

Powder House: \$30,000 with roof, \$20,000 without roof

Chimney/Smelter: \$50,000

Loading Dock: \$1,000

Concrete Slab 3: \$1,000

Wood Retaining Wall: \$10,000

Shed: \$10,000

Cistern: \$10,000

Concrete Piers: No treatment

Wood Floor: No treatment

Blacksmith Shop: \$25,000

Boarding House: \$10,000

Collapsed Privy: No treatment

Pine Well Ranch:

Ranch House: \$100,000

Root Cellar: \$20,000

Privy: \$5,000

Play House: No treatment

Collapsed Building: No treatment

Tack Room: No treatment

Log Building: No treatment

Chicken Coop: No treatment

Windmill: \$60,000

Platform: No treatment

Corrals/Gates/Cattle Chute/Picket Fence: \$10,000



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

National Park Service
U.S. Department of the Interior

Division of Facilities Management, Historic Preservation Projects
Intermountain Support Office
Santa Fe, New Mexico



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