PAINTED DESERT TRADING POST NPS
GRANT COMPLETION REPORT
(Compiled June 2019)

BACKGROUND

The Painted Desert Trading Post, located on former US 66 thirty miles east of Holbrook, Arizona, and five miles east of the Petrified Forest National Park boundary, was built circa 1940 by Dotch Garland Windsor, who operated it until approximately 1960, when a new alignment of the highway opened one mile to the south of the existing road. He then moved to Holbrook, where he died in 1964. The building was never re-purposed or re-opened, and has remained abandoned in the harsh climate of the desert for almost sixty years. Its saving grace during this time has been its isolation and limited access.

The only known postcard of the Painted Desert Trading Post - 1945.

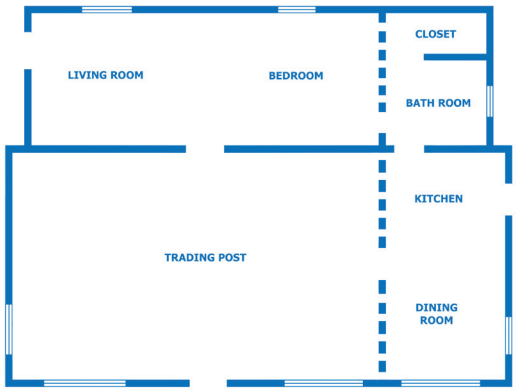
Lack of records has prevented a full accounting of ownership over the years. The most recent owner was Dr. Ken Krauss, a dentist living in Bakersfield, California. It was from Dr. Krauss that the property was purchased by the Route 66 Co-Op in 2018 for the express purpose of stabilizing the building and managing access for visitors. Route 66 Co-Op is a 501(c)3 non-profit organization. Presently, access is through a locked gate, where the old alignment of US 66 leading to the property now lies within the confines of the Padres Mesa Ranch.

WORKFORCE

Generally, five to seven of the ten Route 66 Co-Op members were on-site during each phase of the project. They came from Texas, Oklahoma, Pennsylvania, Ohio, Missouri, New York, and Arizona. Three of them have substantial experience in construction and construction management. Backgrounds of additional volunteers and other co-op members included an astrophysicist, two professional engineers, experienced roofing contractors, carpenters, a heavy-equipment operator, and one experienced concrete contractor. Workers on-site averaged 10-12 during any given work session. A detailed construction plan, as well as comprehensive materials, tools, and equipment lists were prepared in advance for each phase of the work.

THE BUILDING

The Painted Desert Trading Post is essentially a rectangle, just over 40 feet wide by 30 feet deep, with an indented offset of approximately two feet on each side that together narrow the rear width of the building to roughly 36 feet. There is a load-bearing partition wall running the full width of the building, separating the bigger front room from the back room.



Floor plan. Dashed lines represent partition walls no longer existing.

Original construction was wood-frame residential, though rafters and ceiling joists were scabbed and stitched together in many places, and the rafters were substandard in terms of dimension. It is a building that was pieced together using available materials, and whose builders did not follow conventional codes in some areas. The foundation was particularly substandard, consisting of a roughly 8”x8” concrete curb set directly on the surface of the ground. The curb formed the perimeter of the structure as well as the locations of the partition walls. This allowed all of the walls to rest on 8”-thick concrete. A slab floor averaging 2” thick was then poured and finished within the confines of the curb foundation. No reinforcing steel bars were used, and the aggregate in the concrete (both foundation and slab) was purely sand, most likely mixed on-site.

The exterior facade consisted of 1”x12” diagonally placed lumber sheathing covering all exterior walls. Chicken wire was then attached, followed by a concrete application that varied from approximately 1/2” to 1” in thickness. A thin topcoat of trowelled stucco finish was then applied. Parapet walls extended above the level of the roof, stair-stepping along the ends of the building for aesthetic effect. The roof rafters were decked with 1” thick “rough sawn” lumber sheathing, followed by a combination tar-paper and rolled asphalt roofing underlayment, and finished with corrugated steel panels, all of it secured with nails and sealed with roofing tar.

Inside, the surviving partition wall separates two main rooms and serves as a load-bearing support for the roof. The front room is the largest at approximately 18 feet deep, with the back room approximately 12 feet deep. Both rooms were once subdivided, with a wall extending from the exterior front wall to the rear exterior wall, positioned approximately 10 feet inside the east exterior wall. The bigger portion of the front room (roughly 30 x 18) served as the trading post. All of the rest served as living quarters, with the east room in the front of the building a kitchen and dining area and the back room a bedroom and living area, with a bathroom and closet on the east side of the partition wall there. Heat was provided by a wood stove, while electricity was supplied by a windmill generator, and a water well and electric pump provided running water. Exterior lights were once spaced across the front of the building, and there were gas pumps on an island out front.

CONDITION AT BEGINNING OF PROJECT

Damage to the structure over time came not from vandals, but from exposure, wind and water erosion, and from cattle. By the 1990s, the building's sub-standard foundation had broken up and fallen away from the building to a significant extent. This, combined with erosion of the soil around the structure, particularly at the corners, caused the walls to slump, bow, and otherwise be pushed out of shape. By the time of the project, the southeast corner of the trading post was resting on the ground 16" below the level of the interior concrete floor. The southwest corner was similarly distressed, though to a lesser extent.

View of front and east walls. Lisa Drewitz

East end of front wall.

As mentioned, the foundation was heavily compromised. Only parts of it along the rear wall and in the area around the front door were relatively intact. The roof had lost nearly half of its sheet metal, and the roof decking was either missing or rotted, allowing water damage to occur, seriously degrading the roof rafters and ceiling joists. Similarly, the sill plates (base plates) of the walls had long been exposed to the elements due to the failed foundation and stucco loss, rotting them, as well as many of the wall studs resting on them. In some areas, sill plates and wall studs were completely gone from the foundation to a point several inches up the wall. An initial assessment, conducted in April 2018, concluded that collapse of the structure was imminent.

Foundation at NW corner.

Condition of roof.

View of SE corner (camera facing south). NPS

East Wall (view toward front) illustrating fallen wall due to foundation failure. NPS

Foundation and sill plate separated from wall. NPS

Collapsed foundation.

Cattle damage - west front window.

SE corner resting on ground 16" below the floor.

Compounding the deterioration, cattle from the surrounding ranch had damaged the stucco facade in multiple locations and had completely destroyed the front wall beneath the west front window. Virtually all of the drywall on the inside walls, long subjected to rain and snow, had fallen from the walls and ceilings, and was subsequently pulverized by the cattle. Additionally, crows nests, as well as rodent nests, were in evidence. The result was a heavy accumulation of granulated dry-wall mixed with cattle excrement and crow droppings covering large portions of the floor throughout.

NW corner.

Roof collapse at east end of partition wall. NPS

Debris covering the floor.

Bottom of wall pushed away from building (near door opening); cattle damage to stucco.

THE RESCUE PLAN IN THREE PHASES

As described in the grant proposal, it was decided to complete the project in three phases, given the site's remote location and the logistical challenges regarding materials and equipment. The property is desolate and has no services, so water had to be hauled in and a generator brought out for power tools. Most materials and rental equipment had to be acquired in Gallup, New Mexico, sixty miles away, and transported to the site.

In brief, the first phase focused on clean-up of the site and raising the front and end walls to their approximate former positions, straightening them to the extent possible, and bracing them in place once that was accomplished. The second phase involved raising the rear wall (corners primarily) and the rear portions of the end walls, followed by the complete replacement of the roof. The goal of the third phase was replacement of the entire foundation so that the newly raised and straightened walls would remain permanently in place. Stucco repair during all three phases was limited to trimming, adhesive, and re-fastening where it had pulled away from the building.

PHASE I - WALL RAISING (November 4-11, 2018)

Once the building was cleaned out, wall raising began, using an already developed strategy. The four corners of the building had previously been prioritized based on severity of elevation loss. Worst was the southeast corner on the building's front, which had fallen 16" from the level of the concrete slab floor. The opposite (southwest) corner was similarly compromised, having dropped approximately 10." The two back corners (northeast and northwest) showed only minor displacement, with the northwest corner being worse than the other.

It was decided to conduct the wall raising in two stages, beginning with the front and end walls (roughly the front half of the building). The process to accomplish this closely followed recommendations from experienced experts in historic restorations of structures with similar issues. Rather than attempt the raising of the worst (southeast) corner first, the opposite (southwest) corner was attempted first in order to learn from any mistakes or special challenges encountered. This proved beneficial.

Before beginning, the first four ceiling joists on each end of the building extending from the front wall to the partition wall were replaced to provide extra strength that would be needed once the walls were raised and suspended. Some of the roofing material in these areas was also removed to lessen the weight of the roof structure as the lifting got underway. To help prevent loss of stucco caused by stress from the wall raising, the outside of the corners were wrapped and strapped as well.

View of replacement joists and timber beams bolted to walls.

Removing unsupported concrete to allow space for sandbags and timbers.

Preparing jack posts for lifting the SW corner.

SE corner with double row of jack posts. Note use of timbers and sand bags beneath jacks.

The process of lifting employed the use of timber beams bolted to the upper portion of the front and end walls for a distance of roughly 12 feet in each direction. Timber jack posts were placed under the beams in multiple locations atop 5-ton screw jacks. Portions of damaged or unsupported slab had to be removed to keep the placement of the jacks level and the jack posts plumb. This was done using sand bags and timbers as a base for the jacks. Once correctly positioned, this permitted controlled, uniform lifting of the walls until they had reached a point nearing slab level. After the southwest corner was successfully raised, the process was repeated on the southeast corner, using an additional row of jack posts because of the greater displacement there. The center of the front wall was relatively uncompromised and was left in place.

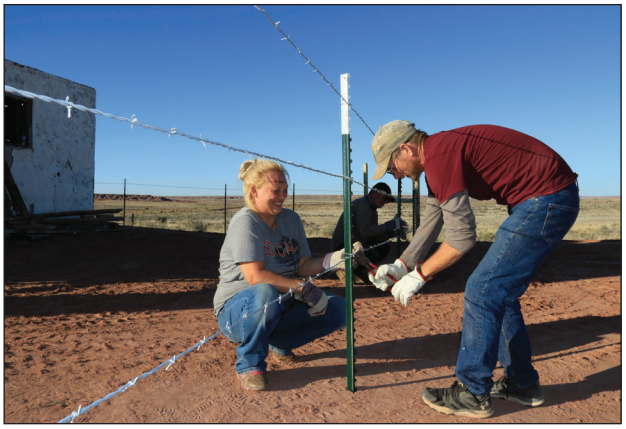
Due to decades of exposure and a failing roof, the entire structure was warped to the point that it was not possible to obtain an exact leveling of the building overall, however it was accomplished to within approximately two inches in the areas of the fallen front corners and end walls. Correcting these offsets between the bottoms of the walls and the slab floor would be done during the third phase (foundation). Having the walls freed from the earth and their remaining connections to the old foundation also allowed them to be partially straightened, and made it possible to pull in bottoms of walls that had been pushed out by the eroding foundation.

Once the walls were re-positioned, a shear wall was built from floor to ceiling 30 inches inside of and paralleling the front wall, extending from each corner toward the middle of the building. These walls served as a substitute for the front wall, carrying the weight of the building in both directions from the corners. With the shear walls in place, many of the jacks and jack posts were removed, while others were left to support the partially elevated end walls and other strategic points. These were to remain in place until the foundation was installed during the third phase.

The first phase concluded with the placement of additional bracing, reshaping the landscape for improved drainage, and the installation of a fence to protect the building from further damage by cattle.

Securing a jack post beam to a replacement ceiling joist on the SE corner of the building.

View of the shear wall on the west end of the building's front room.



Installing the fence.

The conclusion of Phase I. The top of the gate is level, as are the red lines, illustrating the relative success of the wall raising.

PHASE II (March 16-22, 2019)

The goal for Phase II was to complete the wall raising and replace the entire roof structure. Work began with the removal of the remaining sheet metal and roof decking. This was followed by removal and replacement of the rotted ceiling joists and rafters in the back room.

Removal of existing roofing.

All of the original roof decking had to be removed and replaced.

Even though the dimensions of the lumber used for the original roof structure in the back room was substandard (2”x4” as opposed to 2”x6” lumber), it was decided to replace it in-kind with an added linear brace (stiff-back) to help prevent sagging. Once this was done, the remaining portions of the end walls and the back corners were raised, positioned, and braced using the same technique employed during the first phase. As this was done, replacement of the front room joists and rafters got underway.

Rotted ceiling in rear room.

Installing new ceiling joists in rear room.

Jack posts in position in the NE corner.

Jacks and jack posts in the NW corner.

The biggest challenge in replacing the ceiling joists and rafters in the front room was finding a way to incorporate the new with the old while maintaining proper strength for a new roof. Four ceiling joists on each end of the front room had been replaced during Phase I. Of the remaining eleven, seven of them in the middle of the room, along with the block braces in-between them, showed minimal sag and had retained enough integrity to be preserved intact. The existing rafters were of substandard 2”x4” dimension and were deeply bowed and rotted from approximately the middle of the room to the partition wall. To preserve the parts that were still viable, the rotted and broken rafter sections were cut away. The remaining sections where then attached to the new 2”x6” rafters that had been installed alongside them. It was also possible to save and re-use all of the original diagonal braces between rafters and joists.

Condition of existing rafters and joists at the east end of the front room.

Parts of original rafters attached to new ones, along with use of original diagonal braces.

A horizontal beam and jack posts were later used to raise the seven original ceiling joists on plane with their new companion joists, followed by securing them to a stiff-back that ran the entire width of the room. The stiff-back, composed of 2”x6” lumber in an “L” shape, was wedged between the tops of the joists and the bottoms of the new rafters, and served to tie all of the joists and rafters together. Its location was roughly halfway between the partition wall and the diagonal braces nearer the front wall. The stiff-back, diagonal braces, and the block braces combined to eliminate the need for any additional support from below.

Jack posts were used to raise the sagging original front room joists on plane with the new ones. They were then secured to the stiff-back.

Seven of the original ceiling joists in the middle of the main room were preserved intact. The stiff-back can be seen across the tops of the joists in the upper left portion of the photo.

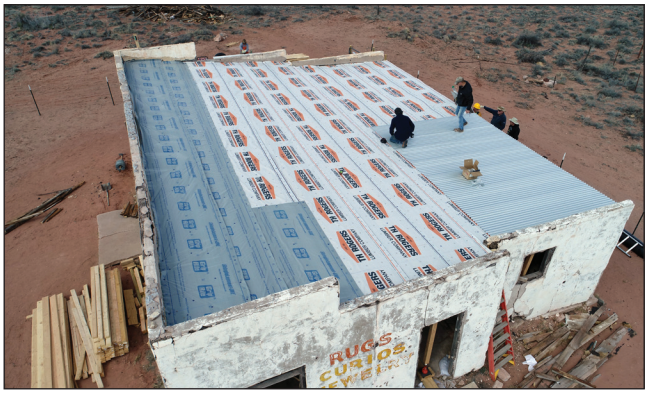
Installation of new rafters, incorporating original diagonal braces.

A front room rafter being secured to the main partition wall. View toward the north.

Once all rafters and joists were installed and secured, workers were able to proceed with roofing. The original decking was “rough sawn” lumber, consisting mostly of 1”x8” dimensional planks. “Rough sawn” lumber is imperfectly cut, as it is typically used in places where it won’t be seen, but has become difficult to find in an age where most decking used is 4’x8’ sheets of OSB or plywood. The Co-Op was fortunate to find a lumber mill located in Albuquerque that could cut and cure “rough sawn” decking to match the original material used.

Views of the new roof structure and decking (above and left), and the roof as seen from inside the rear room.

Synthetic underlayment being applied over the roof decking.



Corrugated Galvalume was used for the sheet metal.

As the roof decking was applied, a shear wall was built across the width of the back room to support the full weight of the exterior rear wall once jack posts were removed, which would occur during Phase III. With the roof decking completed, a synthetic underlayment was applied. Sheet metal used was corrugated Galvalume, which matches the original style. Galvalume is galvanized steel with a protective coating that extends both life and warranty, giving an edge in quality to standard galvanized steel. Shiny when new, it will gradually age to match the original. Following installation, end-wall and side-wall flashing was used around the inside of the parapet walls. This was sealed with silicone. Additional work planned for the parapet walls will further protect them from water seepage.

A view of the sheet metal following installation.

Silicone sealant being applied to the end-wall flashing.

Finished roof. Photo taken after completion of Phase III.

PHASE III (May 23-29, 2019)

The third and final phase of the stabilization project called for replacement of the foundation. This was to be no less challenging than Phases I and II. Preparation had to be completed in time for scheduled delivery of concrete, which was transported more than 50 miles to the site.

Because all new sill plates were to be installed along the bottoms of the walls, jacks still strategically positioned under them could not remain in place. Before concrete could be poured, all exterior walls of the building had to be freely suspended over the foundation trench. Likewise, jacks and jack posts in positions where new concrete would replace missing sections of the slab floor would also have to be removed.

This was accomplished by first completing the middle section of the front room shear wall. Angled braces were then set from ceiling height to the floor on the west interior wall, the front wall, and the area of the northwest corner (rear room). Next, timber beams were extended through window and door openings on the end walls, supported by jack posts in a way that allowed access to the footing. Simultaneously, workers removed the existing foundation and completed digging the trench for its replacement.

Front room shear wall and added braces. Photo taken after completion of Phase III.

Shear wall in back room (right side of image). Photo taken after completion of Phase III.

The interior shear walls, along with angled wall supports and beams positioned through window and door openings were used to "levitate" the building so that remaining temporary supports beneath the walls or otherwise obstructing access to the foundation could be removed.

Workers cutting plywood for concrete forms.

Continual clean-up by volunteers helped keep work spaces unencumbered.

With the bottoms of all walls free of supports, work proceeded on finishing the foundation trench to a depth of 18," installing 1/2" diameter rebar, and replacing all sill plates on the exterior walls. To ensure that the bottoms of the walls were on the same plane as the concrete slab floor, the bottoms of all existing wall studs were cut off 7-1/2" above the level of the floor. New "sister" studs in 31" lengths were then attached to the existing studs, positioned so that the new sill plate would be on plane with the concrete floor once it was added to the bottom of the sister studs. This allowed for correction of the imperfect alignments that remained at both ends of the building during Phase I wall raising. All exterior wall studs were "sistered" in this way.

Rebar used was 1/2" in diameter.

Securing new sill plate to a sistered wall stud.

Installing the new sill plate often required workers on both sides of the wall.

Stucco and the wood sheathing behind it was trimmed to match the bottom of the new sill plate.

The new sill plates consisted of 2”x4” pressure treated lumber with a 25-year “ground contact” life expectancy. For added protection, they were wrapped in black rubberized sill-sealing adhesive, which can be seen on the outside edge of the sill plate in the bottom right photo above.

As sections of new sill plate were completed and the corresponding stucco and sheathing was trimmed to match them, the construction of concrete forms followed along. The forms were set far enough away from the walls to allow room for the concrete to be poured inside them and up to the bottoms of the sill plates. Once properly braced, the forms were backfilled to a point approximately 2” below their top. Lastly, thirty 8”-long galvanized J-bolts were inserted through the sill plate at proper intervals to anchor the walls to the new foundation. The trading post was now level, suspended over the foundation trench, and ready for concrete. The bottoms of the new sill plates, the stucco, the slab floor, and the top of the concrete forms were all on the same plane.

The foundation forms were made of plywood and backfilled with earth prior to pouring the concrete.

The concrete forms had to be the same height as the slab floor inside the building.

One of the Co-Op members supplied a steel bucket of his own design that dispensed the concrete with a rotating auger through a small opening in its end. This proved invaluable, especially along the back wall where the land was sloped and the fence was closer to the building.

The first concrete truck arrived at 9:00 a.m., Tuesday, May 28, 2019.

A patent-pending bucket designed and owned by one of the Co-Op members was used to dispense concrete.

As the concrete entered the foundation trench, workers inside and outside used trowels and concrete rakes to ensure that it completely filled the space up to the bottom of the sill plates.

The concrete truck's chute quickly filled large areas where voids in the slab existed.

The foundation is trowelled smooth as it begins to set up.

The foundation and missing floor together required thirteen cubic yards of concrete. The mix used was 3000 psi. Together with the rebar, this will provide a foundation that should last indefinitely with monitored erosion control.

Finishing touches are given to the concrete as it hardens.

Concrete splatters were cleaned from the stucco immediately after the concrete was poured.

Here the slab and foundation become one. Note the "sistering" of wall studs to the new sill plate.

The NW corner of the trading post now rests on solid concrete.

With the foundation successfully poured, it was left to set up overnight before pulling the forms, which required partial removal of the back fill. This was followed by site clean-up, backfilling the new concrete foundation, and shaping the landscape to allow drainage away from the structure. With an average annual rainfall of just over 9 inches, the arid climate works in favor of the building. Unfortunately, there wasn't time during Phase III to replace the diagonal wood sheathing beneath the rebuilt front windows. This will be done in October 2019.

South view from NE corner following removal of concrete forms.

View of the north (rear) and west walls from the NW corner.

The new foundation after backfilling.

With all three phases successfully completed, the Co-Op looks to the future, where efforts will focus on managing access for visitors, providing interpretation, and completing other protective measures. As a non-profit comprised of seasoned preservationists, the Route 66 Co-Op is dedicated to ensuring that the Painted Desert Trading Post will stand for generations to come.

DESCRIPTION	DATE	COST / VALUE	NPS GRANT CONTRIBUTION	GRANTEE CASH CONTRIBUTION	GRANTEE IN-KIND CONTRIBUTION
On-site consulting / assessment	11/08/2018	$300.00		$300.00	
Phase I: Equipment Rental	11/09-10/2018	$384.30	$192.15	$192.15	
Phase I: Materials/ Tools/Supplies	11/04-12/2018	$3935.02	$1967.51	$1967.51	
Phase I: Volunteer Labor	11/04-12/2018	$5951.25 (396.75 hours @ $15 per hr.)	$2975.62		$2975.63
Phase I: Paid Skilled Labor	11/04-12/2018	$1477.50	$738.75	$738.75	
Phase II: Materials/ Tools/Supplies	03/16-22/2019	$6002.62	$3001.31	$3001.31	
Phase II: Volunteer Labor	03/16-22/2019	$5475.00 (365 hours @ $15 per hr.)	$2737.50		$2737.50
Phase II: Paid Skilled Labor	03/16-22/2019	$3185.00	$1545.41	$1639.59	
Phase III: Equipment Rental	05/24-29/2019	$1203.69	$601.84	$601.85	
Phase III: Materials/ Tools/Supplies	05/23-29/2019	$3354.82	$1677.41	$1677.41	
Phase III: Volunteer Labor	05/22-29/2019	$8025.00 (535 hours @ $15 per hr.)	$4012.50		$4012.50
Phase III: Paid Skilled Labor	05/26-29/2019	$550.00	$550.00		
Partial Lodging and Fuel Expense of Co-Op Members	11/01-14/2019 03/14-25/2019 05/20-31/2019	$7147.00		$7147.00	
PROJECT TOTALS		**$46991.20**	**$20000.00**	**$17265.57**	**$9725.63**

TOTAL NPS GRANT CONTRIBUTION: $20000.00
TOTAL GRANTEE CONTRIBUTION: $26991.20
PROJECT TOTAL: $46991.20