2022 Strategic Preservation Master Plan

Valley of the Moon

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Enchanted Garden, Cathedral Room & Wizard's Tower Complexes

The project is focused on the three most vulnerable and significant resource groupings at the Valley of the Moon. This document is organized as individual condition assessment reports for each of the three clusters and includes recommended priorities and estimated costs of construction. Information from all three reports has been combined onto a graphic map of the site to summarize the findings for easy reference.

By Simon Herbert, in collaboration with Poster Mirto McDonald

Simon Herbert has prepared the Building Condition Assessment Reports in collaboration with volunteer Board Member David Yubeta. He has established plan priorities based on safety, resource stabilization, significance, programming, accessibility, and sequencing; collaborated with the Valley of the Moon for compliance verification, especially Secretary of the Interior Standards and the Tucson Pima County Historic Commission Plans Review for City of Tucson Historic Landmark; and estimated the rough-order-of-magnitude pricing of the recommended repairs. Poster Mirto McDonald - a Tucson based architecture, planning, and preservation firm – has synthesized the reports findings onto a graphic Master Plan document and has provided high level review of estimated costs.

VALLEY OF THE MOON
TUCSON, AZ

PMM
POSTER
MIRTO
McDONALD
ARCHITECTURE
PLANNING
PRESERVATION

Valley of the Moon

Graphic Master Plan - June 2022

AREA A: CATHEDRAL ROOM

A1. Cathedral Room building:	$ 75,200 - $ 80,300
A2. Entry Vestibule, Stairs, and Underground Passageway:	$ 5,250
A3. Proposed re-opening of the southeast side entry door:	$ 5,400
A4. Witches Cauldron Performance Stage:	$ 12,200
A5. Dragon's Teeth Arch:	$ 10,250
A6. Pennyland Performance Area:	$ 9,900
A7. Electrical Services:	$ 18,300
A8. Ponds and Waterfall Features:	$ 12,100
A9. Strategy for Improving Accessibility:	$40,000 - $45,000

AREA B: ENCHANTED GARDEN

B1. Upper thin-shell concrete wall and support:	$ 19,700
B2. Chicken Wire Canopy:	$ 4,900 - $ 6,900
B3. Seating Area and Buttresses within the garden:	$ 2,100 - $ 3,200
B4. Cantilevered Concrete Planter:	$ 720
B5. Miniature architectural structures:	$ 4,800
B6. Repair of crack in wall above the pond:	$ 5,100
B7. Re-construct Door leading to the lower chamber:	$ 2,200
B8. Interior Spaces:	
i. Lower Chamber (George's Bedroom):	$ 7,200
ii. Upper Chamber (George's Writing Room/Office):	$ 6,600
iii. Yellow Room:	$ 3,500
B9. Structural crack in the arch over the Rabbit Hole entry:	$ 24,900
B10. Roof and Drainage:	$ 5,225
B11. Retaining wall in southeast corner:	$ 2,100
B12. Electrical and Lighting:	$ 15,200
B13. Landscaping and Drainage:	$ 8,500
B14. Strategy for Improving Accessibility:	$ 22,850

AREA C: WIZARDS TOWER

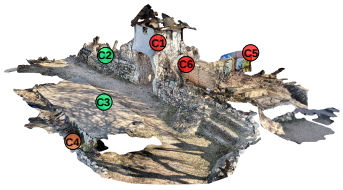
C1. Wizard's Tower and connecting wall structures:	$ 129,800 - $ 136,200
C2. Second Story Room Access:	$ 10,700
C3. Concrete Stage:	$ 4,200 - $5,300
C4. Concrete Wall between stage and grass seating area:	
Alternate 1: (Repair wall)	$ 21,400 - $ 27,000
Alternate 2: (Replace wall)	$ 12,000 - $ 15,000
C5. Concrete wall and "wall of doors" extending north.	$ 11,800 - $ 14,900
C6. Electrical:	$ 13,200 - $ 15,100

CATEGORY D: BUILDING AND SITE ELEMENT IDENTIFICATIONS

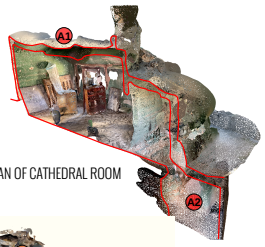
- D1: VEHICLE GATE
- D2: PARKING AREA
- D3: CONCESSION STAND
- D4: TICKET BOOTH
- D5: RESTROOMS
- D6: STORAGE SHED
- D7: AMPHITHEATER
- D8: MAGIC ROOM
- D9: SHRINE OF THE SPIRIT OF PEACE
- D10: FRANK AND ROSES HOUSE
- D11: STAIRS TO AMPHITHEATER

LEGEND

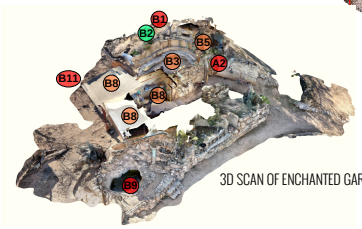
HIGH PRIORITY	MEDIUM PRIORITY
LOW PRIORITY	INFORMATIONAL ITEM



3D SCAN OF WIZARDS TOWER



3D SCAN OF CATHEDRAL ROOM



3D SCAN OF ENCHANTED GARDEN

VALLEY OF THE MOON TUCSON, AZ

POSTER MIRTO McDONALD
PMM
ARCHITECTURE PLANNING PRESERVATION

The Cathedral Complex

An assessment of
Conditions, Repair Recommendations and **Cost Estimates**
for the above complex at the Historic

Valley of the Moon

Located at 2544 East Allen Road in Tucson, Arizona.

Presented to: **Jenni Sunshine**, President
The George Phar Legler Society, Tucson AZ.

By: Simon Herbert, Tucson, AZ
June 2022

To: **Jenni Sunshine, President**
The George Phar Legler Society, Tucson
From: Simon Herbert, Tucson, Arizona
Date: June 2022

Below is an assessment of conditions, repair recommendations and cost estimates for the **Cathedral** complex at the **Valley of the Moon** facility located at 2544 East Allen Road in Tucson, Arizona.

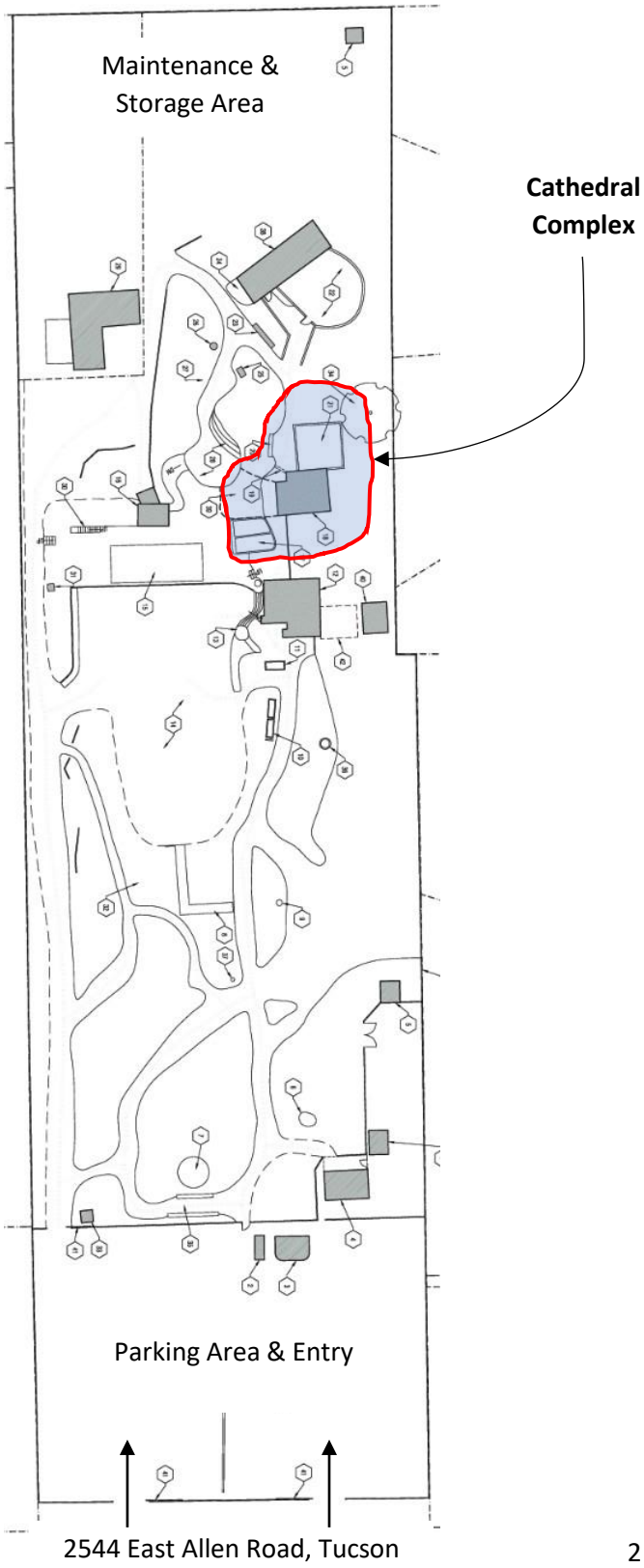
The
Cathedral Complex

Right: View north of the Cathedral building with the Dragon's Teeth Arch, and Witches Cauldron performance area in the foreground.

Contents

Report Overview:

The purpose of this report is to provide the George Phar Legler Society with a roadmap for repairing this portion of the Valley of the Moon facility, and covers **condition, repair strategies,** and **cost estimates**. For a contextual description of the property and how the Cathedral complex fits within it, please refer to the description in the National Park Service/National Register of Historic Places Registration Form (2011).

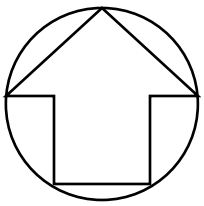


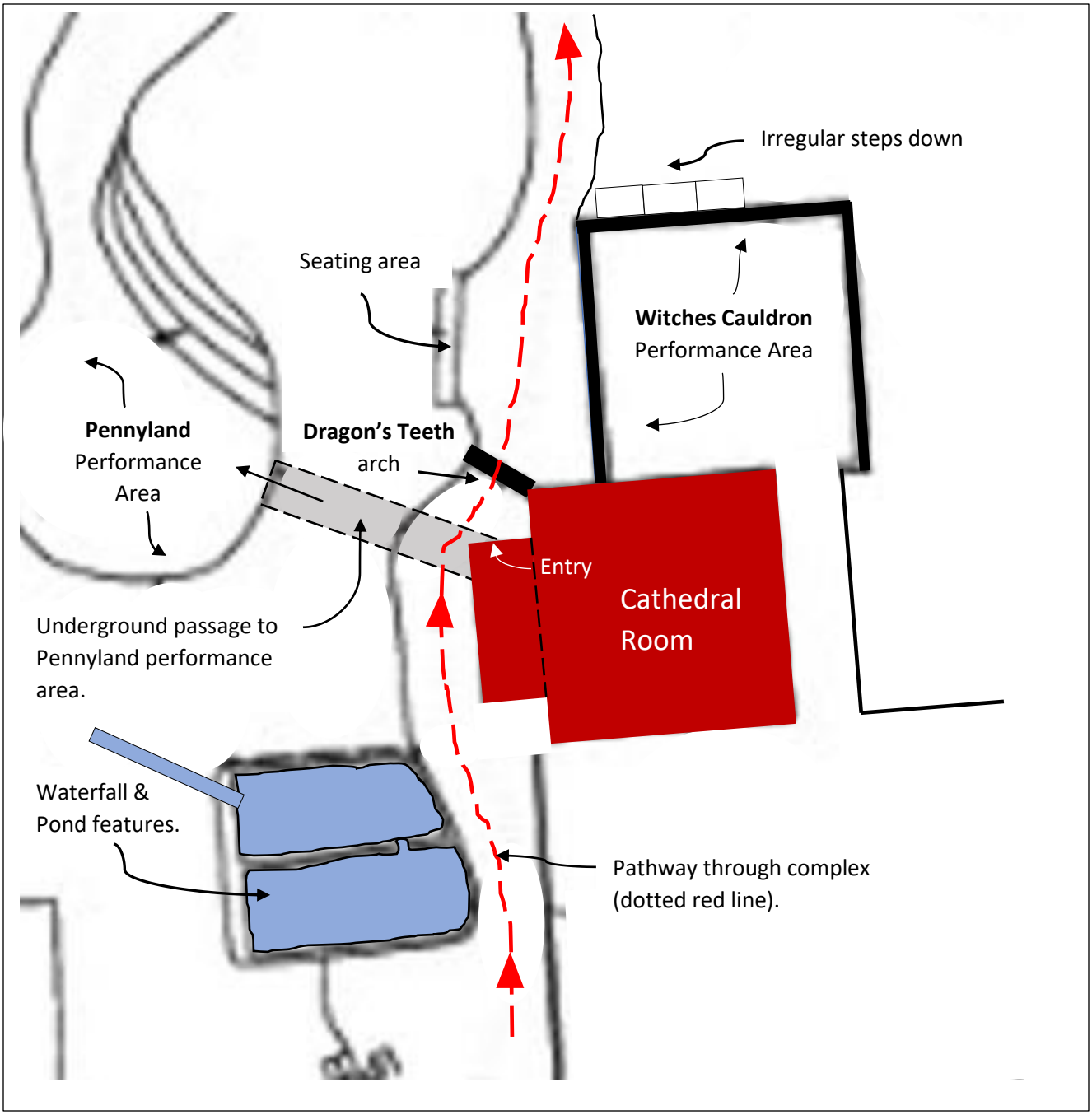
Valley of the Moon **Site Plan**

Site plan showing location of the Cathedral Complex oriented as viewed and experienced by the visitor moving from north to south. Parking is shown at the bottom (north) end of the property.

Note:
The Site Plan shown here was taken from the Valley of the Moon Assessment Report by Burns Wald-Hopkins Schambach, Architects (2008) on the general condition of resources. Therefore, keys to symbols are not linked to anything in this report.

South

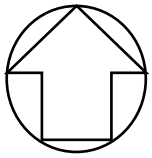




The Cathedral Complex
Enlarged view from Site Plan (not to scale).

The above site plan shows only the principal components and features of the complex.

South



General Description of the Cathedral Complex:

Also referred to as the Fairy Queen's Grotto, the Cathedral complex represents a dense system of spaces and structures on several interwoven levels, including an underground passage. In the design of the Cathedral complex, it is apparent that Legler ingeniously manipulated the quality of three-dimensional space by squeezing unusual experiences into small areas.

According to Legler's son, Randall Legler, the first thing constructed at Valley of the Moon in 1923 was this building, then called by Legler the **Spiritualist Church**. This underlies the importance that Legler placed on having a spiritual foundation for the whole complex; and setting the tone for what was to be built over the years.

Normal pedestrian flow through the complex is north to south, and visitors first encounter a set of low-walled pond-features on the left with a small waterfall feeding the circulating water. The Cathedral building is adjacent to the ponds and separated by the pathway. To the south of the building is the Dragon's Teeth arch and Witches Cauldron performance area.

Cathedral Building:

The entire building is made of thin shell concrete, including the roof. Being a monolithic structure, walls and roof are one, and there is no roof overhang. The main structure, the Cathedral, consists of a single-story main room with an entry vestibule attached to its western gable end. Entry is via a wooden door located in the southeast corner, opening onto a small landing above a stairway. Entry to the main Cathedral Room is reached from the same level to the left through an irregular opening in the wall.

Spaced unevenly within the main room are eight posts of both wood and metal, helping to support the dramatically sagging roof. There are four small windows, each a different size. The floor surface is of uneven stones, and just left of the doorway in the southeast corner is a raised stone and concrete platform with a stove.

The stairway in the vestibule descends with uneven concrete steps in a 180-degree dogleg turn to a short underground passageway leading to the Pennyland performance area (not part of this report).

Witches Cauldron Performance Area:

Visitors leaving the Cathedral Room from the main entry may continue to proceed south, and immediately encounter a steep slope leading under a rock arch. Built from a wall on the left and engaging with the corner of the Cathedral building to the right, it features on the underside, a set of hanging rock "teeth", suitably called the "Dragon's Teeth" arch. Passing underneath, visitors come to a small raised rectangular stage called the "Witches Cauldron".

It should be noted that the pathway between the pond features and the Witches Cauldron area is not easily accessible, because this is the main pathway through the Valley of the Moon complex, this has presented accessibility issues over the years.

Left: View west of the raised stage area from the seating area/pathway.

Legler's Thin Shell Concrete Construction:

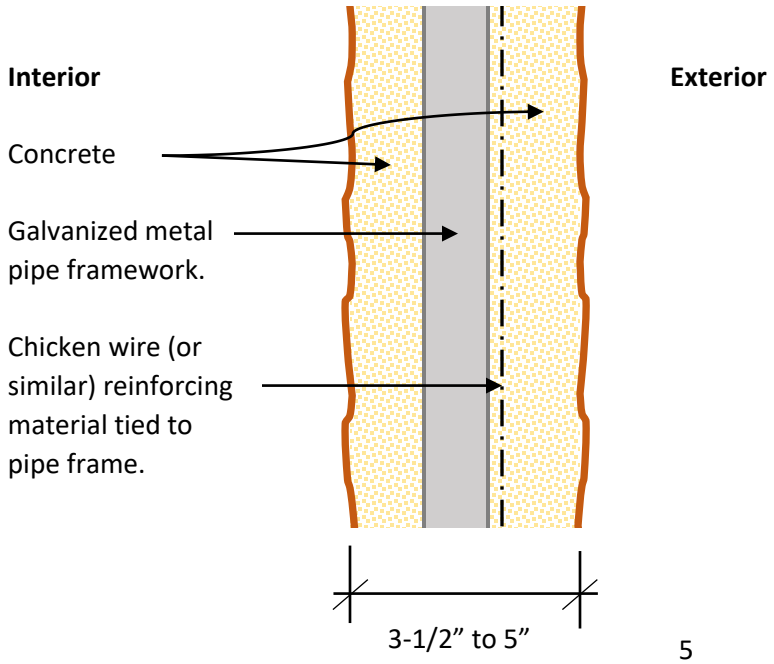
The Cathedral building is perhaps the best example at Valley of the Moon of Legler's approach to thin shell concrete construction.

It is worth mentioning here that Legler was using at the time a new and experimental use of concrete construction. First used by German architects in the early 1920s, it seems unlikely that Legler was familiar with emerging and cutting-edge building technologies in Europe. His approach may well stem from his extreme thrift in the acquisition of materials, gravitating toward those that were cheap or even better, free. Evidence of his use of scrap and re-purposed materials abound at Valley of the Moon, and it may have been this empirical desire to economize which led him to apply the use of thin shell concrete construction in the way he did (see also Supplemental Material, p.43).

Legler used thin shell concrete for floors, walls, and roof structures, including the creation of underground rooms or "caves". At one time, several underground chambers existed around the Cathedral complex, but due to structural concerns these were filled-in during the 1970s and 1980s. Legler's methodology for creating such underground rooms was to first level-off the ground, then pour concrete reinforced with various metal materials, including chicken wire. Once cured, he would then excavate under the floor, pouring walls and another floor as he built the underground chamber. (Jenni Sunshine, George Phar Legler Society, conversation February 2022).

Due to the under-structured nature of some of his thin shell concrete systems, walls, and floors (especially) would weaken or buckle over time, leading to their abandonment and later in-filling with earth or rubble. What remains in the vicinity of the passageway at the Cathedral complex are possible caves which now have bricked up openings on either side of the short underground passage leading to the open performance area known as Pennyland. This complex sits in a man-made depression surrounded by natural and faux rock walls, and live vegetation. It is unknown at this time if any underground rooms existed under the main floor of the Cathedral Room itself.

In the case of the Cathedral building 's main room, wall thickness is (approximately) 3-1/2 inches for the end gable walls (east and west), and 5 inches for the side walls (north and south). The thickness of the roof was not ascertained but is expected to be in the region of 2-1/2 to 3 inches. It should be noted that obtaining accurate measurements is made more challenging by the extremely rough nature of the concrete work and the out-of-square building.



Left:
Typical section through thin shell concrete wall of the Cathedral Room.

The roof system is likely to be similar to this, although thickness has yet to be verified.

Preservation Approaches to repairing materials and features at Valley of the Moon:

Originally constructed by mostly unskilled labor, many of the building systems were under-structured when built, and nearly 100 later are showing signs of deterioration in many areas. Over the intervening years, some of the features constructed by Legler have already been removed as they represented a threat to public safety.

The goal is to preserve as much remaining original material as possible, but be cognizant that some structural changes, material replacement, and certain other changes are required for essential maintenance, public safety, and accessibility. Not doing so will see a continued and compounding deterioration of many aspects of the facility.

Preservation of original materials is one of the key goals in the care of historic structures, but it should be recognized that many materials have a life-span culminating in eventual degradation and material loss. This necessarily leads to decisions concerning material treatment and replacement, and the National Park Service **Secretary's Standards for the Treatment of Historic Properties,** which include **Standards for Rehabilitation** providing a set of guidelines on how to approach these complex issues.

Many of the materials at Valley of the Moon have reached the end of their life expectancy – they have simply “aged out”. When conducting repairs, great care must be taken to maintain the essential character of the site, which means being careful not to change or overly improve appearances. During the repair process, steps should be taken to make discreet improvements with detailing to reduce the mechanisms of deterioration which led to material deterioration and loss in the first place. This is a tall order, and in the case of Valley of the Moon, presents something of a “preservation minefield” since at almost every turn a new complex set of preservation questions arise. This report seeks to find the most achievable balance of repair and preservation.

Valley of the Moon operates largely on a “shoestring” budget, dependent on a small entry fee from visitors; income from special events such as performances and weddings; grants and donations; and the invaluable assistance of its many volunteers. Maintenance is provided largely by the volunteers, while larger physical improvements and more extensive repairs are a combination of contractors, volunteers, and donated services. This delicate patchwork of assistance provides the means of keeping the Valley of the Moon facility open to the public.

Condition, Repair Strategies, and Cost Estimates:

1. Cathedral Room (Measuring approximately 21’ - 6” x 17’ - 3”, with an 8’ – 3” x 6’ -4” Entry Vestibule).

Conditions:
The main concern for this building is the sagging thin shell concrete roof. Deflecting under its own weight and now supported from below with posts and horizontal support girders, the concrete roof also exhibits extensive structural cracking, continuing movement, and plane-shifting. In places, water continues to penetrate the roof system despite coatings of roofing paint and the plugging of leaks with expanding foam. Repairs have been attempted over the course of many years, with more supports being added as the structural situation deteriorated.

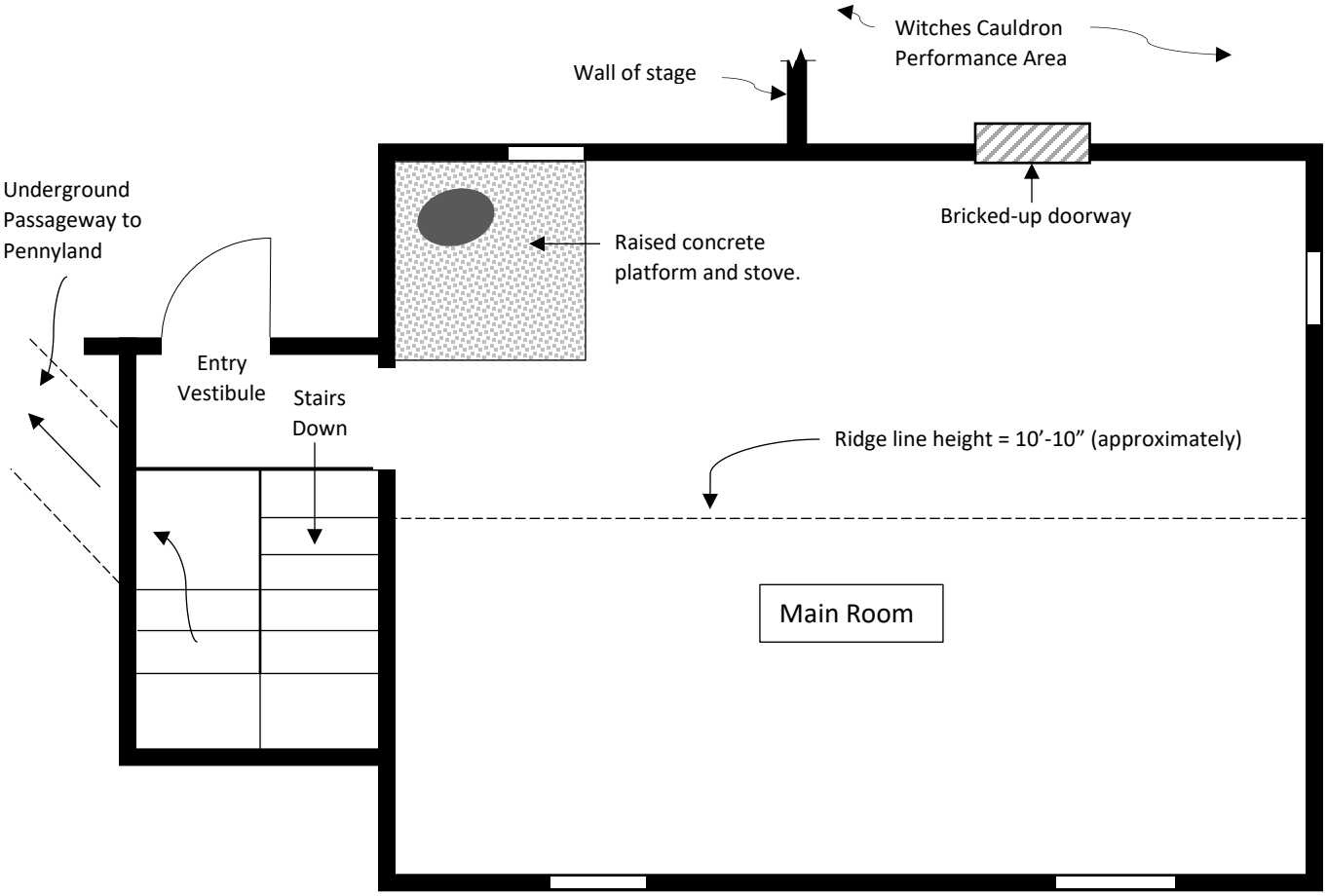
The roof contains no overhang, with the concrete simply changing direction from the walls to create a continuous concrete envelope. A structural ridge beam on the interior was not observed, and the roof planes appear to abut one another at the ridge. On the exterior, there are two frame lines visible pers side, but it is unclear without destructive investigation what they are made of, their purpose, or their condition. The roof, when viewed from the inside exhibits similar technique and workmanship as seen in the walls.

The eight vertical posts supporting the steel beams and the concrete roof are an assortment of unevenly spaced wooden 4 x 4 and adjustable metal post jacks. At ceiling height steel beam of various sizes support the concrete shell roof. Two of the posts and connecting beam have been disguised by a covering with concrete (or plaster) possibly intended to mimic medieval cellar construction. Unfortunately, with so many supports in place, the interior space is greatly compromised, making its usefulness meager. Bases of support posts rest on the stone floor.

To the left of the entry to the room is a raised fireplace area, with a stovepipe exiting through the roof. At one time a doorway existed in the southeast corner of the room, since bricked-up.

The structure of the thin shell concrete roof is clearly visible on the interior however, the roof is severely depressed, indicating a steady loss of structural integrity over time. The weight of the roof exceeds the ability of the internal structure intended to support it. The downward deflection is mirrored when viewed from the exterior, as there are undulating wave-like depressions. It is evident there are several sequential campaigns of introducing supports for the sagging roof, and the under-structuring is evident in other thin-shell concrete structures at Valley of the Moon, most of which were similarly built by Legler during the 1920s and 1930s.

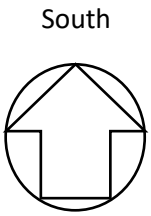
There exist several types of finish on the building, the result of different approaches to original construction, and subsequent treatments and repairs. The most original condition is seen at the back of the building (east side) where repairs are few. Here, the rough-cast concrete is plainly visible, along with the various patterns created from an assortment of shuttering during the stages of pouring concrete. The walls vary in thickness but are approximately 3-1/2 to 5 inches thick. Other treatments include the application of stucco on the southwest exterior. The application of stucco may be tied to attempts to make the wall more “waterproof” as water. The stucco is in poor condition, with signs of surface spider-web like cracking. Such cracking is often the result of a stucco with a higher-than-needed ratio of Portland cement, too much water in the mix, or having been applied in weather that was too hot, causing rapid drying and shrinkage (or a combination of all the above). Portions of the building are painted with either a pale buff color or a dark green.



Plan of Cathedral Room and Entry Vestibule

The interior of the main room measures approximately **17'-6" x 21'-9"** or 380 sq.ft. (it is not square). The location of the eight roof support posts has been removed here for clarity.

Drawing by Simon W. Herbert (Not to scale)



While arguments might be made to preserve the existing conditions because they contain mostly original materials and represent a building changing over time, there are compelling reasons to consider a different approach:

a) As originally conceived, the roof Legler designed was a two-plane unsupported gable roof. Over time the roof lost structural integrity and without supports would certainly have collapsed, severely damaging or destroying most of the exterior walls.
b) There is considerable downward deflection of the roof over the length of the approximately 21'-6" gable roof planes, with an approximately **17 inches sag** of on the north-side plane, and **15 inches of sag** on the south-side plane.
c) Since all support posts and beam/girders were installed after construction, it is clear Legler's original intent was to have an open room unimpeded by vertical supports. This open plan offered a range of use opportunities. With the room now containing eight support posts, it no longer represents the originally intended space, and severely limits use.
d) Roof leaks, and the continued addition of water-proofing materials on the roof only adds more weight to an already compromised structure. Additional weight also impacts the structural integrity of exterior walls through weight re-distribution. Because the roof is integrally tied to the walls, movement of the roof tends to tug at the walls, which may account for some visible inward defection of the eastern gable wall.
e) The original roof will never be made structurally sound, given its inherent weaknesses.
f) Attempts to jack the concrete roof upward into the original position will not be successful and cause damage to walls in the process. Additionally, the concrete roof will still be weak and unable to support itself, requiring an independent support structure.
g) Some of the concrete materials and integral structural systems have "aged out".
h) The raised concrete floor in the area below the stove is cracked and springy when stepped on. This indicates a void below and must be exposed for investigation, analysis, and repair. At this point a decision should be made about restoring the raised section or removing it. **This condition constitutes an immediate hazard for visitors and staff**.
i) Adding more support posts will only further degrade the space, and further reduce its usefulness.
j) <u>The apparent continued movement of the concrete roof should be of concern to the Valley of the Moon staff.</u>

Repair Strategy:

Given the listed observations and concerns, **replacement of the entire thin shell roofing system** is the recommended approach. Doing so will resolve long standing issues with repair and maintenance, and most importantly, return the room's special characteristics to a near-original configuration. The process is fraught with challenges that will stretch the ingenuity of the preservation team. Below are a series of proposed steps for repairing the structural components of the building, subject to approval by architect, structural engineer, and preservation interests:

1) Carefully disassemble the existing thin shell concrete roof down to the walls, along with removal all vertical post and beam supports that supported the roof. It must be noted that due to the monolithic construction, removal of the roof presents tremendous challenges of stability. The walls are thin and already vulnerable to movement. Being nearly 100 years, the structure has developed a "structural memory", which when disturbed is likely to cause flexing and further movement. Therefore, shoring and stabilization of the walls during this very delicate operation will be needed.
2) Design and construct an independent metal framework or structural "cage" inside and against the existing concrete walls, to include metal ridge beam and supplementary supports as needed for a new roof

structure. None of the remaining concrete walls should be “straightened”, so the new frame must conform to the existing walls as much as possible.

3) Install a lightweight roof paneling system to the frame. The underside surfaces of the roof visible from the interior could potentially have formwork patterning as a formed concrete. The exterior roof should be suitable to take a waterproof roof coating system. Examination of the original roof finish during deconstruction will provide additional clues to the original appearance of the roof (and therefore provide a matching finish to aim for).
4) The frame will likely be structurally independent of the walls but tied to them for additional bracing of the walls (**as determined necessary by the structural engineer**).
5) Where the framework engages with the concrete floor of the Cathedral Room, special footings will be necessary. This will also involve below-grade examination of soil and other weight-bearing conditions. Cutting into the floor will therefore be necessary, along with suitable patch repairs.
6) Roof edge detailing, as much as possible, needs to be consistent with the original but adjustments may be necessary for weather-tightness and maintenance.
7) Final appearance should match as closely as possible the originally intended finish on the exterior, but the new internal support framework will read as a modern structural intervention, with no attempt to disguise or hide it. Metal finishes of the frame could be a treated “rust” finish, or paint (color TBD).
8) The exterior roof finish/coating needs to be easily maintainable by volunteer staff or contractors working on a maintenance schedule. A buff or tan-colored roofing coating would be preferred over white, as this blends better to the aged concrete walls.
9) Remove the stove (permanently) and cut into the raised concrete floor to determine conditions.
10) Included in this work are two items: (a) Checking the watertightness and treatment of the structure over the stairway entry, which appears as a lower extension of the main room, and (b) restoring the metal castellated roof sculpture located above the west end gable.
11) Roof drainage is to be included as part of the plan, and to help water evacuate those areas currently contributing to water infiltration around the structure.
12) Remove all stucco to the concrete base material and re-assess.
13) Remove all paint from the structure through either chemical of “soft” abrasive methods such a crushed walnut shells, through an airline under suitable pressure. If performed correctly, this will remove paint and loose debris, but not damage the concrete.
14) The exterior concrete walls are somewhat absorbent to water. They also contain some cracking, typically along “fault lines” where formwork exists, and likely places for water to migrate to the interior. Investigate way to reduce water migration through crack filling using suitable mortars that remain softer and therefore subservient to the strength of the original concrete. Experiments with colors and mixes will be necessary before application is approved.
15) At the base of the wall where erosion is evident, fill voids with a suitable mortar mixture compatible in color and composition to the original concrete. A starting point for experimentation is a 1:3 m ix of Portland Cement and coarse sand (with mica present) with a little lime paste added (Yubeta).
16) To help prevent further erosion, add a small retaining wall with loose fill to just above the level of the damage to protect the repair.
17) Where black mold appears, neutralize with a mixture of bleach and water (or as otherwise recommended). Better roof drainage will help alleviate the growth of mold, but some natural accumulations of lichens is acceptable.
18) The use and application of green paint was discussed in the Enchanted Garden Report (Simon W. Herbert, 2022) and its removal is recommended. This will also have the benefit of making the interiors less dark.
19) Perched precariously on top of the western most portion of the roof gable is a castellated-topped metal structure with an unfinished concrete base. This is thought to have been relocated from nearby on the site

and erected on the ridge. This could be kept in place (post repairs) as it fits well with the whimsical character, and almost reads as a "steeple" – again in character with the intended use of the building. Or it could be removed and relocated elsewhere.

20) Replace the electrical system as part of an overall Cathedral complex electrical upgrade. Include LED lighting for safety and accent lighting.

The Cathedral Room will need the specialized services of both a structural engineer and architect to determine the correct balance of materials and systems. The result will be a structurally sound roof, and a building with a restored open-plan interior space as originally intended, along with greatly increased programming opportunities for future events than currently exists.

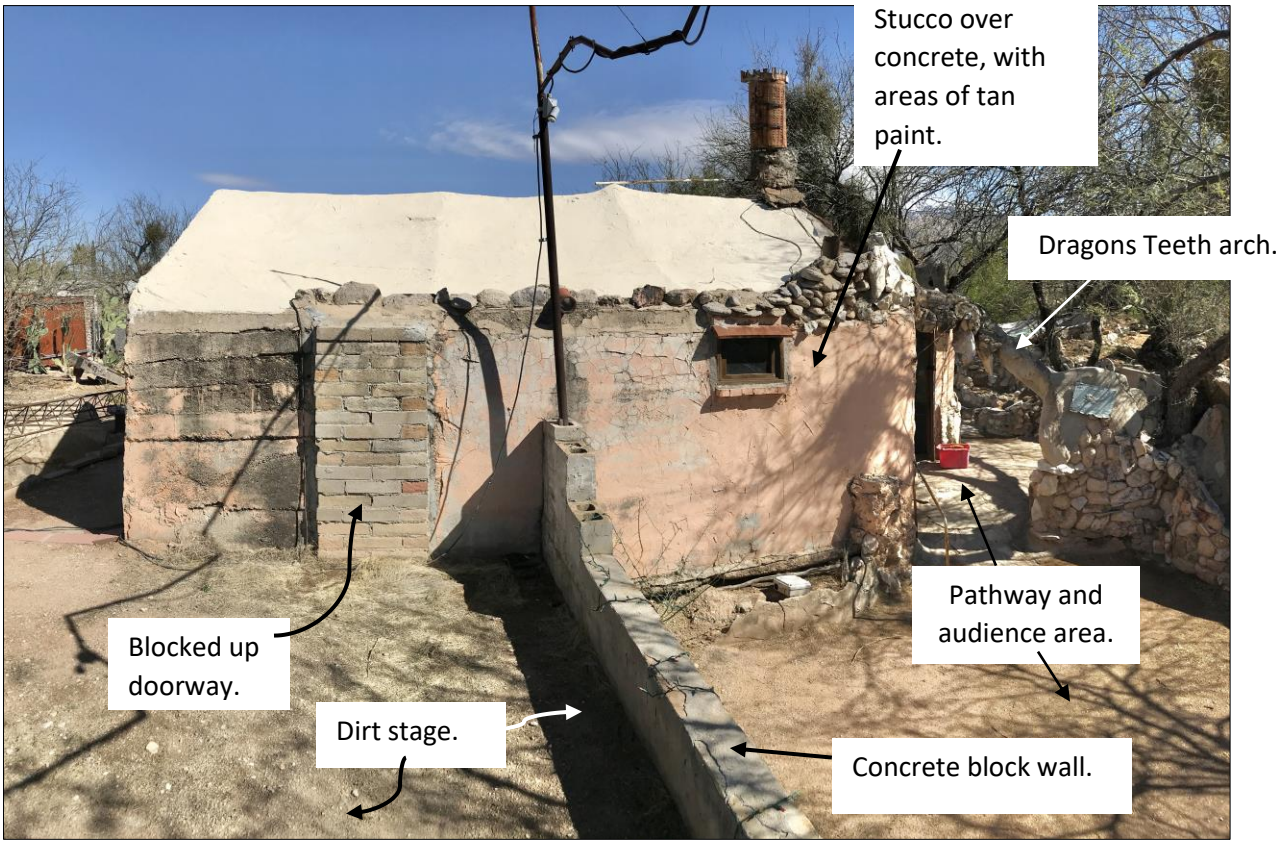
It is predicted that rehabilitation of this structure will represent one of the most technically challenging and costly repairs to the Valley of the Moon site.

Cost Estimate (range): **$ 75,200 – 80,300**

Photographs:

Above: View of Cathedral building looking southwest.

Taken on a rainy day, this photo shows how water drains directly from the roof to and down the walls. Small metal rain-guards over the windows greatly help shed water away from the window frames.



Above: View to the north.
In the foreground is part of the Witches Cauldron raised stage, with the blocked-up doorway at center left.

Left: Panoramic view of north wall.

Above: View of southeast portion of exterior.
The roof drains to a clay pipe which directs water to the top of the concrete wall and onto the foundation. Water flowing into the lower wall may be contributing to a cavity below the floor (to be investigated).

Above: oblique view of southeast corner showing the Dragon's Teeth arch at right. This portion of the exterior concrete wall has been covered with stucco and painted tan color. It would be preferrable if the stucco was removed and the concrete wall repaired.

Left:
View of the "gutter" system on the southeast part of the roof.

The stones arranged at the edge help direct rainwater to the clay pipe drain. It is likely that the addition of stones came after the construction of the Cathedral building, as problems with water infiltration developed.

The placement of stones along the edge are not a visual intrusion on the very organic appearance of the building, and their extended use may be a good way to integrate a better drainage system at the roof edge as part of the rehabilitation work.

The stove and stove pipe should be removed.

One horizontal and one vertical galvanized pipe help secure this to the roof. The horizontal pipe only appears to be resting on the ridge (circled in red).
Underneath are small rocks, metal lath and concrete (incomplete).

Left and Above:
This whimsical structure is known as "**Old Mother Hubbard's House**" and was apparently relocated to the ridge from an adjacent hillside location. It is recommended a choice be made to either move it back (if a suitable location be found) or make it a permanent part of the building. Either way, the structure must first be removed for roof repairs to take place. Without further examination, it was difficult to determine what was preventing this from imminent collapse.

Left: Wall at northwest corner below roof.

The roughness of the concrete shuttering is evident throughout the building. Here, wood left in place from the construction remains.

Walls should be cleaned of paint, and exposed wood where found treated with a wood clear wood preservative.

Above: Exterior northwest corner.
Exposed is part of the galvanized pipe frame that forms the initial shape and structure of the building. Concrete has exfoliated at the corner and will need to be repaired with suitable a patch.

Above: West side wall near gable.
The exposed vertical pipe at center shows more of the pipe framework, with chicken wire reinforcing material exposed.

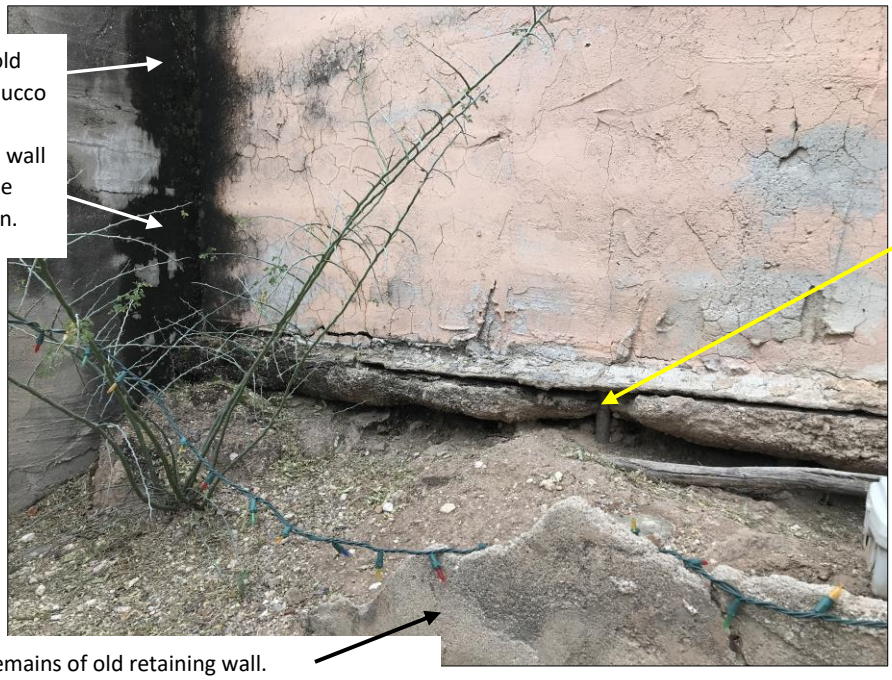
Left: Typical concrete detail.

Where chicken wire is exposed, loose ends should be removed, and the remainder treated with a rust converter.

Where material loss has occurred, a repair patch should be carefully installed to match surrounding historic material.

Above: Examples of wood framed windows.
All the windows appear to be of near recent construction, made from 2x material with newer patched-in mortar securing them into the wall. While they are unpainted, they may have been treated with a wood preservative. An additional application of preservative is recommended, along with servicing them for opening/closing. Where joints are loose, remove the sash and repair.

While the metal caps over the windows are not original, they serve an important function of shedding rainwater away from the windows and the building. They should be retained as they also complement the rustic nature of the building.



Left: Base of exterior wall near southeast corner.

This shows the section of wall with exposed galvanized pipe and either a concrete footing or old floor. The horizontal crack is evidence of settlement, and above this area on the interior is the fireplace with a settling floor.

After examination and repair, the existing low retaining wall in poor condition should be rebuilt.

Install a dry well in the area below the stage to help control drainage. The finish surface will remain smooth.

Left: Interior view looking west (from entry).

The eight supports are made from wood and metal, with custom support girders installed to contour the sagging concrete roof.

The floor is stone. Damp areas from recent rain are circled.

Left:

View east toward the entry door.

There was never an actual “door” in this location.

Inset: a hole at the wall/roof intersection lets light and water in.

A concern of staff has been a separation crack in the floor at the threshold. This should be examined at the same time as the weakened floor below the fireplace.

Above: View of south wall.
The two columns near the wall along with the supporting girder at ceiling height have been covered with chicken wire and concrete or plaster. This was an attempt to "hide" the supports. The other posts and girders are not disguised.

Above: View of north wall. The sag of the roof on this side is more severe, with a downward deflection of approximately 17 inches within a length of 21 ft. – 6 inches.

The interior space is severely compromised due to the profusion of supporting posts.

Left: Stove on raised concrete platform.

Post and beam structure is hidden by chicken wire and concrete or plaster. Cracking at both the roof and concrete and stone base indicate continuing movement.

The area behind the stove is cracked and springy underfoot, indicating a void.

Based on other examples at valley of the Moon, Legler may have built a small cave under this spot, but only further examination will yield the answer.

The modernistic stove and pipe should be permanently removed. If the platform serves no purpose, it could be removed, and the floor leveled to create additional useable interior space.

Left:
South wall showing the bricked-up entry.

Enclosed after the interior was painted a dark green (paint removal to bare concrete recommended), the 32-inch wide x 6 ft-6-inch high opening exits to the Witches Cauldron performance area.

By restoring this entry and installing a door, both the interior and exterior spaces benefit from much increased use opportunities.

2. Entry Vestibule, Stairs, and Underground Passageway.

Condition:
Evidence points to the entry vestibule being constructed at the same time as the main room, as the irregular-shaped entry from the vestibule never had a door. It is highly probable that the vestibule is lending structural support to the main structure.

The construction of the vestibule employs the same thin shell concrete construction used in the main structure, with walls indented from the main building's west end gable. The walls and roof are highly irregular, with a variety of formwork used to pour the concrete, including corrugated metal sheeting. The "roof" is also highly irregular in shape and like the main structure as the walls merge into the roof without an overhang. The exterior is decorated with small nooks for displaying artifacts and has stonework placed on the lower portions.

The visitor steps onto a narrow landing in a two-story space. Stairs descend to the left to the left of a metal pipe guard railing to the passageway below. The difference in height from top of landing to the dirt floor below is approximately 6 ft – 1-inch (i.e., head clearance). The interior space has been also painted a dark green. Evidence of the thin shell construction is particularly noticeable here, with exposed chicken wire in several areas. Water has been entering the system for many years, and there has been a suspected shifting of sections of concrete. Where the only lighting fixture is hung in the vestibule, the electrical cable enters through a hole in the roof through which water also enters. It was difficult to determine the structural stability of the thin shell concrete roof, however a more detailed examination by a structural engineer is recommended following removal of all paint.

Electrical service is antiquated. None of the light switches appeared to work fixtures, however some lights were observed to be operating during an initial visit. Extension cords are routed in a variety of places to supply power for both lights and plug-in power needs. Some electrical circuits had exposed wires, but these were not tested.

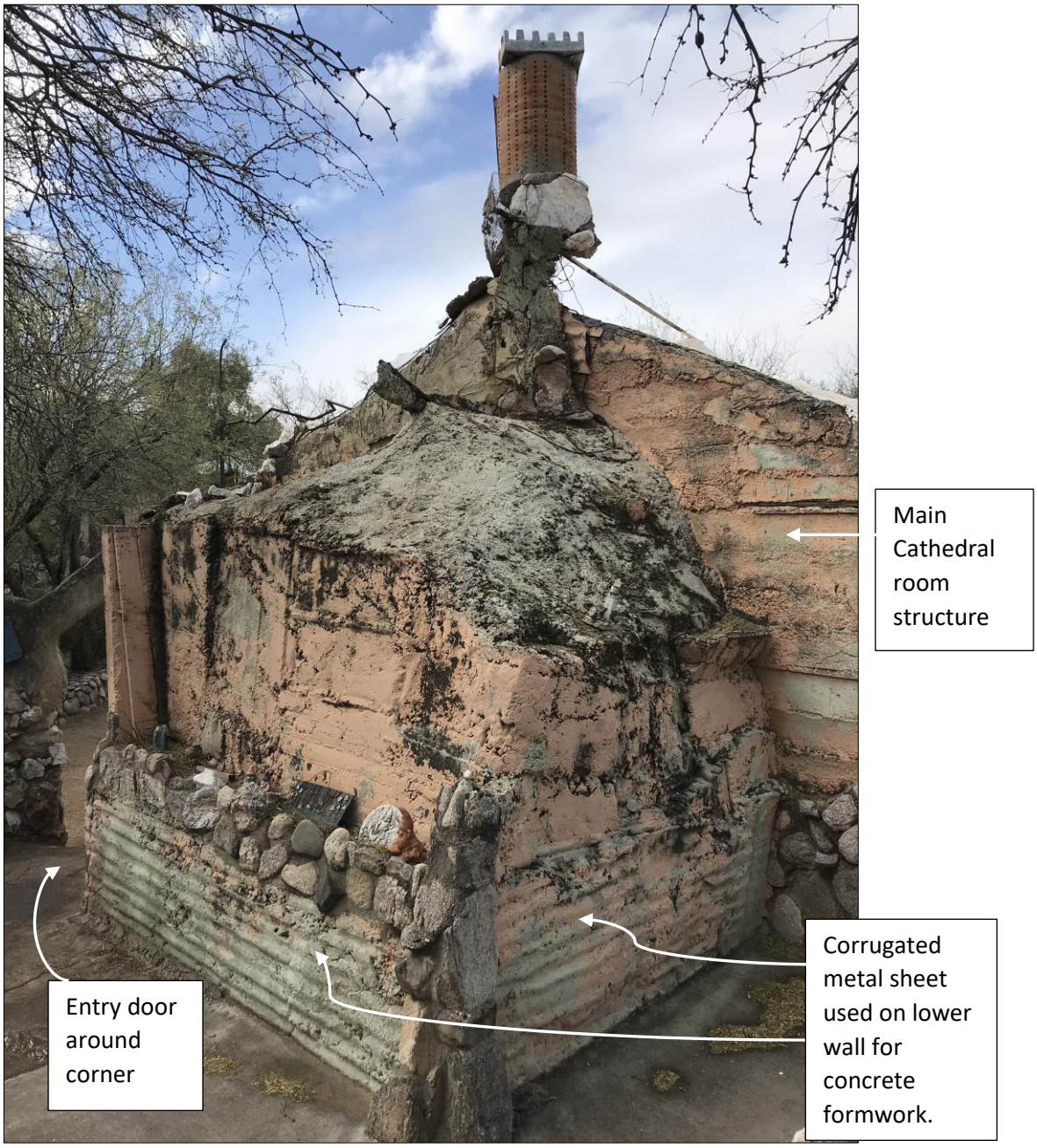
The wooden entry door is a simple "Z" bar design in a wooden frame.
Sometime in the past, the concrete was painted with both a tan and green paint.

Repair Strategy:

- Investigate the structural integrity of the thin shell concrete roof and reinforce as required while maintaining the essential character of the construction both inside and out.
- Investigate the use of a waterproofing agent or membrane on the roof surfaces to deter water infiltration. Again, maintaining the character of the concrete material is recommended.
- Remove all paint form the structure (interior and exterior) using a gentle abrasive method such as crushed walnut shells and an air gun.
- Replace the electrical system as part of the Cathedral complex upgrading. Include LED lighting for safety and accent lighting.
- Repair the entry door in the vestibule for proper closure.
- Clean out the area below the stairs, to include the small nook. Remove debris and repair damaged or missing mortar around the passageway and ceiling areas.
- Install a new wooden "rustic" door and frame at the passageway entry to Pennyland.
- Adjust the metal security gate leading to Pennyland to ensure its correct closure and install a padlock.

Estimated Costs (Range): **$ 5,250**

Photographs:



Above: Entry Vestibule, view of northwest corner.

During any repairs, it will be important to maintain the strong textural character of the building, including the entry vestibule.

Above: View of the entry door from under the Dragon's Teeth arch. The handrail assists those need help to traverse the steep slope.

Above: View of the door in the "open" position.

There is a small landing just inside the door with the steps descending down, and an opening into the main room at left.

Left: View looking down the stairway.

The variated shuttering technique will be enhanced with the removal of the green paint.

Each step is different in size and height, requiring the user to pay attention. While some might see this as a safety hazard, this aspect of many built features at Valley of the Moon is one of its chief attractions, allowing the visitor a sense of adventure and experiences outside of "normal" everyday life.

Above: View of the stairway with entry door at right.

The decorative metal pipe handrail provides an adequate barrier in most situations and should be retained. The cast concrete support on the second step is not original but is necessary for stability.

Above: Detail of delamination of paint from the concrete surface in the vestibule ceiling.

The exfoliation seen here is evidence of water entering the concrete roof structure and migrating to the inside. Internal pressure pushes against the less-porous paint causing loss of both paint and concrete. Removal paint will help the system breathe, and greatly improve the appearance of the space.

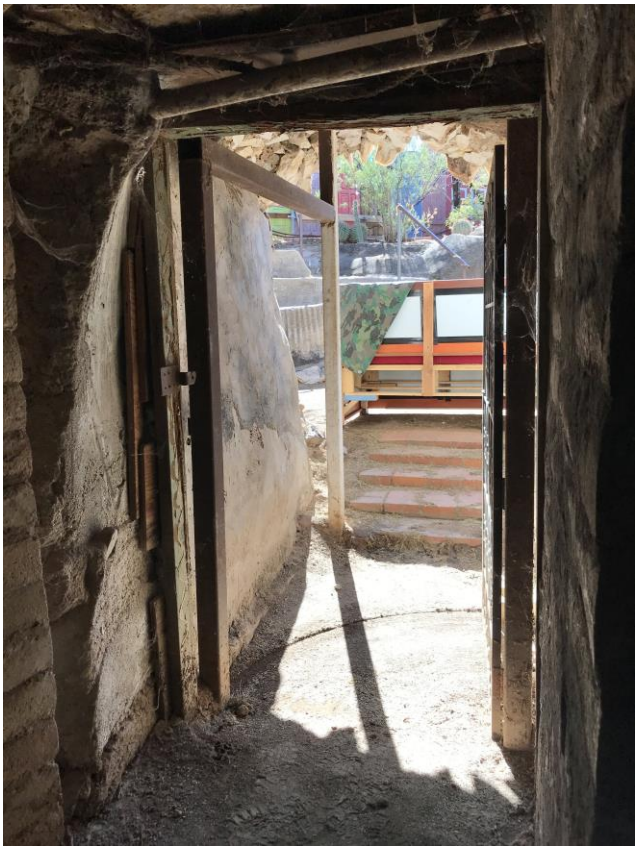
Some surface repair is likely, but only removal of the paint will allow for a full inspection.

Left: View looking over the stairwell to the wall and ceiling curvatures.

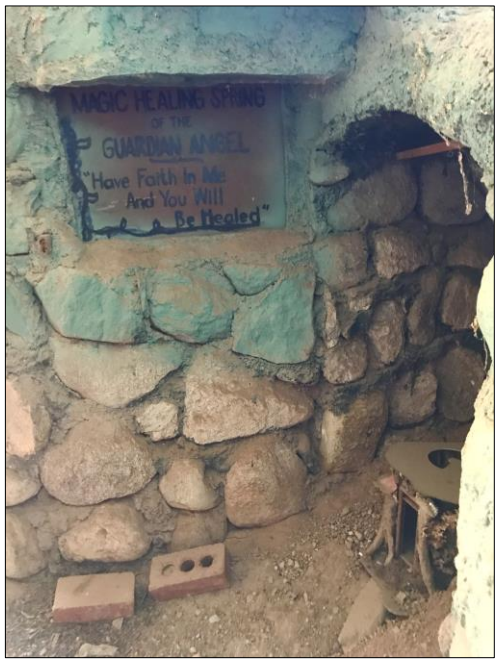
A portion of the sloped ceiling concrete work appears to have shifted over time. This will need further examination to determine if this is connected to a structural problem.

The lighting fixture illuminates the interior vestibule. The electrical supply cable runs through a hole in the concrete ceiling which also allows water through. The fixture should be replaced with a properly wired fixture of more suitable design.

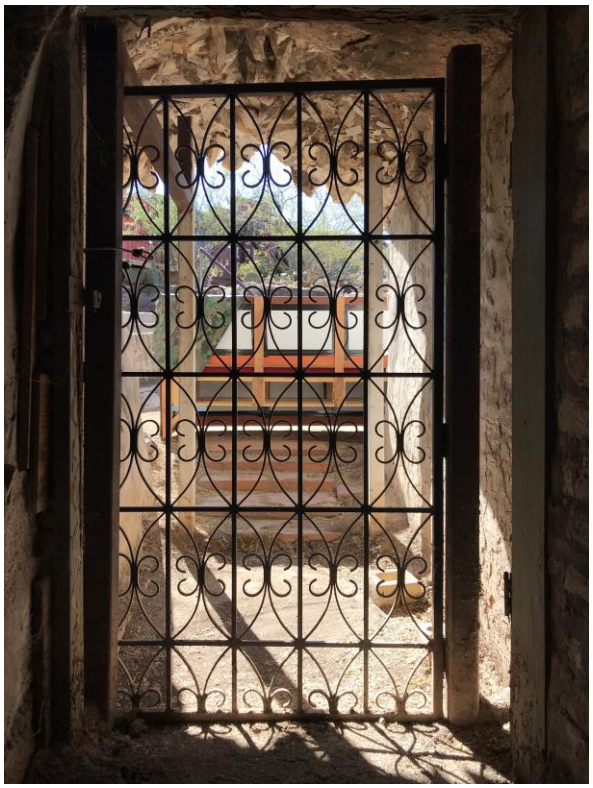
Above: View of the steps from the bottom.
Under the stairs is a small nook labelled the "Magic Healing Spring of the Guardian Angel", but no water flows here.



Above: View looking out southwest to the Pennyland performance area.
A door once stood here, but only the rotting wood door frame remains.



Above and below:
Two views of the nook under the stairs.
The area needs to be cleaned out and a small accent light installed.



Left: View from inside the passageway with the security gate closed.

The metal framework is independent of the stone and concrete passageway. The gate does not properly close and will need adjustment.

All metalwork should be sanded, primed and re-painted.

Above: View toward the stairway showing the ceiling at the old door frame.
Some re-mortaring of the stones is recommended. The wooden frame is rotten and should be replaced with a frame of treated lumber, including a new sill/threshold. A new rustic wooden door needs to be installed that will prevent entry of animals and rodents. This will help make the building more secure and sanitary, and cut down on cleaning and maintenance.

4: Proposed re-opening of the southeast side entry door

Condition:
Although it is unclear if this doorway was original to construction, it was roughly bricked-up in the past for reasons unknown. The burnt adobe bricks appear to match those used in the nearby entry passage to the Enchanted Garden, so it is possible the work dates to a similar time frame (thought to be the 1970s or 1980s).

Repair Strategy:
It is recommended this doorway be restored by removing the adobe brick and installing a frame and door. Doing so carries several potential benefits for programming events at Valley of the Moon:

a. With the removal of post structures and the opening-up of the floorplan inside the Cathedral Room, more flexibility of use will occur, especially for small weddings and gatherings. Having another entrance provides the opportunity for greater flexibility of ceremonial movement, including surprise entrances.
b. With the proposed upgrading of the adjacent Witches Cauldron performance stage, having a doorway to the interior space will allow performers to use the Cathedral Room for preparation and changing for performances. Conversely, performances being held inside the room can utilize the doorway for stage entrances.
c. Events such as wedding receptions can have a more free-flowing indoor/outdoor circulation pattern.
d. The replacement door should match other doors on the building in material and workmanship. It should also be capable of excluding water especially at the threshold, and prevent the intrusion of rodents, etc.

Cost Estimate: **$ 5,350**

Photographs:

Left: View of south façade with the bricked-up doorway (circled).

The door is conveniently located next to the Witches Cauldron performance stage area.

The pathway at the rear (left of the building as seen here), will provide increased ADA accessibility to both the stage and the area below the stage for viewing performances.

Proposed route of new pathway indicated.

5. Witches Cauldron Performance Area:

Originally this structure was built during the 1970s and thought to have been an attempt by volunteers to build a more permanent home for George Legler, who at the time was living in the rooms of the Enchanted Garden complex (Jenni Sunshine, conversation February 2022). The building was never completed, but the unfinished structure has existed for many years as the "Witches Cauldron", a raised performance area with limited audience seating on the lower west side.

The structure measures approximately 18'-0" wide by 24'- 4" deep (east to west), with the difference in elevation between stage and pathway being approximately 36 inches, not counting a 15-inch-high lip at the front of the stage and upper crenelated portions of the walls. On the south wall, a set of rough steps lead down to the path. The stage has a simple lighting rig setup over the stage, utilizing metal posts and a welded tube lighting girder.

The circulation path and audience area below the Witches Cauldron stage continues up a gentle slope toward the nearby Enchanted Garden complex.

Condition:
Constructed of stucco-covered 8-inch concrete blocks, the structure appears to be in good condition, apart from a vertical crack near the center of the stage wall. The surface of the stage is dirt, and the castellated corners rise to about 36 inches from stage height. The front of the stage contains a 15-inch-high lip of 8-inch block, which prevents closer audience interaction from actors and performers, which in turn prevents an audience from fully seeing those on stage. The combined drop in height from the lowest portion of the wall to the ground (pathway below the stage) is 47 inches.

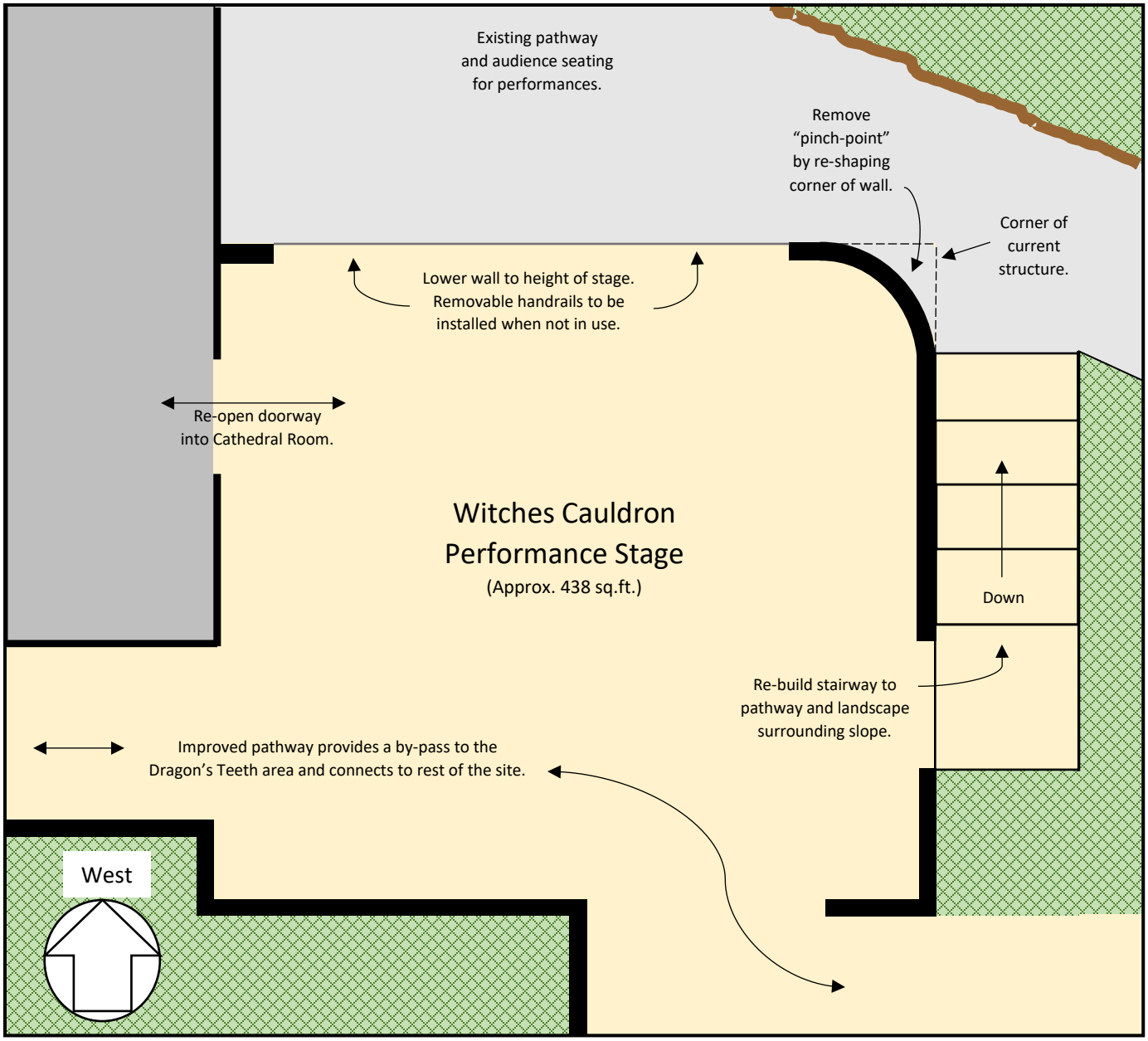
Although the structure was built after the main construction period (1970s or 80s), it does have a useful function, and with some slight modifications, would greatly enhance the useability and accessibility for both performers and visitors. It is possible the structure lends some structural support to the adjoining older Cathedral building.

As mentioned above, re-opening the doorway leading into the Cathedral Room will allow increased use opportunities for both spaces, and remove a somewhat inappropriate closure in the wall.

Repair and Modification Strategy:

- Remove enough of the raised concrete block wall (the raised "lip" to create a more stage-like performance area. Consultation should include the architect/structural engineer and performance and staff to determine the optimal width needed. Fill open block to prevent water intrusion, or cap with 2" solid block.
- Create a proper edge for the stage, likely to be a concrete cap extending to the drop-off, but which is level with the existing surface of the stage.
- Install a removable railing that can be removed at performance time for maximum viewing and reinstalled after the performance for public safety.
- Re-shape the southeast corner of the wall to remove the current "pinch-point" at the corner and curve the corner of the wall (see plan diagram next page).
- Re-surface the stage area with decomposed granite (or similar) to make this entire area accessible, also connecting this to the proposed circulation pathway with a new breach in the east block wall.
- Re-use or replace the light pylon system with a new arrangement, designed to fit the revived performance space more appropriately.
- Re-build the steps along the side of the south end stage which lead up/down to the lower path. Doing so makes traversing this height-adjustment safer, thereby increasing performance opportunities, and less of a scramble between the two areas for performers and visitors alike.

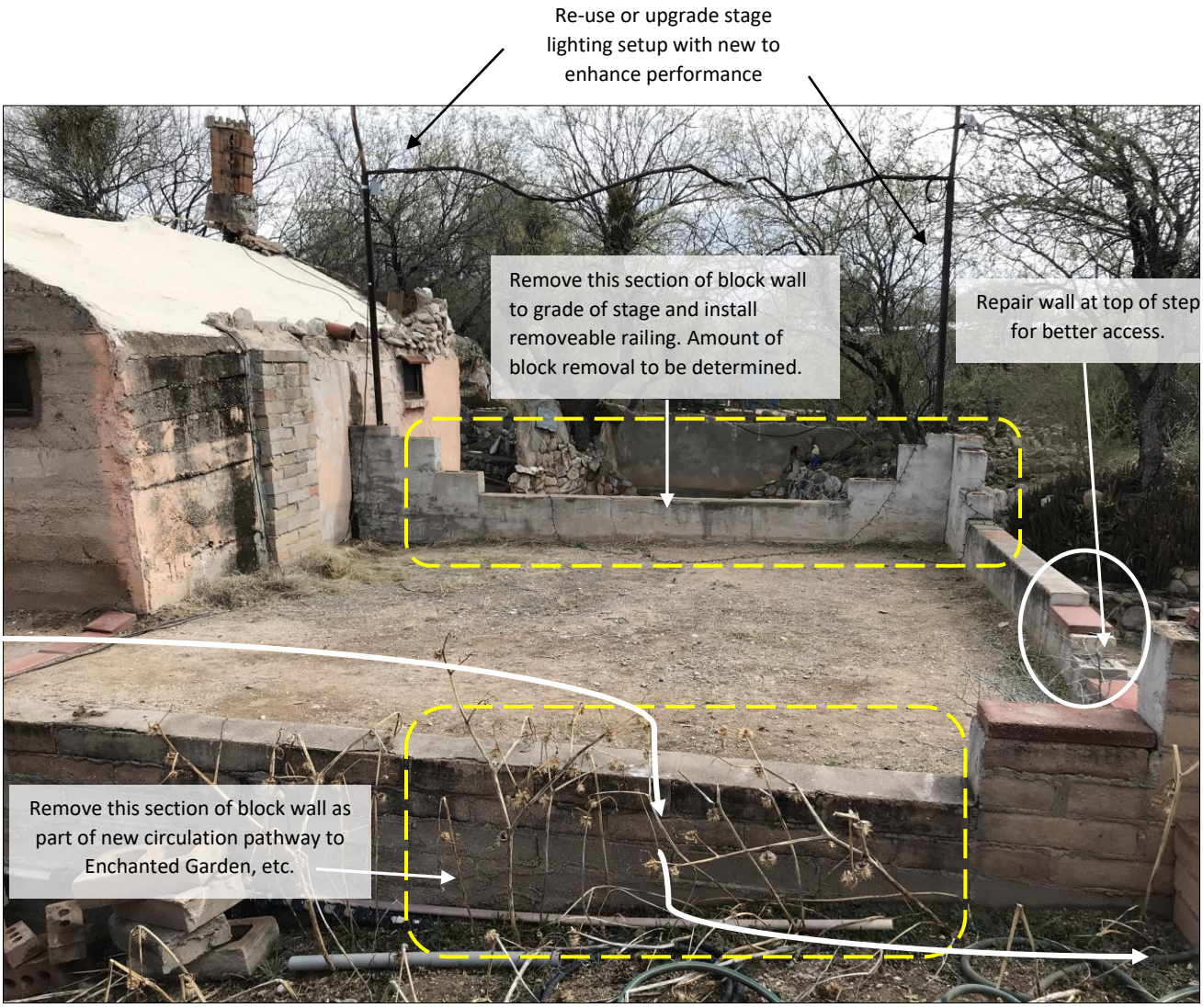
Cost Estimate: **$12,200**



Above: **Concept Plan** of the revised Witches Cauldron performance area (not to scale).
Drawing by Simon Herbert

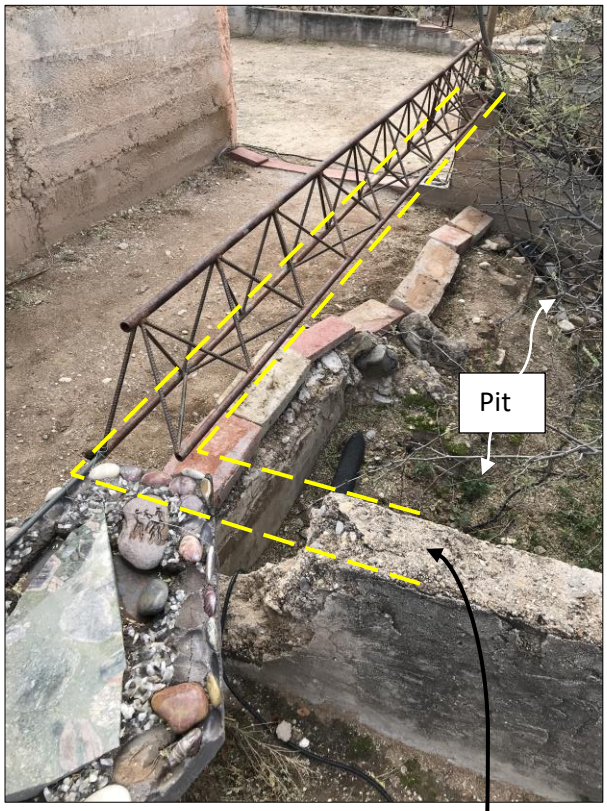
The plan makes good use of existing features and greatly expands the use-potential of the area. Combined with carefully integrated accessibility paths and landscaping, this will be a much more attractive area for the public and performers.

Photographs:



Above: View of the Witches Cauldron performance stage looking from back to front of the stage (east to west).

Shown are some of the changes being proposed for this important area that will make the space much more useable, and better connected to other areas of Valley of the Moon.



Above: View south showing existing pathway between the east wall of the Cathedral building and the unused pit (at right).

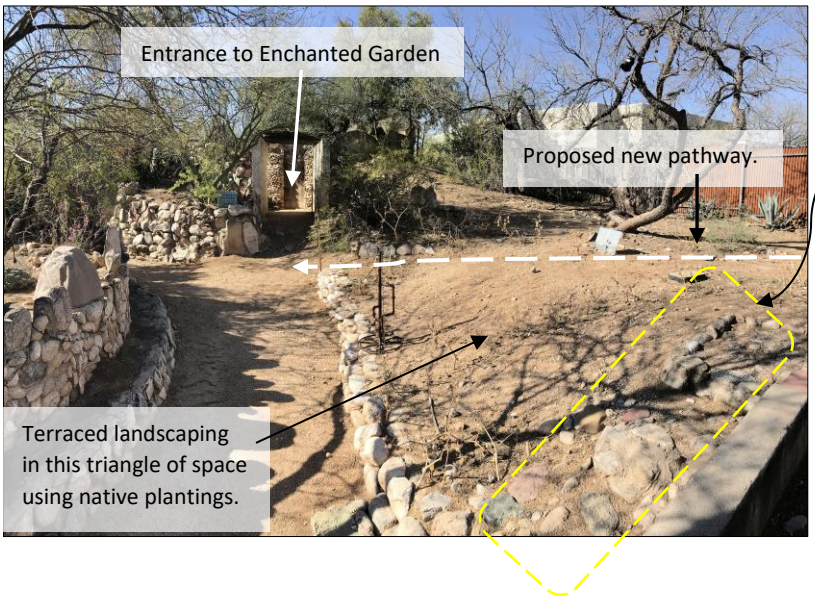
This pathway will form part of the proposed new ADA pathway to the Enchanted Garden (dotted white line).

Above: Detail of the pathway.
The existing concrete wall should be repaired in formed concrete and extended to the south, replacing the deteriorated brick edging. Approximate location of top of new wall shown as yellow lines. The metal girder was placed there to prevent people from falling into the open pit at right, which needs to be cleaned-out and properly landscaped.

Left: View looking down on the stone steps aside the stage.

These need to be rebuilt and integrated into a re-contoured landscape which also integrates with the new pathway. Additionally, the access through the block wall at left needs to be repaired and properly integrated with the stage area (circled in yellow dotted line).

Above: View to northeast of the Witches Cauldron performance area and Cathedral building.



Left: View to the southwest from the edge of the stage wall by the steps (circled in yellow dotted line).

A new, more accessible pathway connects from stage level to the Enchanted Garden, the audience area below the stage, and to other areas of the Valley of the Moon. Some adjustments in pathway heights will be necessary.

6. Dragon's Teeth Archway:

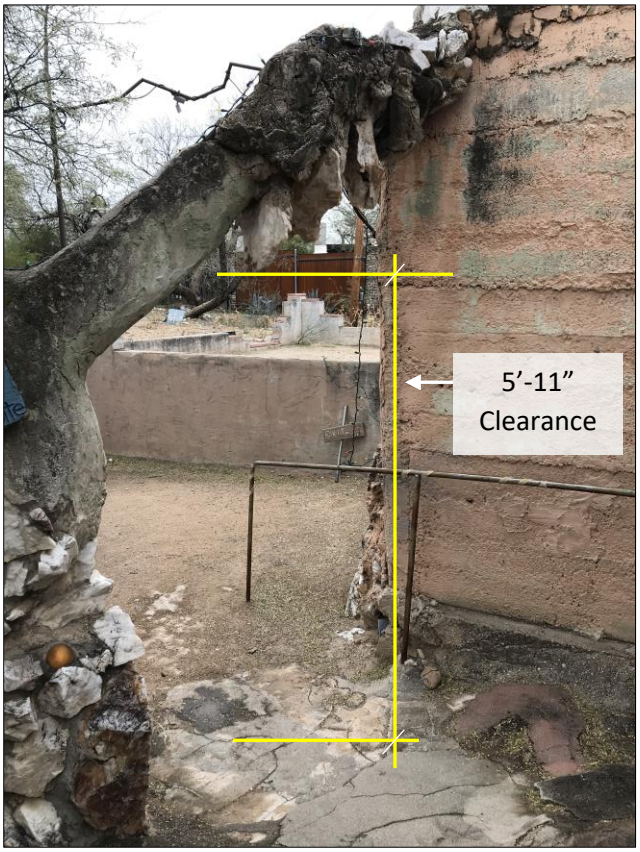
Condition:
This feature has a clearance of just 5'-11", making it potentially hazardous for tall individuals, especially at night. The potential for injury from this feature is a concern, as the jagged rocks hang down to head-height. While no injuries from this hazard are known, it is recommended this feature be reconstructed at a safer height. This was also the recommendation of the 2008 report by the architectural firm of Burns Wald-Hopkins Schambach (p. 29) which states:

"The Dragon's Teeth will require additional investigation to ascertain the original materials used and requirements for supplemental support. We recommend that it be taken down and then reconstructed, and somewhat higher to provide better clearance."

The western arch abutment is adjacent to a mesquite tree, and some reinforcing of footings will almost certainly be required. A structural engineer's services may be required to ensure a sound reconstruction. Paramount in the reconstruction is the need to retain the "teeth"-like appearance so that at least visually, it retains a somewhat forbidding and scary appearance. The addition of lighting onto the arch at night will also enhance the experience.

Cost Estimate: **$9,900**

Photographs:



Above: Dragon's Teeth arch view to southeast.

The minimum measured head clearance under the arch was 5'-11", making the arch too low for safe passage of taller persons.

Above: Dragon's Teeth arch view to northwest.

It should be noted that the slope of the pathway through the arch is steep and does not meet ADA requirements. Changing the slope by lowering the grade is not possible as below the concrete lies the passageway to Pennyland performance area. See the section on accessibility improvements (p.38).

7. Pennyland Performance Area

Description:
The amphitheater-like space is surrounded by sloped walls of concrete and stone, with bench seating surrounding the central performance area. Native vegetation grows all around areas, and access is from three directions: (1) a pathway sloping down from the south and the Rabbit Hole entry of the Enchanted Garden, (2) the underground passageway from the Cathedral Room building, and (3) a set of steps leading from behind the Wizard's Tower. The bench seating can accommodate approximately 30-50 persons, depending on their size.

Existing Conditions:

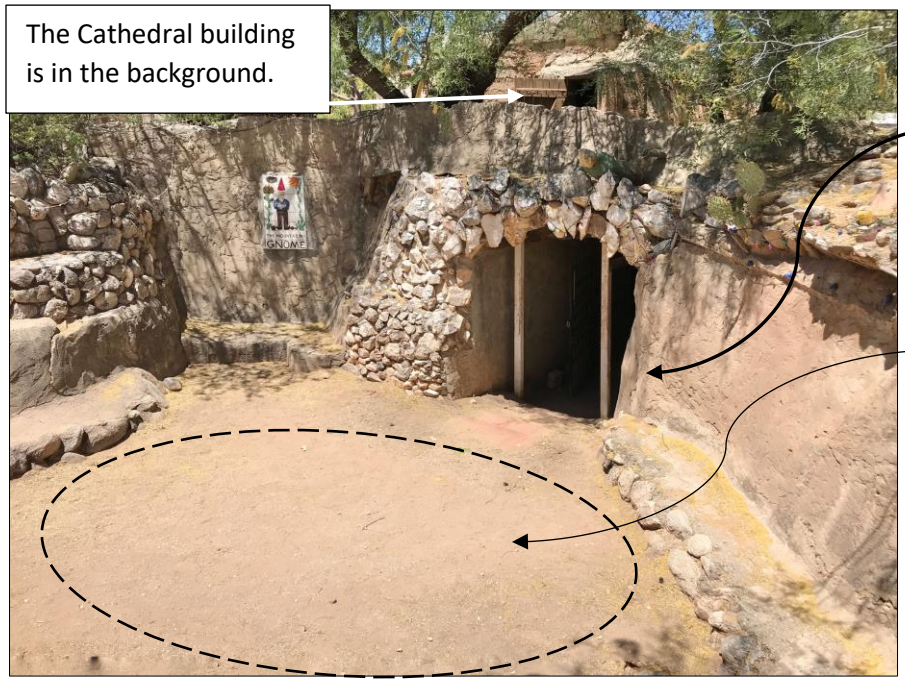
- There is some minor deterioration of concrete around the seating area.
- Occasional flooding of the lower flat performance area.
- There is an unoriginal gnome tile piece on the wall to the left of the underground passageway.

Repair Strategies:

- Remove any loose sections of concrete around seating areas and reattach or replace with matching material. Grind cracks and fill voids with matching grout.
- Install dry well in center of performance area. Finished surface to be as close to existing as possible.
- Remove gnome tile piece and repair wall below to match surrounding.

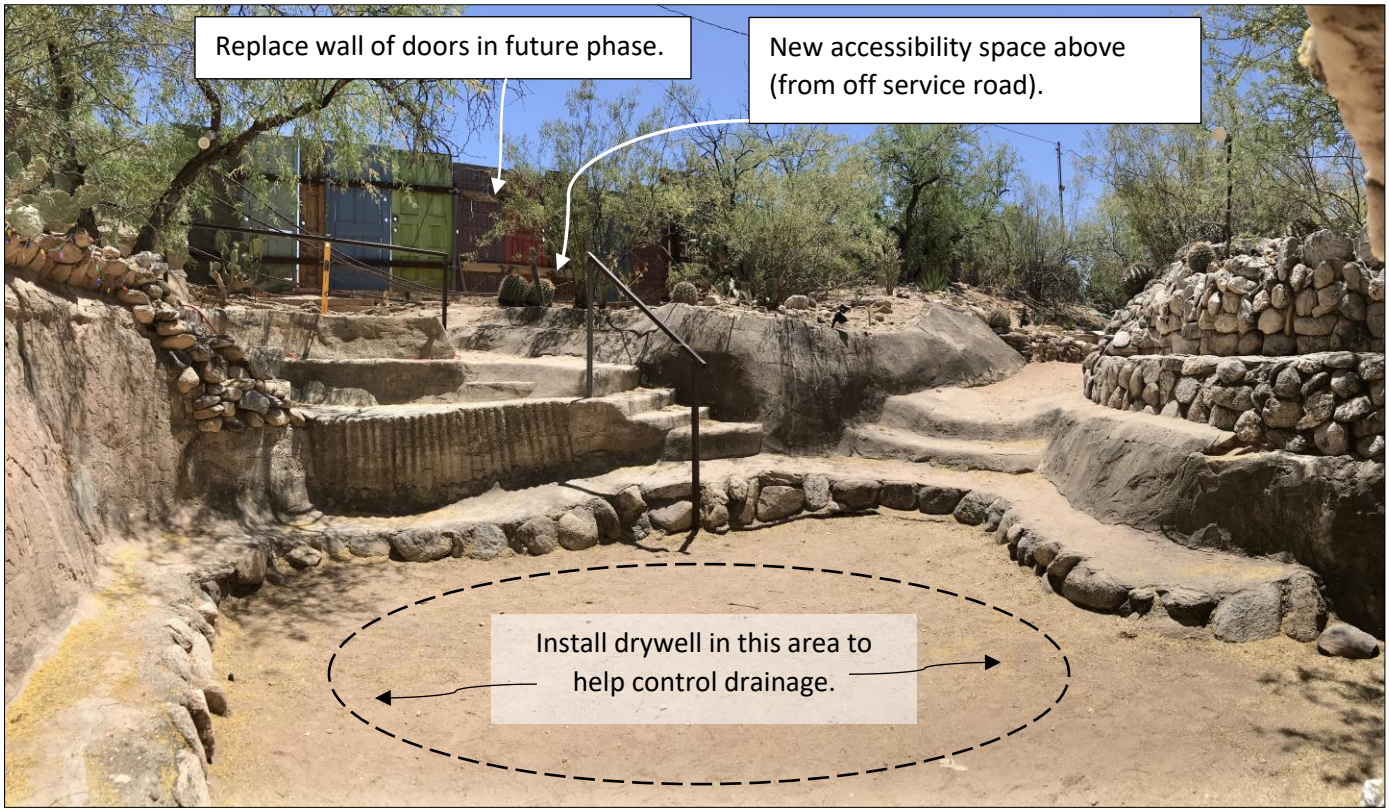
Estimated Cost: **$ 9,900**

Photographs:



Left: View of the exit from the passageway into the Pennyland performance area.

Due to ground slope, water collecting here tends to run into the passageway. Installing a dry-well in the center of the space will help drain excess water. Top cover to remain the decomposed granite or similar.



Above: View of the Pennyland amphitheater with the organic seating and steps (from passageway exit).

Some repair work to the concrete seating area will be needed, with material replacement or consolidation where cracking has occurred.

The line of painted old doors is intended to shield views beyond the amphitheater, but a more suitable long-term solution is recommended, especially with the proposed accessibility improvements. The use of masonry walls and combined with native vegetation is recommended for a proposed future project.

Left: Tilework art piece to left of exit from passageway.

While well-intentioned, this art piece is not original to the space and is distracting. Its removal is recommended and the wall behind restored to blend with surrounding finishes.

8. Ponds and Waterfall Feature:

Conditions:

There are two interconnected ponds, and a circulating pump supplies water to a waterfall that enters the southern pond. One of these ponds has lower walls than its neighbor to the south, the result of a partial demolition to carry out repairs using a piece of heavy equipment. The full height of the pond wall was never rebuilt, leaving the interconnected pond water level only as high as the north pond.

The pond has been partially painted with an aqua-green/blue paint – an attempt to unify and possibly waterproof the pond's interior. The effect is perhaps more appropriate to a swimming pool that a pond, and a different surface treatment is recommended. According to staff, the pond leaks. There were several small fish in the ponds, which also contained an amount of plant debris and algae growth.

Repair Strategy:

Part of the pond rehabilitation is to install a new water-proofing barrier of a suitable color. Discussions between Valley of the Moon staff and a pond expert is also recommended to determine what pond vegetation (if any) is desirable. There is certainly good potential in upgrading the aesthetic quality of the pond for the visitor's enjoyment. An outside pond consultant may be needed.

Cost Estimate: **$ 12,100**

Photographs:

Left: The waterfall feature.

The placing and setting of more rocks around the spillway would enhance the feature while also hiding some of the waterlines and mechanicals.

The color of the paint is distracting and should be changed (color TBD).

Above: The second pond (in background) has a lower wall, the result of construction activity. The wall heights should match each other.

<u>Below:</u> The pond and waterfall need to be re-lined (made waterproof) with a suitable color to promote fish and associated vegetation. The ponds are difficult to keep clean from unwanted debris.

9. Electrical:

Conditions:

The complex appears to have been constructed without an electrical system, that was installed later. Now antiquated, it is clear a dedicated electrical system is long overdue.

Repair Strategy:

Integrate a new electrical system as part of the repair work to minimize the intrusion of supply conduit, etc. Some runs might be run inside the roofing system, and a discreet location for the breaker found. Lighting should have the ability to showcase the unique spaces on the exterior and interior, making this a major focal point of the Valley of the Moon complex.

Cost Estimate: **$ 18,300**

Photographs:

Above: Examples of existing electrical work.

Wiring runs are a maze of cabling to support switches, lights, and extension cords, some which are defunct or cut-off to expose bare wires. This detracts from the visitor experience.

10. Strategy for Improving Accessibility and Public Engagement:

Conditions:

In the Valley of the Moon Assessment Report by Burns Wald-Hopkins Shambach Architects (2008), Section Four provides valuable insights to making some improvements to enhance accessibility (insert at right).

As stated in their assessment, ***Valley of the Moon is exempt from ADA compliance*** in its current condition (item No.1). Nevertheless, BWS recognized that providing certain accessibility improvements would greatly enhance the range of those with disabilities to traverse the site.

ACCESSIBILITY ASSESSMENT

1. The Valley of the Moon is an existing facility, built before 1992 when the ADA requirements became effective, and is listed on the State of Arizona Register of Historic Places. It is exempt from ADA compliance in its current condition.

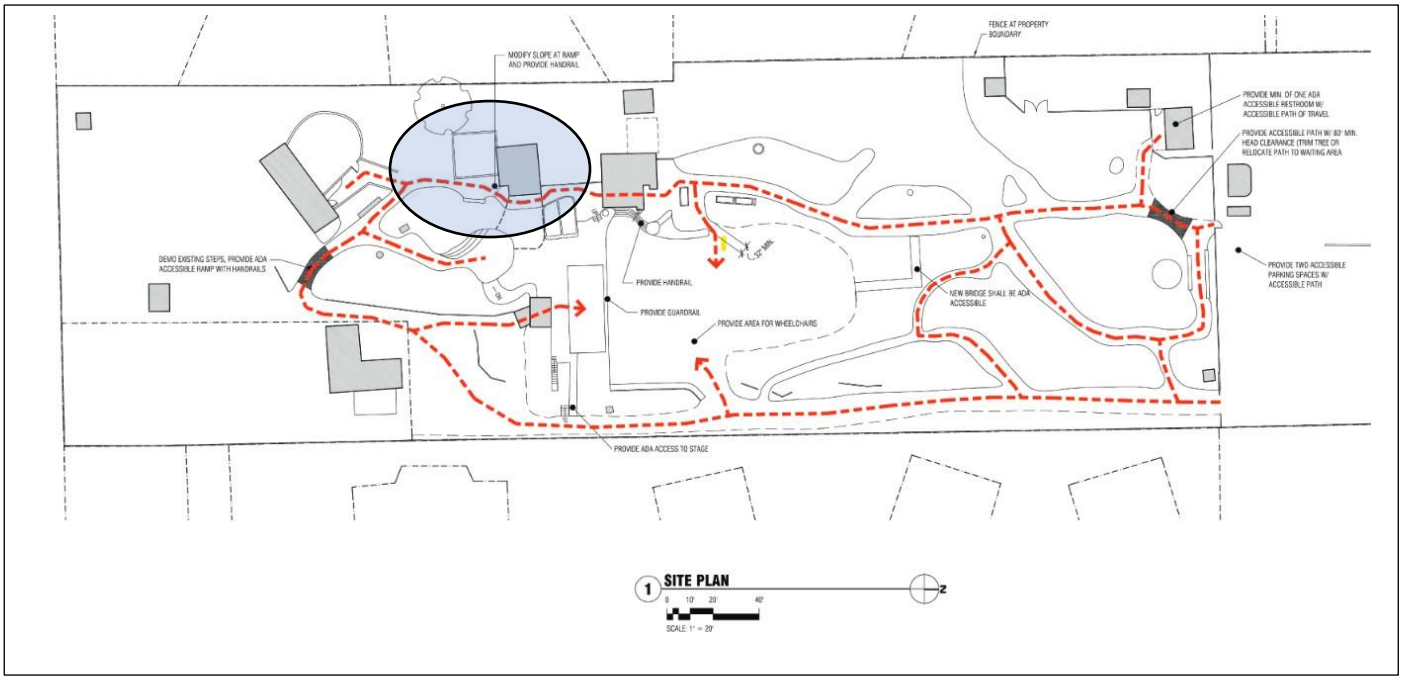
2. When alterations to a property are made, 20% of the costs of those alterations shall be dedicated to improving the accessibility of the property in accordance with ADA requirements.

3. All alterations that could affect the usability of the facility must be made in an accessible manner to the greatest extent feasible.

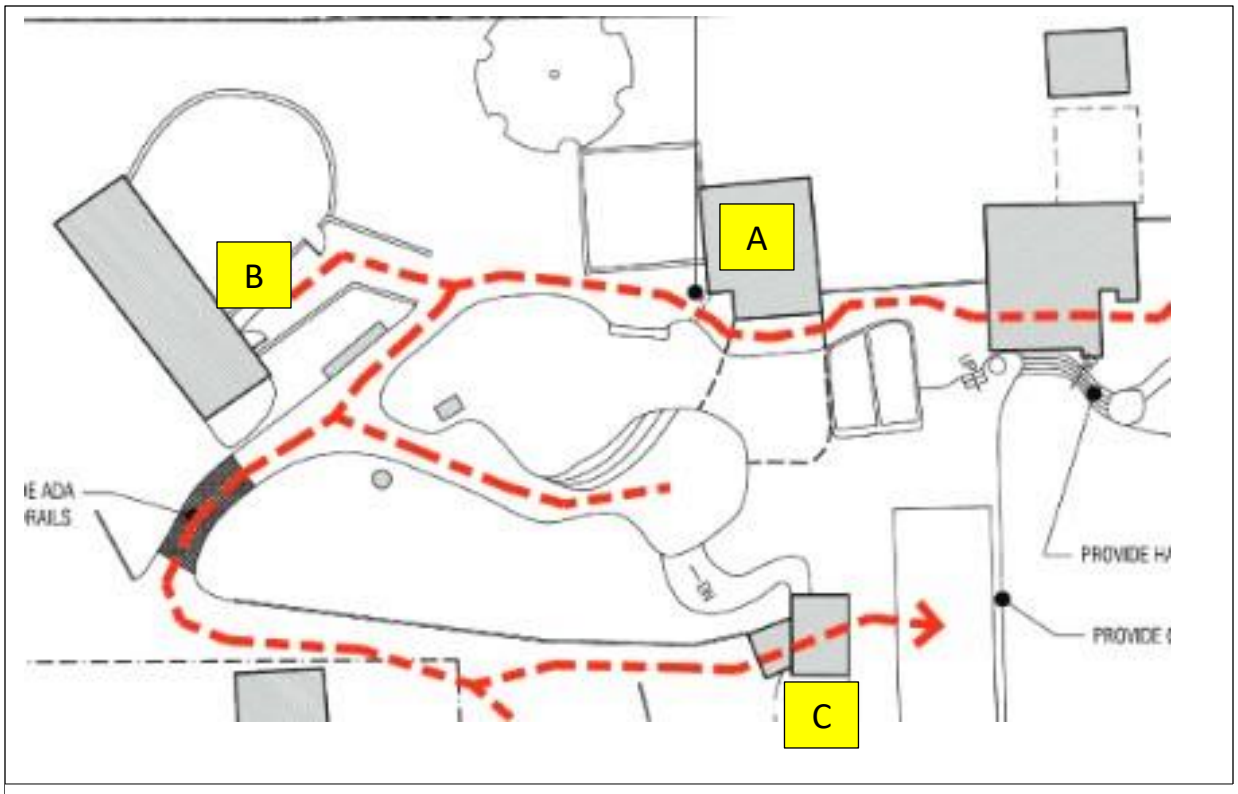
4. The regulations do not require any actions that would threaten or destroy the historic significance of the property.

Recommendations:
The facility will be enhanced in its use and appeal to the public by improvement of general site accessibility. This includes provision of dedicated handicap parking spaces, an ADA-compliant restroom, and particularly an accessible route through the park.

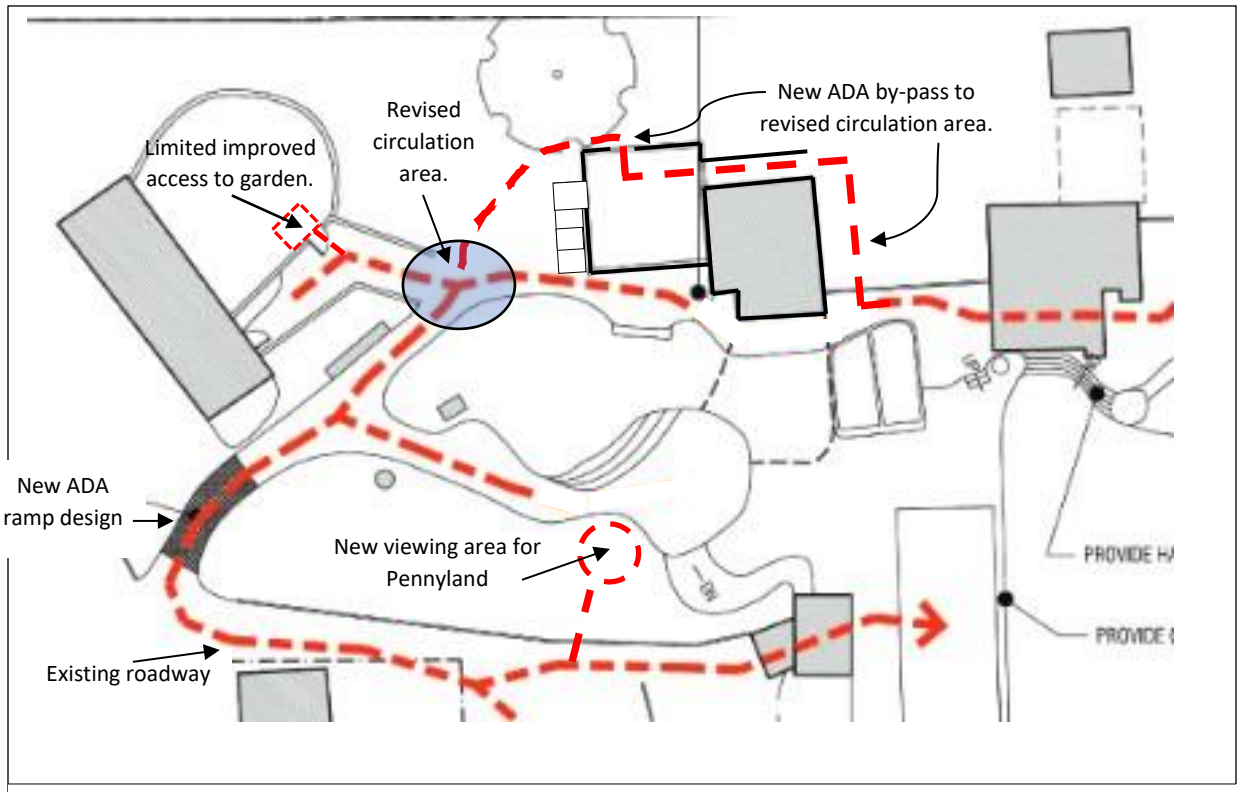
See the attached Accessibility Site Plan showing proposed parking locations and proposed accessible routes. Several recommended minor modifications to accommodate the accessible routes are noted.



Above: BWS Architects accessibility pathways plan is shown in red dotted line. The Cathedral complex has been circled in this report to show its relationship to the entire site.



Above: Enlargement of BWS recommended improved accessibility plan showing: Cathedral complex (A), Enchanted Garden Complex (B), and the Wizard's Tower (C).



Above: Same plan as above but showing recommended enhanced accessibility **by-pass** around the Cathedral building, thereby avoiding the steep slope under the Dragon's Teeth arch.

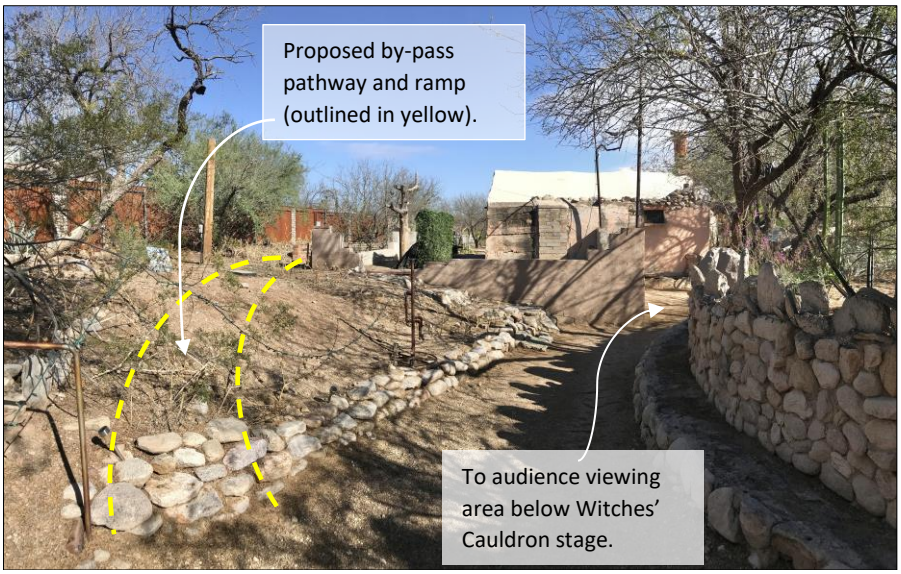
Strategy for Improving Accessibility and Public Engagement:

The overall recommended approach is to use as many existing features as possible to enhance what is currently only a partial system of limited accessible pathways. By making selective changes there will be minimal impact to original or existing features, and a very high return in benefits to accessibility, and with greater programming opportunities. The entire Valley of the Moon will never be fully accessible, but such an approach is expected to utilize to the fullest what is available. Below are the essential changes being proposed:

- Build a new pathway west and south around the Cathedral building.
- Repair and extend the low wall east of the pit (behind the Cathedral building) to provide safe passage for all users. If required, install a safety railing along the wall (recommended).
- Using the newly made breach in the east corner of the wall of the Witches Cauldron, the pathway makes a jog to the east (right), then heads south in a gently sloping arc to connect with the proposed raised-up circulation area near the head of the slope leading to the Enchanted Garden (which also has improved accessibility).
- This circulation area provides improved accessibility to the audience spot in front of the Witches Cauldron stage, and to the southwest, other features.
- The section of path between the circulation area and the pool next to the Rabbit's Hole entrance will also be raised. This is to reduce the amount of slope required to gain height for the roadway next to the Adobe House, with continued circulation to the Wizard's Tower and beyond.
- The path leading down the slope to the Pennyland performance area will remain but will not reach as far as the audience seating are (as shown in the BWS report). The reason to terminate the accessible pathway above Pennyland is that for the slope to be compliant, a much deeper cut would be needed.
- As an alternative location for a limited-mobility access to Pennyland, create a short new path from the road area that reaches a new viewing spot above the Pennyland performance area, surrounded by a railing and a limited seating area for caregivers.

Estimated Cost: **$ 40,000 – 45,000**

Photograph:



Left: View of the proposed revised circulation area near the base of the ramp leading to the Enchanted Garden (located behind viewer).

The pathway in the foreground would be raised to accommodate needed grade changes. A complete survey of grade requirements will be necessary.

11: Cost Estimates Overview: The Cathedral Complex

Cost Estimates Overview:

Providing cost estimates for a historic preservation project of this nature raises significant challenges when attempting to provide accurate figures. While the Cathedral complex is not large, it does contain numerous "unknowns" which are difficult to quantify without further investigative work. It should be noted that Item No. 8 (Strategy for Improving Accessibility and Public Engagement) includes work that interconnects other areas in the Valley of the Moon site).

Below, each section area has been assigned costs, some with cost ranges. Please be aware these ranges represent a fluid dollar amount dependent on what is discovered once work is underway. Prioritization of tasks are designated High **(H)**, Medium **(M)**, and Low **(L)**, and equate to critical, needed repair, and wish-list upgrade.

Cost Estimates by Section	**$**	**Priority Level**
1. Cathedral Room building:	$ 75,200 – $ 80,300	**H**
2. Entry Vestibule, Stairs, and Underground Passageway:	$ 5,250	**H**
3. Proposed re-opening of the southeast side entry door:	$ 5,400	**L**
4. Witches Cauldron Performance Stage:	$ 12,200	**M**
5. Dragon's Teeth Arch:	$ 10,250	**H**
6. Pennyland Performance Area:	$ 9,900	**M**
7. Electrical Services:	$ 18,300	**H**
8. Ponds and Waterfall Features:	$ 12,100	**L**
9. Strategy for Improving Accessibility and Public Engagement:	$ 40,000 – $ 45,000	**M**

Sub-Total Base Estimate (Range): $188,600 - $198,700

Determining related costs:
In addition to the base estimate, several other factors must be included to cover necessary related costs. These include:

- 25% Design and Construction contingency.
- 10% Design fees.
- 7.4% Permit and Plan Check fees.
- 20% Inflation (10% per year for two years).

= **62.4% Multiplier** (applied to Base Estimate above. Multiplier information supplied by Jon Mirto, PMM).

62.4% multiplier added to Base Estimate = Total Estimate (Range): $306,286 – $322,688

11. Report Summary:

While this report has attempted to cover all the areas of concern with sufficient detail to accomplish needed repairs and upgrades, it became apparent with investigation this was going to be a near impossible task with the time and resources available. This is essentially due to the immense amount of detail which surfaced within each of the categories, akin to peeling an onion and discovering there are yet more layers. Also, invariably, one component is intimately tied to adjacent items both large and small, and cosmetically and structurally. In terms of priorities, structural concerns need to be addressed first.

There will undoubtedly be more discoveries at almost every turn in the work that invoke the need for further analysis, a quest for answers to new questions, and discussion followed by the formulation of an acceptable pathway.

While additional time could be spent formulating further studies and reports before repair work begins, it may be a more prudent use of resources to begin the repair work with the understanding that uncovering new challenges will simply be the norm, and that on-the-ground (and sound) decision making with accountability will be the preferred method of moving ahead.

Each step can be undertaken with a measure of "controlled flexibility" as fresh repair discoveries are made. One of the most challenging aspects of this project is the need to respectfully preserve as much original material as possible. During the design phase, many peripheral details will be addressed that were not included within this report, and during construction, more details for resolution will undoubtedly emerge. Working with Valley of the Moon resources will entail an extra effort in coordination, communication, and oversight.

Acknowledgments:

The following have lent invaluable assistance in both the direction and formulation of this report:

Jon Mirto	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Charles Pifer	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Jenni Sunshine	President, The George Phar Legler Society, Tucson
David Yubeta	National Park Service (retired). Tubac, AZ.

12. Supplemental Material: Additional background information about thin shell concrete.

In a communication from Jenni Sunshine (April 2022), it was revealed there might be a connection between George Legler's technique of using thin shell concrete and a well-known architect from Mexico.

It was recounted to Jenni that Legler once taught a visiting Mexican architect (born in Spain), how he made structures using chicken wire reinforced with concrete. The date of this possible interaction is unclear, but the Mexican architect later became famous for his thin shell concrete structures. An initial search by Jenni turned up the name of **Felix Candela**, who also taught architecture at several universities, including in the U.S. It is possible this is the architect in question but requires verification.

Felix Candela Outerino was born in Spain in 1910. He studied architecture in Spain, with further studies of architecture in Germany (where thin shell concrete was first developed in the 1920s). He was imprisoned by Franco's government during the Spanish Civil War and sent to Mexico in 1939, where his career flourished. In 1951, he completed his first thin shell concrete building called the Pabellón de Rayos Cósmicos ("Pavilion of Cosmic Rays"), at the University of Mexico, which remains in situ today. His work in the use of thin shell concrete construction was pioneering, and his structures are known around the world for their daring, beautiful, and innovative design. Candela moved to the USA in 1971 and was hired by the University of Chicago. He died in North Carolina in 1997. His work continues to influence architect around the world.

Felix Candela, 1951. Pabellón de Rayos Cósmicos ("Pavilion of Cosmic Rays"), National Autonomous University of Mexico. (With Jorge González Reyna).

Felix Candela, 1993. Oceanografic Aquarium in the City of Arts & Sciences. Valencia, Alicante, Spain.

The personal and professional papers of Felix Candela are located at Columbia University, where further research might uncover a connection between his possible experience with the Valley of the Moon, and George Legler's use of thin shell concrete.

End of Report

The
Enchanted Garden Complex

An assessment of
Conditions, Repair Recommendations and **Cost Estimates**
for the above complex at the Historic

Valley of the Moon

Located at 2544 East Allen Road in Tucson, Arizona.

Presented to: **Jenni Sunshine**, President
The George Phar Legler Society, Tucson AZ.
By: Simon Herbert, Tucson, AZ
June 2022

To: **Jenni Sunshine, President**
The George Phar Legler Society, Tucson
From: Simon Herbert, Tucson, Arizona
Date: June 2022

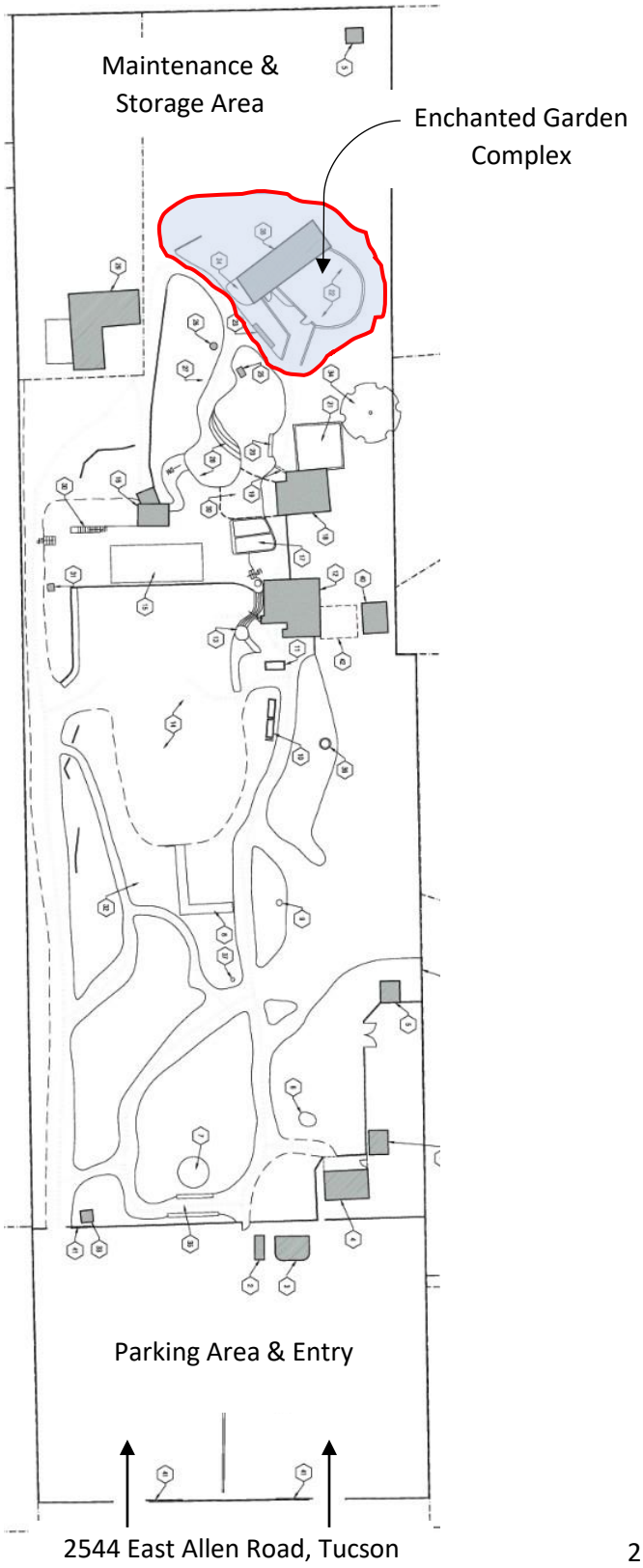
Below is an assessment of conditions, repair recommendations and cost estimates for the **Enchanted Garden** complex at the Valley of the Moon facility located at 2544 East Allen Road in Tucson, Arizona.

The Enchanted Garden Complex

Contents

Report Overview:

The purpose of this report is to provide the George Phar Legler Society with a roadmap for repairing this portion of the Valley of the Moon facility, and covers **condition, repair strategies,** and **cost estimates**. For a contextual description of the property and how the Enchanted Garden fits within it, please refer to the description in the National Park Service/National Register of Historic Places Registration Form (2011).

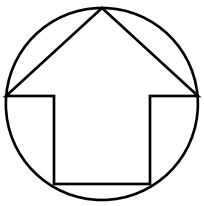


Valley of the Moon **Site Plan**

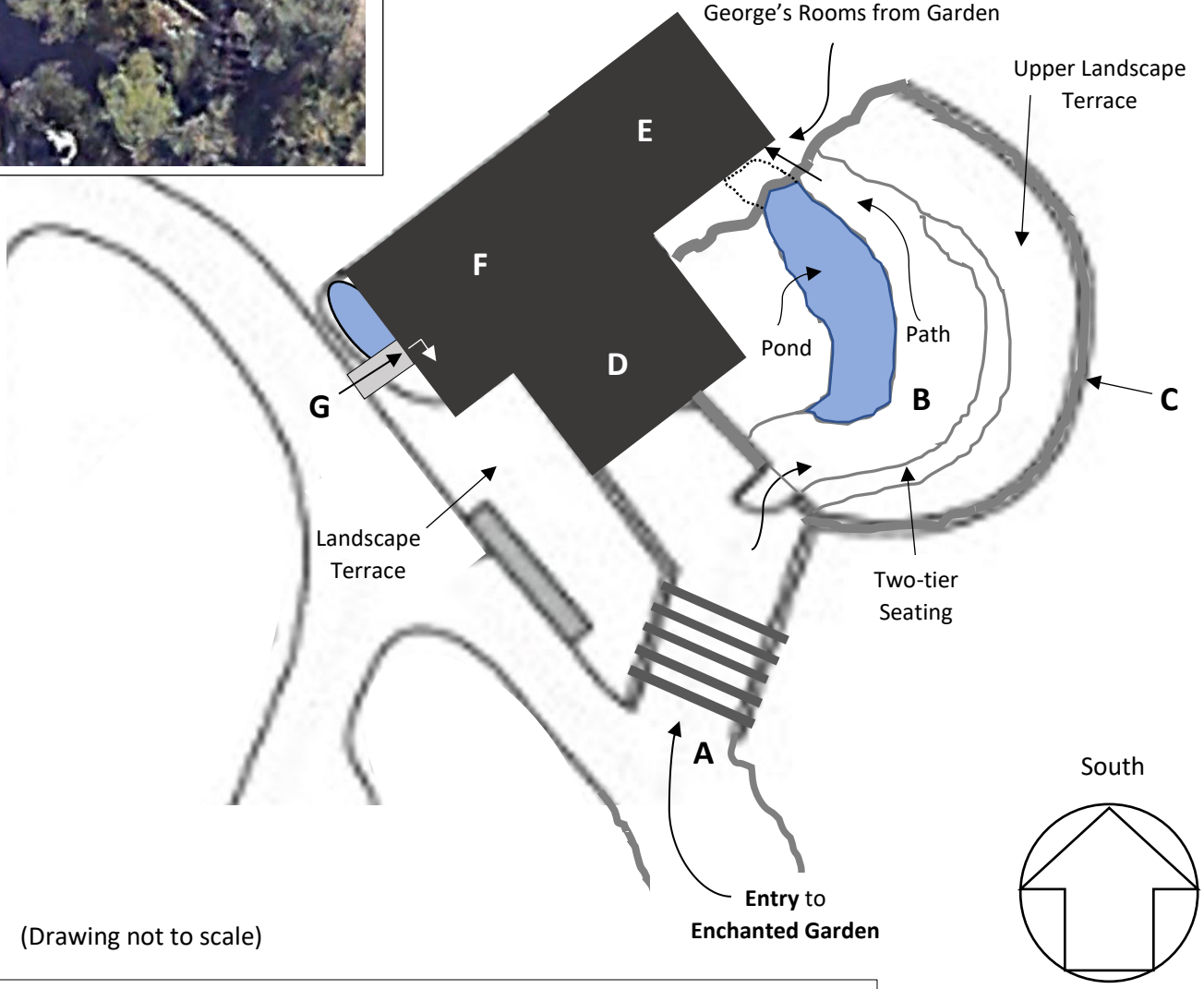
Site plan showing location of the Enchanted Garden complex oriented as viewed and experienced by the visitor moving from north to south. Parking is shown at the bottom (north) end of the property.

Note:
The Site Plan shown here were taken from the Valley of the Moon Assessment Report by Burns Wald-Hopkins Schambach, Architects (2008) on the general condition of resources. Therefore, keys to symbols are not linked to anything in this report.

South



Insert at left: Photo view of Enchanted Garden from Google Earth.



(Drawing not to scale)

The Enchanted Garden

KEY:

A. Entry to garden with railroad ties above entry passageway.
B. Enchanted Garden area (surrounded by landscape terrace and high wall).
C. Thin shell concrete wall.
D. Yellow Room.
E. George's Bedroom.
F. George's Writing Room & Office.
G. Walkway over pool & steps up to Rabbit Hole Entrance.

General description of the Enchanted Garden and interior spaces:

The Enchanted Garden is a complex of exterior and interior spaces located near the southwest corner of the property.

The principal entry to the garden is by walking up a steep path flanked by two masonry walls approximately 8 ft. high **(A**). Old railroad ties spaced atop the passageway walls provide diffused light, and the tunnel-like effect helps create a sense of increasing anticipation as the passageway approaches the rustic wooden entry door to the Enchanted Garden.

The garden **(B)** comprises a pond with circulating water and plantings, a small waterfall, low seating platforms arranged in a curvilinear form, an upper-level terrace also with plantings, and whimsical miniature buildings and other features built from stone and concrete located around the terrace and water features. A small African Sumac tree provides some shade over the eastern side of the sunken garden.

The garden is partly encircled by a high, irregularly shaped thin-shell concrete wall which extends above ground level and supported on the rear side by an assemblage of metal pipe trusses and other supports **(C).** This wall gives the impression of the garden being set much deeper into the ground that it really is – an ingenious manipulation of space used by Legler.

Covering most of the open garden space is a canopy made from chicken wire supported on cables strung from metal poles located around the perimeter of the garden's upper wall. The purpose of the chicken wire appears to be that of keeping unwanted birds and wildlife from descending into the garden.

In the southern end of the garden, where the pond and seating wall come closer together, a short narrow path leads into a narrow cave-like passageway and two chambers. There was once an entry door here, now removed, with only traces of a threshold, and marks in the concrete walls and ceiling indicating where the door and frame once stood. It should be noted that having no door at this location allows wildlife easy access to the interior rooms.

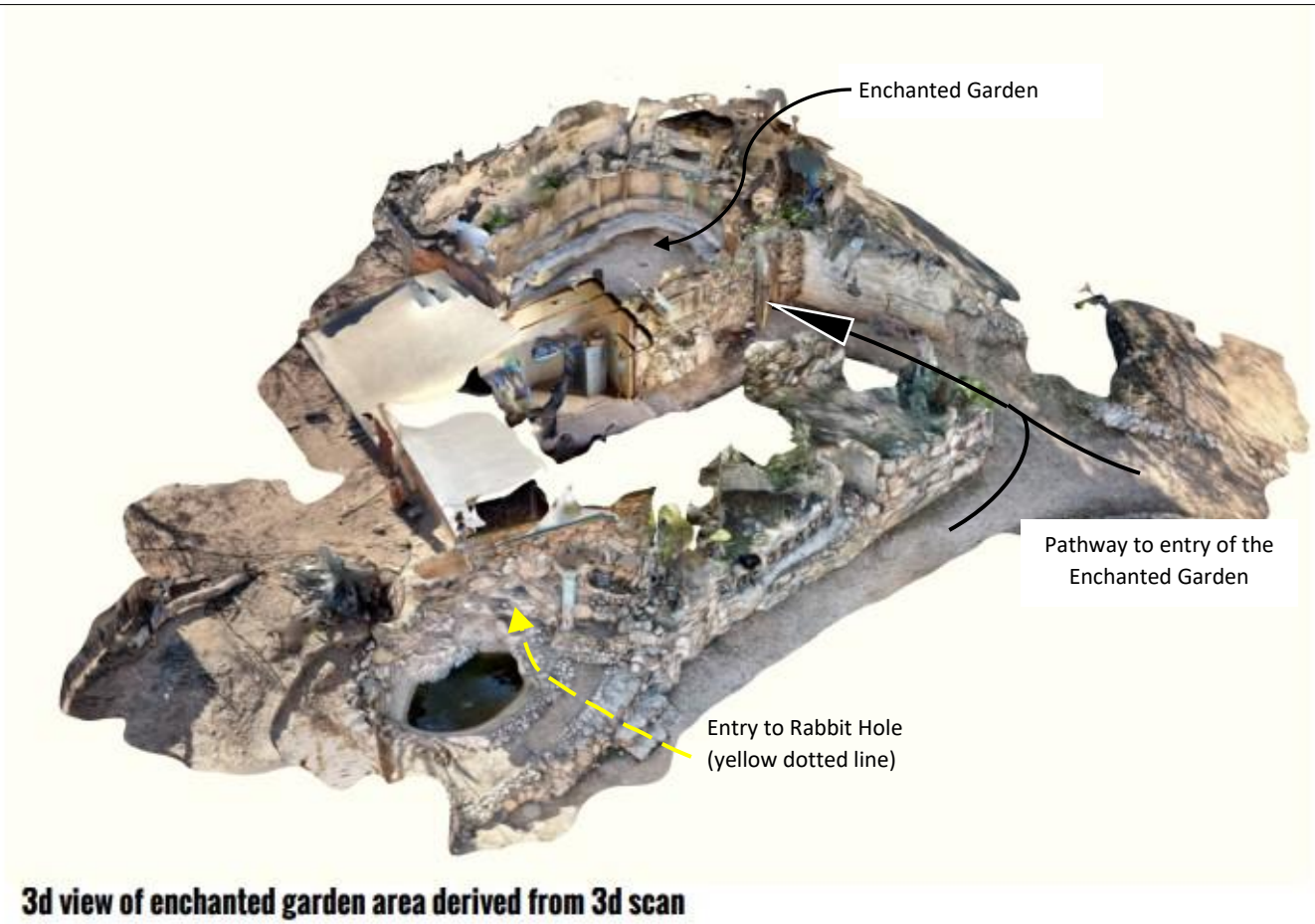
Above: Some of the magical expression of Legler's Enchanted Garden has been captured in this photo by **Greg Holmes** (2013), showing the basin-like garden at night.

The interior rooms form an irregularly shaped single-story building which are located on the eastern perimeter of the garden. Containing three spaces, these are best described as the Yellow Room **(D)** [it is painted yellow on the inside]**,** and two other interconnecting chambers **(E and F)**. These are commonly referred to as "George's Rooms" since he lived in these rooms for many years, but these are also referred to as "The Rabbit Hole". The lower room **(E)** was George's Bedroom and is entered from the garden, while the upper connecting room **(F)** is known as the Writing Room or Office. At one time this room connected to the Yellow Room **(D)** however, the doorway was bricked-up in the past (date of closure unknown at the time of writing). Prior to the closure, it would have been possible to circulate through the interior complex of rooms starting from the doorway at the rear of the garden, and exit out the Yellow Room door, or alternatively, the Rabbit Hole entrance door at the rear. The Yellow Room **(D)** is located to the left of the main wooden entry door to the garden and reached by a dogleg turn and continuation of the open-topped main entry passage.

The second entry (or Rabbit Hole entrance) to the complex is located on the northeastern corner of the building, which unusually, is constructed over a stone arch above a small pond **(G)** named the Mystic Pool of Peace. To reach the entry door of the Rabbit Hole, visitors must travers a short concrete pathway over the right-hand edge of the pool by holding on to a sloping metal pipe rail, then wiggle under the arch before making a sharp righthand turn and climb a few steps to the entry door. This entry was clearly intended for adventuresome children, less so for adults, and almost certainly not older adults. It is this entry door which enters the second chamber **(F)** but is currently closed (screwed shut) due to both security concerns, and safety concerns from a vertical structural crack in the stone arch above the passageway.

Above: View of the garden area through the main entry door.

Above: Partially hidden by the cave-like entrance, the Rabbit Hole is accessed by passing over edge of the pool and turning right.



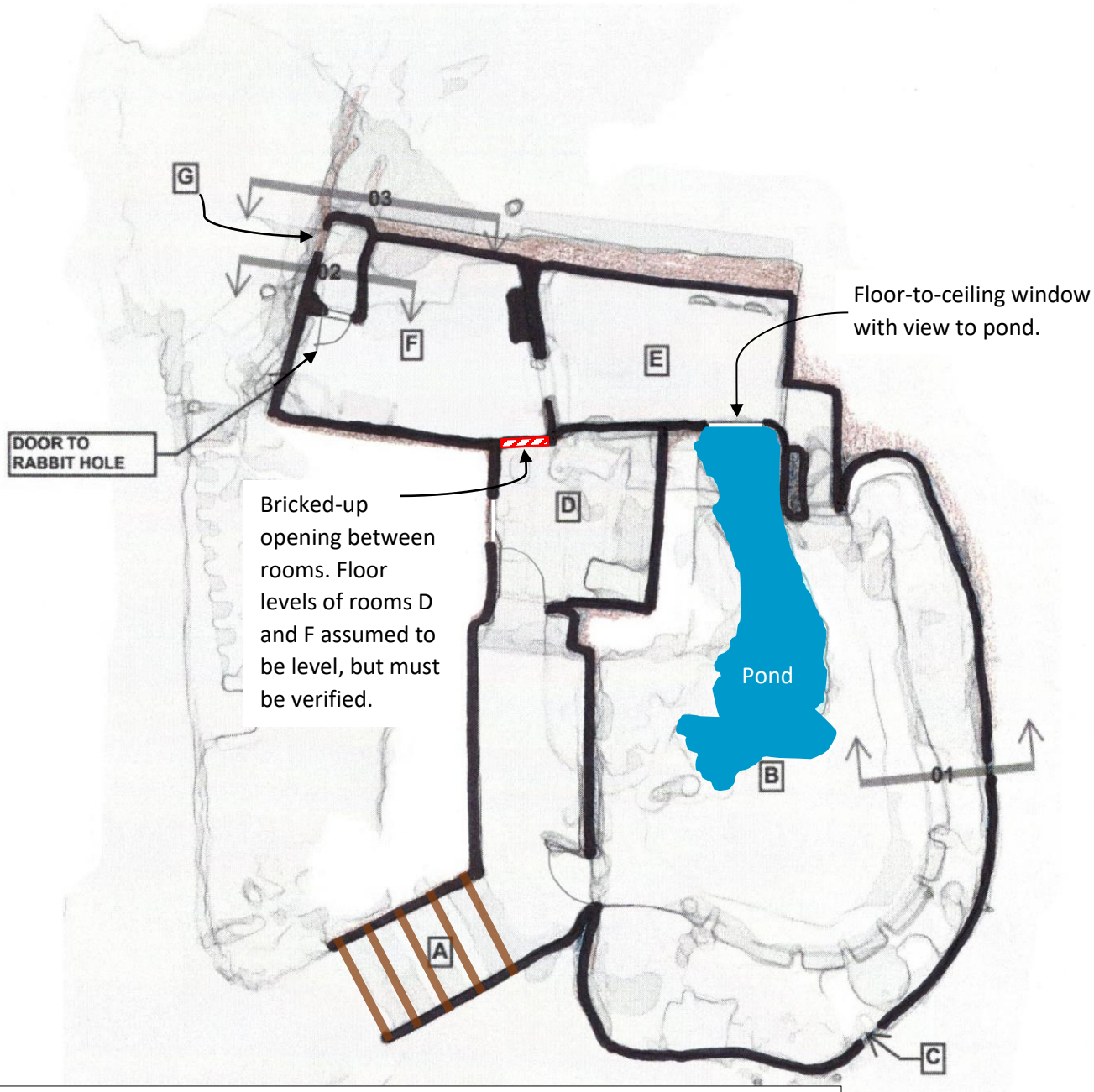
3d view of enchanted garden area derived from 3d scan

3D View courtesy of Charles Pifer, Poster Mirto McDonald. (View to Northwest)
(Additional notations by Simon W. Herbert)

3d view of enchanted garden area derived from 3d scan

3D View courtesy of Charles Pifer, Poster Mirto McDonald. (View to Northwest)
(Additional notations by Simon W. Herbert)

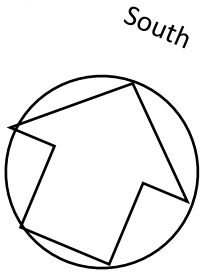
Plan View courtesy of Charles Pifer, Poster Mirto McDonald.
(Additional information by Simon W. Herbert showing spaces in relation to principal walls).



The Enchanted Garden

KEY:

A. Entry to garden with railroad ties above entry passageway.
B. Enchanted Garden area (surrounded by landscape terrace and high wall).
C. Thin shell concrete wall.
D. Yellow Room (currently storage).
E. George's Bedroom.
F. George's Writing Room & Office.
G. Walkway over pool & steps up to Rabbit Hole Entrance.



Preservation Approaches to repairing materials and features at Valley of the Moon:

Originally constructed by mostly unskilled labor, many of the building systems were under-structured when built, and nearly 100 later are showing signs of deterioration in many areas. Over the years, some of the features constructed by Legler have already been removed.

The goal is to preserve as much remaining original material as possible, but be cognizant that structural augmentation, material replacement, and certain other changes are required for essential maintenance, public safety, and accessibility. Not doing so will see a continued and compounding deterioration of many aspects of the facility.

Preservation of original materials is one of the key goals in the care of historic structures, but it should be recognized that many materials have a life-span culminating in eventual degradation and material loss. This necessarily leads to decisions concerning material treatment and replacement, and the National Park Service **Secretary's Standards for the Treatment of Historic Properties,** which include **Standards for Rehabilitation** providing a set of guidelines on how to approach these complex issues.

Many of the materials at Valley of the Moon have reached the end of their life expectancy – they have simply “aged out”. When conducting repairs, great care must be taken to maintain the essential character of the site, which means being careful not to change or overly improve appearances. During the repair process, steps should be taken to make discreet improvements with detailing to reduce the mechanisms of deterioration which led to material deterioration and loss in the first place. This is a tall order, and in the case of Valley of the Moon, presents something of a “preservation minefield” since at almost every turn a new complex set of preservation questions arise. This report seeks to find the most achievable balance of repair and preservation.

Valley of the Moon operates largely on a “shoestring” budget, dependent on a small entry fee from visitors; income from special events such as performances and weddings; grants and donations; and the invaluable assistance of its many volunteers. Maintenance is provided largely by the volunteers, while larger physical improvements and more extensive repairs are a combination of contractors, volunteers, and donated services. This delicate patchwork of assistance provides the means of keeping the Valley of the Moon facility open to the public.

Condition, Repair Strategies, and Cost Estimates:

Following is a description of condition of each feature of the **Enchanted Garden**, along with recommended repair strategies and cost estimates.

1. Upper thin-shell concrete wall and support.

Condition:
The wall extends for approximately 65 linear feet, and made from a combination of chicken wire with additional reinforcement from very heavy steel cable (mostly near the top), infused with concrete and stone. Thickness of the upper wall varies but is on average about 2-1/2 inches thick. Over time, this wall has moved due to both its own weight, and likely corrosion of inner metal reinforcing, combined with any adjacent movement in the soils. All these mechanisms of deterioration contribute to visible cracking.

In the past, and to help counter this movement, an arrangement of vertical and horizontal metal pipes and wooden blocks on the rear side of the wall help to prevent further movement in the wall. They perform like a girdle around the wall: a system which appears to have been in place for many years yet augmented in places with additional bracing. The earth at the top behind the wall is very uneven. While there is little doubt the metal bracing has prevented the wall from collapse, a more permanent solution is recommended. The greatest depth from the bottom of the garden path to top of the thin shell wall is just under 12 feet in height.

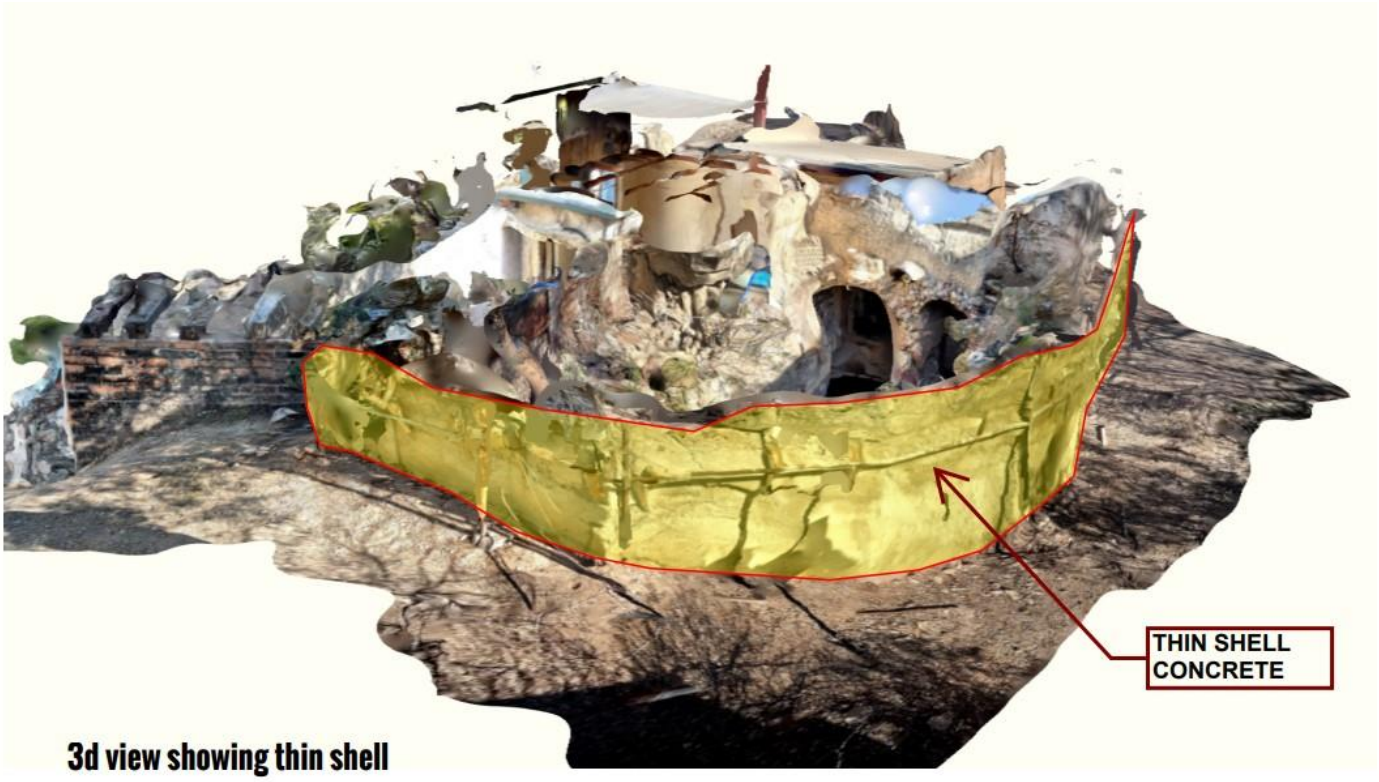
The condition of this wall should be considered very frail.

Repair Strategy:

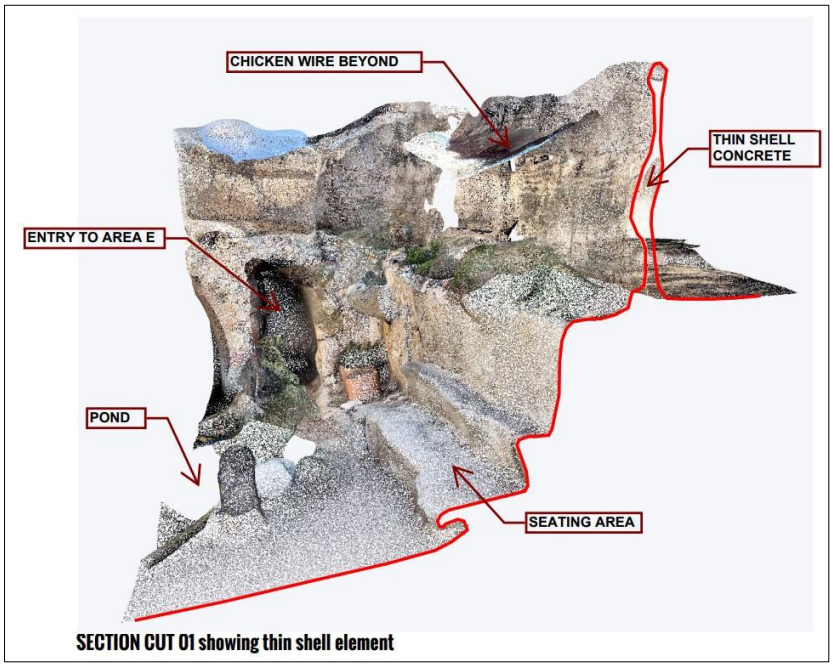
- Replace the metal pipe support system with a new 8” wide concrete block retaining wall on a continuous reinforced concrete foundation, reinforced with rebar and core-filled with concrete.
- Fill the space between the new block wall and the back side of the uneven concrete shell wall with grout.
- Keep the new structure approximately 4 inches below the original wall on the rear/back side of the thin-shell concrete wall, which varies between approximately 2’.00’’ and 6’.00 high.
- Use rust inhibitor on all remaining and exposed metal reinforcing material not removed during repair work.

<u>The new wall support will need an engineer’s assessment and design.</u>

Additionally, consideration must be given to whether the original support poles for the cables supporting the chicken wire canopy can be re-used, or to introduce a new system integrated within the new wall structure. Remaining gaps in the original concrete wall should be repaired with mortar that is matched as closely as possible in sand granular size distribution and finished (when dry) coloration. Some experimentation will need to be performed ahead of repairs to find the best combination of materials.



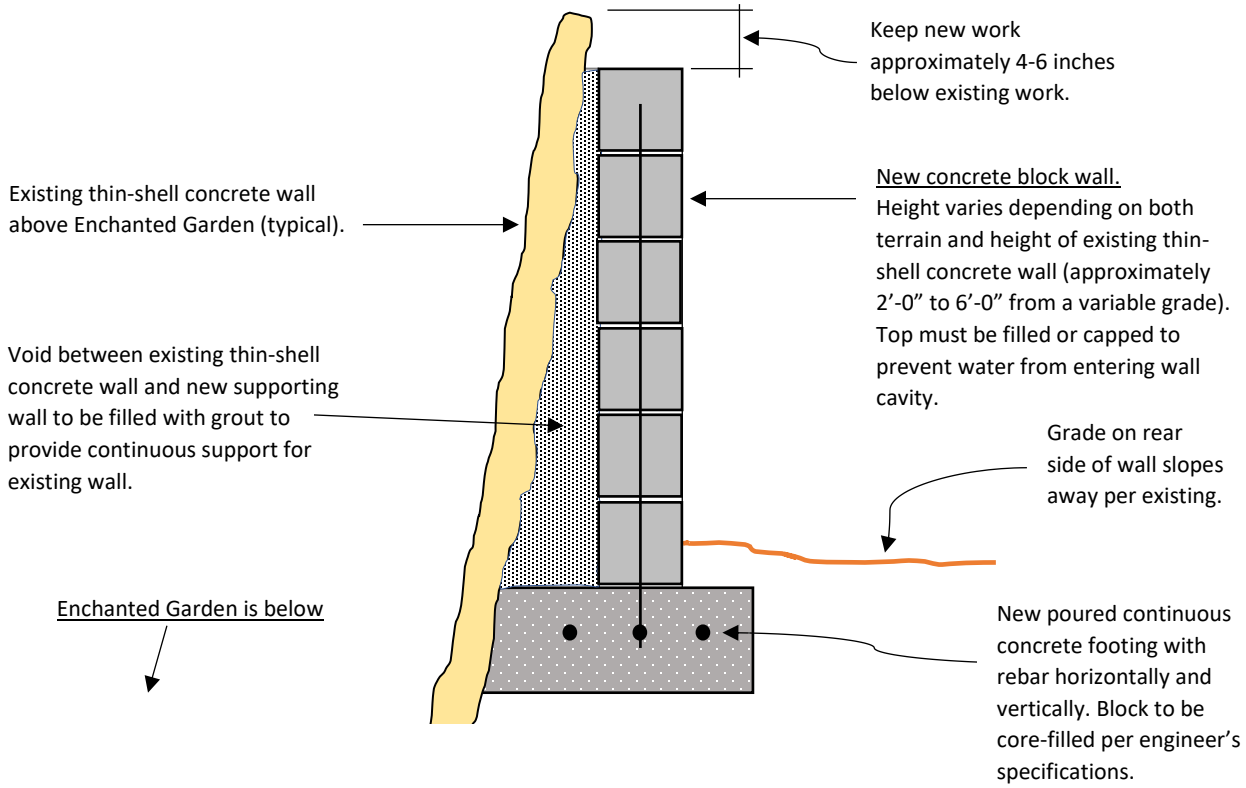
Above: 3D View by Charles Pifer, PMM. (View to Southeast). The unique curvilinear form of the thin shell concrete wall is apparent in this graphic. A small portion of the wall continues from the top right of the graphic to the left, to form part of the backdrop to the pond area.



Left:

3D Section views of the thin shell wall structure by Charles Pifer, PMM.

Concept drawing of new support wall for upper thin-shell concrete wall (by SWH).
Section view through proposed wall system (Typical) Drawing not to scale.



Cost Estimate: **$ 19,700**

Photographs:

Right:
The thin-shell concrete wall begins to the right of the entry passage, and a combination at this juncture of stones, metal sheeting, and concrete.

At lower left is one side of the wall of the entry passageway to the garden, constructed with burnt adobe bricks, and spaced railroad ties on top.

Above: The thin-shell wall is supported with vertical and horizontal metal pipes installed over time. Large wooden wedges provide contact with the wall for support, and to reduce movement.

Above: Pipe supports run in several directions, and tie-into vertical pipes supporting the cable and chicken wire canopy.

Above: Both photos show to good effect the methodology used in pouring the concrete during the construction period (1920s – 1930s), with a combination of smooth and corrugated formwork mirrored in the concrete. The vertical and horizontal metal poles help to keep the wall stable, but a more permanent solution is recommended.

Most of the wall was built with an outward tilting angle - the intended design of Legler to create a basin-effect within the lower garden.

Above: Both photos showing details of how the chicken wire and thick mining cable are intrinsically tied into the system. In places the concrete is damaged, and the chicken wire canopy frequently is woven into the thin-shell concrete wall system, making repairs to either system challenging.

In many locations the concrete thin-shell has fractured – the likely effect of ground movement over time and metal within the wall being subjected to moisture, and consequent rust-jacking. Loose areas will need to be stabilized or removed and repaired.

Left:

This image gives a good idea of the challenges facing repair work:

- Different concrete pour-stages during construction (the wall was not poured in "one go", but over a period of time, likely leaving some "cold joints" which are prone to cracking and movement.
- Different textural finishes.
- Variable colors within the wall.
- Exposed chicken wire reinforcing material that is slowly rusting within the thin shell wall.
- Different erosion speeds of concrete based upon material composition and other factors.

2. Chicken Wire Canopy

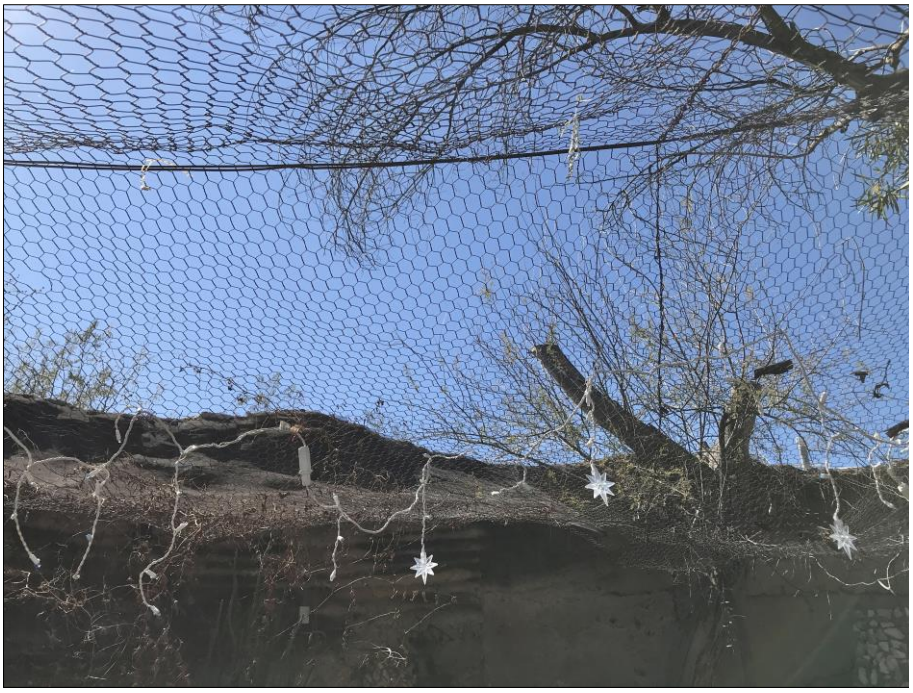
Condition:
The canopy likely dates from the construction period, as portions of the chicken wire are imbedded into the concrete wall at the top and intertwined with other construction materials. There are significant gaps, and portions of the canopy missing due to age, damage from falling branches, and animal (and possibly human) intrusion. Racoons are known to enter the garden area, and use several areas to defecate, their feces being evident among some of the miniature stone buildings.

Repair Strategy:
The chicken wire canopy material has aged out, is not repairable, and needs to be replaced along with the cables supporting them. As mentioned above, the supporting posts may need to be replaced, but the decision will fall within the realm of the structural engineer once the retaining wall system has been evaluated. The location of cables and replacement chicken wire must be carefully designed since the African Sumac tree and some of the vegetation must be considered. The options for chicken wire replacement are galvanized or stainless steel (which will last longer but will remain "bright" rather than dull over time).

Where existing (historical) chicken wire remains in the concrete near the top, cut it back as close to the concrete as possible, and leave it in place.

Cost Estimate: **$ 4,900 - $6,900**

Photograph:



Left: The chicken wire canopy viewed from below.

One of the cable braces supports the canopy.

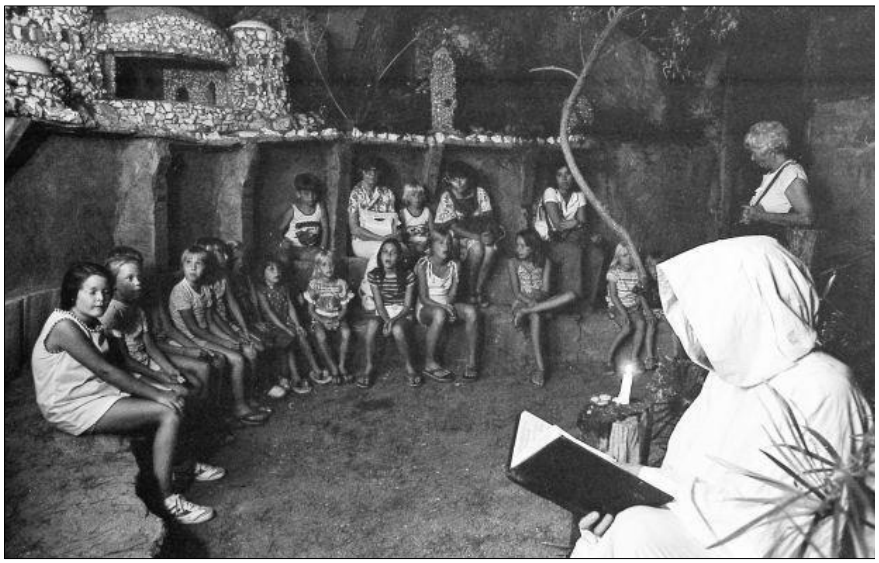
Dead trees and landscaping waste should be removed from the garden and terraces to allow for new plantings.

The only tree in the garden is an African Sumac. Consideration should be made to replace this tree with a better-defined ornamental tree that provides some shade year-round. The wire netting will need to be carefully placed around the trunk in a way that does not damage the tree yet eliminates animal and bird entry.

3. Seating Area within the Garden:

Description:

The construction used in the seating area employed the same thin-shell construction technique employed widely at Valley of the Moon. Concrete infused chicken wire provides the basic construction and sculptural form of the garden and its surrounding walls, which appear as one contiguous form. The two layers of seating provide a curvilinear bench seating on the lower level, with a series of raised "nooks" for children to sit in. The nooks are defined by thin-shell concrete buttresses, above which they merge into the terraced gardens and miniature architectural features. Larger children and adults must use the lower benches, with the feet of the smaller children sitting in the nooks resting on the lower bench.



Above:
Historic photo of children listening to a story being read, while seated on the concrete bench, and in the upper seating nooks.

Condition:

- The lower curving concrete bench seat shows signs of possible movement over time, with some undulation and cracking of the surface.
- Three of the buttresses (Nos. 3,4 & 5 counting left of the entry door) are cracked, and separated at the top by about one inch, indicating downward movement. The cause of this is likely subsoil movement and compression over time coupled with the general weakness of the thin-shell concrete structure.
- The top "shelf" over the nooks also shows signs of deterioration, with corroded metal exposed and disconnected, and cracking at the intersections with the buttresses. Rainwater falling onto the upper garden has no place to go except within the soils behind the thin-shell concrete structure, leading to deterioration and movement. The only sure method to stop future movement would be to invasively rebuild the entire inner thin-shell portion of the Enchanted Garden, which would result in loss of much original material - and be costly. Therefore, it is recommended that in-situ repairs be carried out to slow down or prevent further movement; patching cracks and small holes, while monitoring conditions post-repair to determine any on-going issues.

Left:
Detail of one of the seating/bench areas showing cracking of the concrete surface.

Repair Strategies:

Patch and repair the tops of the buttresses in place and seating aeras

- Drill slightly upwards and inwards into the concrete substrate, and epoxy a fiberglass rod, held short from the outer face (see drawing p.19).
- Once cured, fill the gaps with mortar colored and textured to match original concrete.
- Remove any loose material from the bench seat, clean and patch to blend in with original concrete.
- If the use of dowels into the concrete is not feasible, then replacement will be the only remaining option.

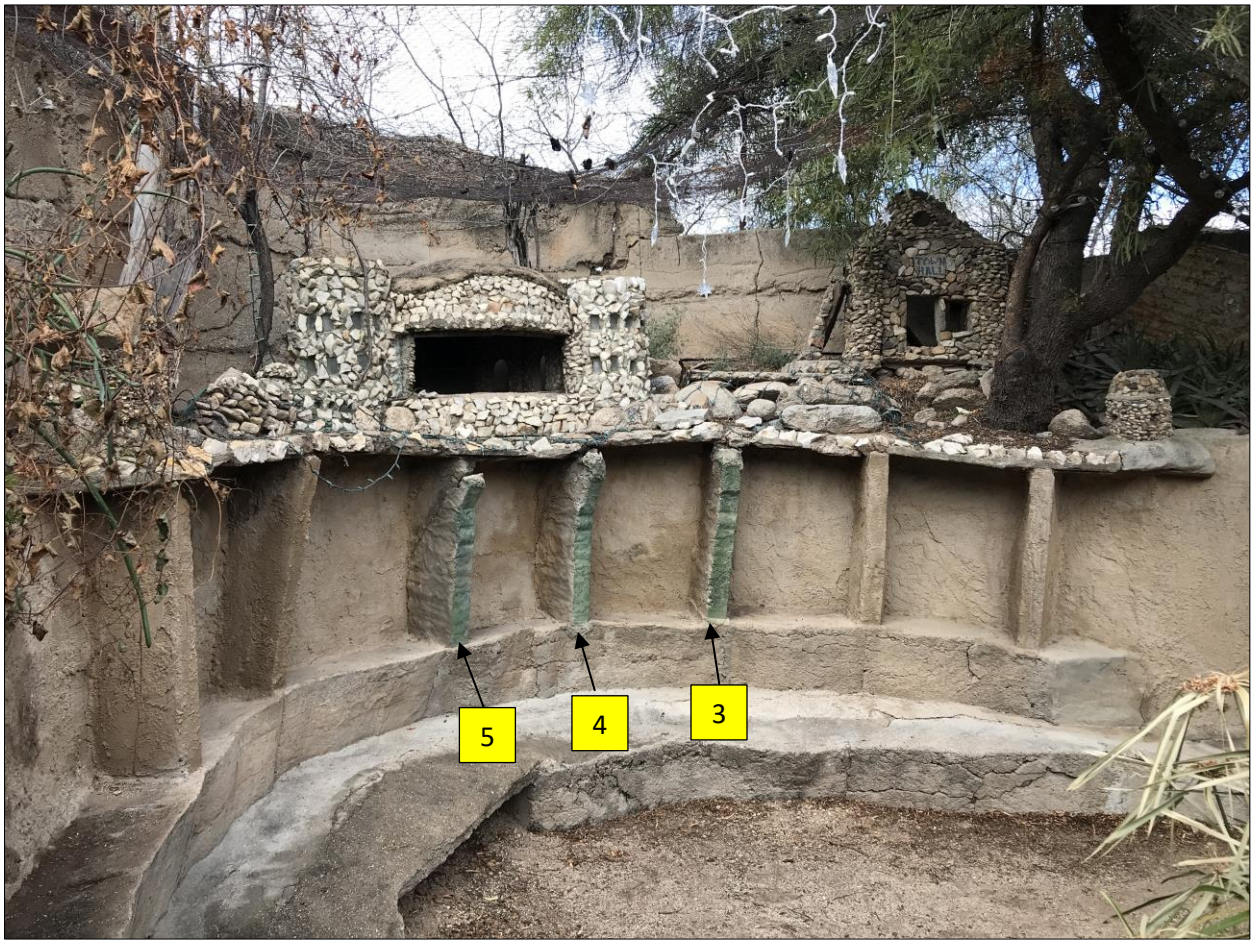
Cost Estimate: **$ 2,100 - $3,200**

Photographs:

Left:

Seating area viewed from above the garden.

Highlighted buttresses **3,4 & 5** require some repair work due to cracking and material loss.



Above: View of the buttresses from the garden level. Each of the whimsical architectural buildings on the upper terrace are different.

Left:
Buttress Nos. 5 & 4 showing cracking and delamination from the rear wall structure.

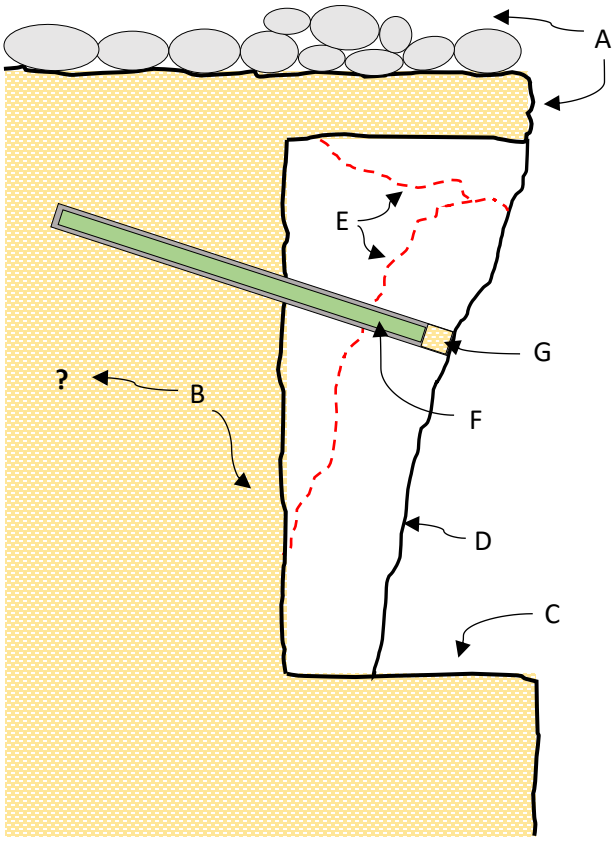
A repair-in-place approach is recommended.

The buttresses were built in place using a variety of metal reinforcing, adding to the challenges of repair.

Left: A piece of loosened metal support for the concrete shell next to the top of one of the buttresses.

The metal needs to be treated with a rust converter before being encapsulated with a repair mortar, where necessary. **As much as possible, a standard method of repair needs to be adopted which includes preparation, applications of specialized products to maximize adhesion, and application of repair mortars.** An initial test of materials is suggested as being a 3:1 sand/ cement, with the addition of pre-mixed lime paste. Experimentation panels must be approved by the team before repairs to historic resources (Yubeta).

Post-application treatments might include surface application of stains such as charcoal or other stains to help blend new materials with the old. The objective is to provide an even set of sympathetic repairs to the concrete, and not to make repairs stand out. With so many variations of tone and texture in the original work, this should not be too difficult, but will take practice and guidance.



Left: Concept Drawing showing section through buttress repair

(by SWH – Not to scale).

Subject to Engineer's recommendations.

Key:

A. Upper landscape terrace and supporting concrete ledge.
B. Thin shell concrete structure (thickness of material currently unknown).
C. Seating nook.
D. Buttress.
E. Cracking (typical).
F. Drilled hole with fiberglass reinforcing rod set in epoxy.
G. Mortar plug over recessed hole.

4. Cantilevered Concrete Planter

Condition:
Located near the entrance to the lower chamber room by the pond, this 32” x 16” x 16” planter is pulling away from the wall supporting it. There is cracking and gapping on all sides, indicating progressive structural failure.

Repair Strategy:
Repair options are to (A) build supporting walls or fill in below the planter with solid stones or concrete, which would keep the planter in place, but alter its original appearance. (B) is to remove it entirely and patch the hole. Option (C) would require a more invasive repair – to remove the planter, drill through the old concrete wall and install a new metal support basket before making a new cantilevered concrete planter. The recommendation is for **Option (B), removal of the planter.** Should this feature be desired later, it can be accomplished using Option (C). Additional repair will be needed to address

---

Cost Estimate: **$ 720**

Photographs:

Left:
The planter has cracks around all sides where it attaches to the thin-shell concrete wall, indicating structural failure. The planter’s removal is recommended at this time.

Above:
The vertical crack just north of the planter and above the concrete bench seating is also of concern. Loose material needs to be removed for inspection of the its stability, and repairs made using similar methods to that being recommended for the buttresses (above section).

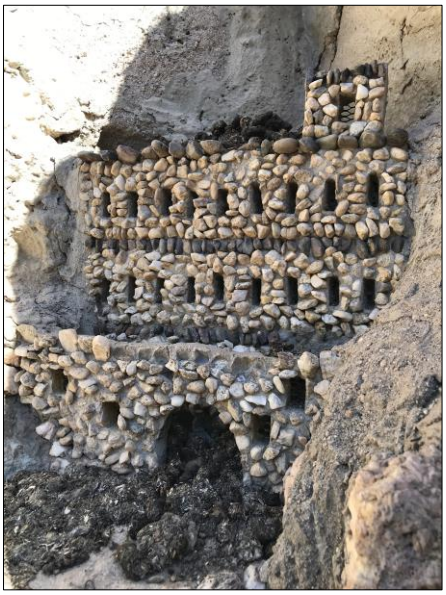
5. Miniature Architectural Structures:

Condition:
There are approximately ten architectural miniatures of different sizes, all representing an imaginative "small world" around the upper terrace and pond area. Each has its own unique design, likely supporting a set of stories being told to children while they were seated. They appear to have been illuminated (possibly originally by candles, and later by electric lights). These features should be restored and properly illuminated with LED lights. One of the miniatures is in very poor condition with one wall removed and laying against another wall. The foundation of the miniature needs to be stabilized, leveled, and the wall panel reattached. Their interiors and environs need to have animal feces removed, and their interiors cleaned, etc.

Estimated Cost: **$ 4,800**

Photographs:

<u>Clockwise from right:</u>
Cleaning-up of feces and minor repair can quite easily be accomplished ,but restoring a working lighting system is crucial to having them viewed as intended, especially at night.



6. Repair of crack in wall above the pond in the Enchanted Garden.

Condition:
Above the pond is an "outcropping" feature of concrete which show cracks of between one and two inches. Cracking appears worst near the wall and corner of the adjacent building (the "Yellow Room"). The cause is possibly linked to rainwater getting in and behind the wall near the top, where a gap of several inches exists between the top of the thin-shell concrete wall and the roof of the building. Over the years, it is likely metal reinforcing within the thin-shell concrete has corroded, weakening the concrete, and leading to movement.

Repair Strategy:

1. Remove all loose material between the fascia of the building and the thin-shell concrete (performed from above while lying on the roof of the Yellow Room). The fascia contains rot in this vicinity, which will be difficult to repair or replace due to space and roofing materials.
2. Make repairs to the facia and install a waterproof membrane in the U-shaped spaced between fascia and concrete wall. Drain to grade. Alternatively, fill this portion of the gap with lightweight concrete and slope to grade. Coat the surface with white roofing cement. This will help prevent future water intrusion behind the concrete above the fountain and pond.
3. Infill gaps caused by the failure with matching stone and include a small sloping buttress wall along the wall. This will fill in a large gap in the existing wall (used by animals to enter the garden) and lend support to the failing outcropping above.
4. Fill any remaining voids and cracks with smaller stones and mortar to match existing finishes.

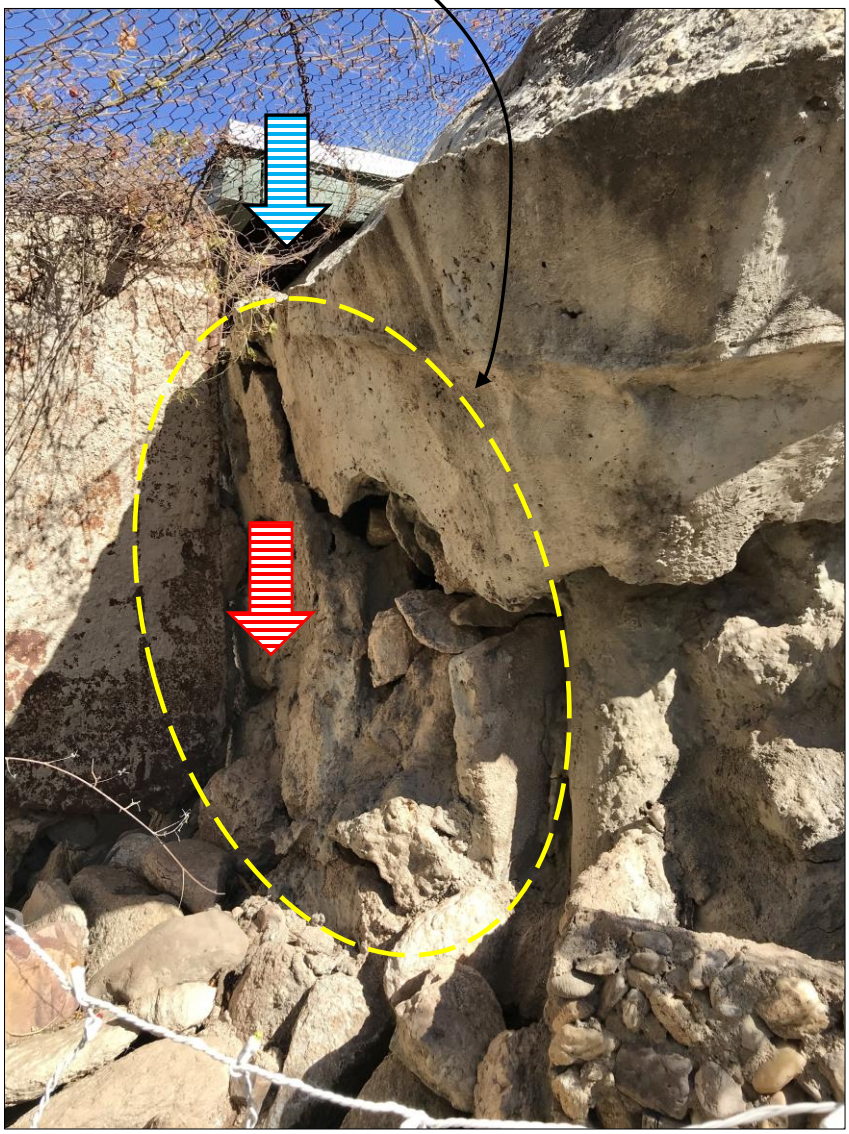
Cost Estimate: **$ 5,100**

Photographs:

Above: Panoramic view of the pond area with the subject wall at top center (circled).

The corner of the roof atop the Yellow Room below has a gap of several inches between its outer wall and the back of the thin shell concrete forming the faux rock outcropping. It is likely water has been penetrating this area since it was built, resulting in weakening of material through loss of reinforcing metals and settlement (blue arrow).

The width of crack shown varies in width but indicates a downward movement of material in the section circled below.



The area containing gaps can be filled with new matching material including stones following removal of loose material.

This would slightly alter the "original" appearance but may be necessary to obtain structural stability.

Note:
This is a project area that will need the overview and final recommendation of a structural engineer.

The filling of rodent and racoon -sized holes in the garden wall structure is recommended at this time.

7. Re-construct Door leading to the George's Bedroom from Enchanted Garden.

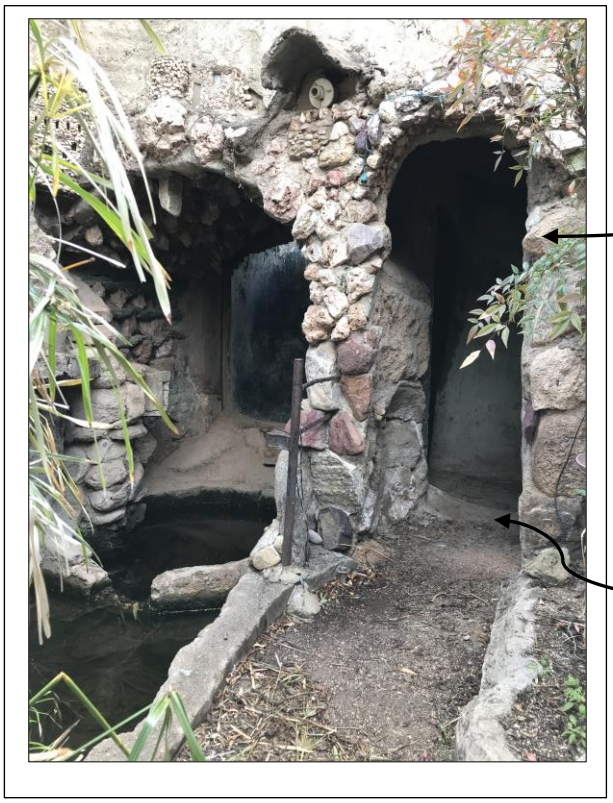
Condition:
The door leading from the garden to George's Bedroom (Lower Chamber (E) should be reconstructed to provide a closure to the chamber – thereby restoring an original feature currently missing. Doing so adds a measure of security, also resulting in increased cleanliness, which will in turn reduce maintenance and periodic cleaning. The rough opening is currently 28" wide x 6'-4" high.

Repair Strategy:
Install a custom-made wooden door where the original door once stood, to open inward against the flat portion of the wall (hinge on the right-hand side). This is a highly custom carpentry task which requires leaving as much room as possible for visitor movement. The door should seal reasonably to prevent entry of vermin, etc. There are no known photographs of what this entry door looked like, but evidence in the concrete provides sufficient information as to location and width general size of the frame.

Recommendation is for a simple rustic door with vertical wooden boards. To reduce door thickness, and to maintain as wide a passageway as possible, apply 3/4-inch-thick vertical plank strips to marine grade plywood using waterproof glue, screwed from the inside plywood, which will be unseen once the door is opened and hinged against the entry wall. Install a metal throw-bolt like the one used on the main entry door to the garden. The finished door opening/clearance will be narrower than 28 inches when accounting for the frame and hinge-opening.

Cost Estimate: **$ 2,200**

Photographs:



Left: Exterior view the doorway/entry, with the arch over the window looking out onto the pond to the left.

The odd-shaped doorway is narrow at the bottom but wider at the top (on one side only).

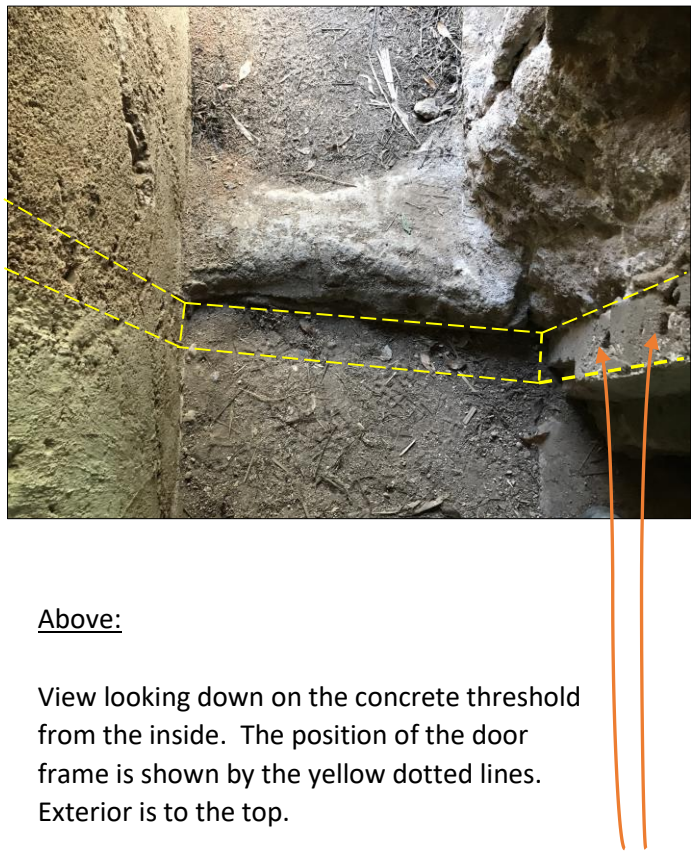
Evidence points to there being a doorway that was hinged on the right, and opening inwards against the interior flat wall.

The concrete threshold mirrors the curvature of the top but may have been partially removed. The door closed against the inside of the threshold.

Above:

View of inside the entry passageway (right is to outside).

Evidence indicates the existence of door framework around the doorway.



Above:

View looking down on the concrete threshold from the inside. The position of the door frame is shown by the yellow dotted lines. Exterior is to the top.

On the right-hand side can be seen two attachment holes, likely bolts set into the concrete to hold a wooden jamb, since removed.

The door would have been hinged on the left-hand side jamb, and it is likely the threshold will need to be re-formed to fit against the new door.

8. Interior Spaces

i. George's Bedroom [Lower Chamber, and **(E)** on Plans, p.3 & p.7]

Room measures approximately 12'x 8', with an average (sloping) ceiling of 8'-6".

Conditions:

- The main feature of the first room is a large, fixed glass window overlooking the pond to the north. The window is nearly full height to the room and comes to within a few inches of the concrete floor.
- The interior of this wall has been covered with vertically applied narrow wooden slats which changed the original shape and size of the glazed area. This feature is not original to the room and has considerable deterioration at its base – which is located just above the water level of the pond.
- There is also evidence of previous repairs in the wall with plaster (or similar) having failed.
- Soil particles in many locations indicate movement of rodents, suggesting the whole interior complex needs to be made more vermin proof.
- Rodent droppings are not a healthy environment for visitors and contribute to the spaces feeling dirty or "grungy".

Note on the paint color:
It is worth noting here the dark green paint color used on the walls and one ceiling in rooms **(E)** and (**F)**. It is found in several other areas of the Valley of the Moon complex on both inside and outside surfaces. Valley of the Moon staff understand the green paint was added by volunteers in the 1970s, the likely outcome of a batch of donated green paint. It is unclear whether George Legler was ever consulted about its application, but there is assurance that he would never have spent money on paint. Therefore, the green paint is not considered original to the construction not to the intend of Legler's vision.

The removal of the green paint is recommended, along with expose of original concrete and other materials. Removal methods could include chemical or gentle abrasive cleaning such as with walnut shells that is typically less abrasive and damaging to softer materials.

Repair Strategy:

- Carefully remove the wooden "curtain wall" and assess conditions and damage below. **Note:** it is highly likely that examination of this wall will reveal an opening to the Yellow Room. This may open-up a discussion about future use as part of programming needs.
- Determine best course of action, which may include masonry/concrete repair of substrate, replacement of the large, glazed window frame (if found to be heavily damaged by wood rot).
- Check and repair electrical, especially pertaining to pump function. Upgrade as needed.
- Increase ventilation by installing roof-mounted turbines and opening screened windows to help reduce humidity and damage caused by the build-up of mold.
- Upgrade lighting fixtures and make them compatible with adjoining room F.
- Clean all old paint from wall surfaces using a crushed walnut shell system.

Cost Estimate: **$ 7,200**

Photographs:

Right and above: Exterior views of the large viewing window, with the pond in the foreground. Electrical cables supporting pond function (pumps, etc.) are visible. Loose soil is being deposited from a gap between the side of the wall and the glazing window frame, indicating rodent activity.

Left: Inside view of the glazed window, with the entry door to the left.

The wooden wall needs to be removed, and the substrate repaired after evaluation and a work plan has been established.

Area shown here may reveal a previous entry point to the Yellow Room.

Electrical work incudes removal of defunct services and upgrading live circuits where necessary.

Above:

A hole exists at the base of the wall, with soil-like materials being pushed out. Once the wooden wall material has been removed, a thorough examination of this wall needs to take place to determine the next course of action.

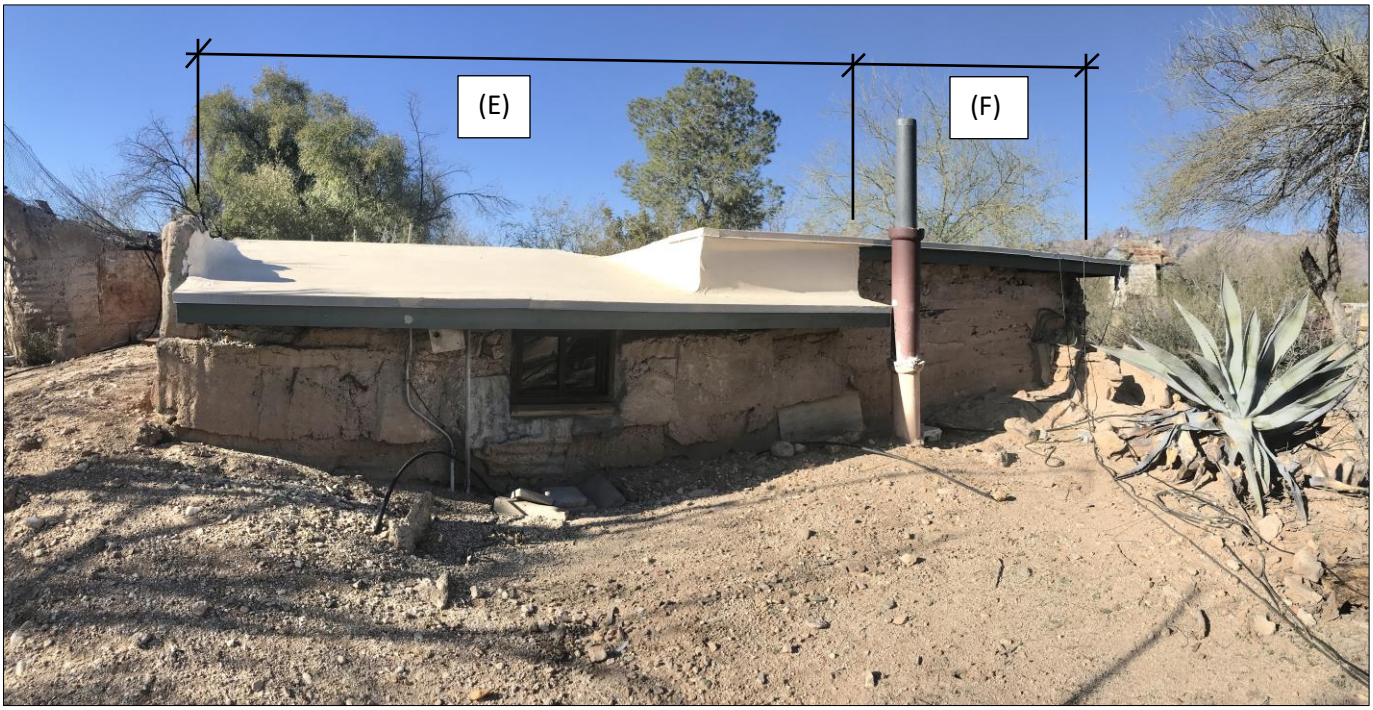
Above: View of the fireplace wall and steps leading up to the adjoining room (F).

The fireplace has a chimney and exterior clay stove pipe, but it is recommended this be formally abandoned and left is place as a decorative feature. If desired, an imitation electric fireplace could be installed to simulate a working fireplace. Partially visible top right is a small window to the exterior of the structure.

Left: Another view of the wooden curtain wall.

From this view it is apparent the vertical wooden strips are becoming loose in the bottom third due to loss of mechanical fastenings.

Exposing this wall is essential to determining the next steps including final treatment options.



Above: Rear view (looking north) showing the exterior of George's Bedroom **(E)** on the left, and Georges Writing Room/Office **(F)** on the right. The highly irregular wall texture is the result of the style and sequence of pouring the concrete as the building was constructed. The clay pipe seen near center is the chimney for the fireplace. In George's Bedroom. While the fireplace should be closed off/abandoned, the clay pipe should remain.

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ii. George's Writing Room & Office [Upper Chamber **(F)** on Plan, p.7]

Room measures approximately 12'x 9', with a flat ceiling of 6'-6.5".

Conditions:

The second chamber **(F)** is reached via two steps to the east. Due to the step-up in height and fewer windows, this chamber feels more cave-like. Four small viewing windows are located on the north wall, positioned by Legler to support his story-telling narrative. At the end of this room is a low irregular shaped masonry form, which covers a portion of the cave-like entry (the "Rabbit Hole" entrance).

Next to this is another door, screwed closed from the inside, which was the entry or exit to the Rabbit Hole, depending on which way the visitor travelled through the complex. Visitors to these chambers must currently enter and exit through the same narrow passage from the garden. Adding-to the cave-like atmosphere, the walls are painted a dark Green (refer to Note above). On the wall's southeast exterior, there is a vertical crack.

Repair Strategy:

- The largest of the small viewing windows is broken-out and must be replaced. Because the glass was built into the wall during construction, the replacement glass (safety-type) should be installed from the exterior, requiring the cutting-out of masonry/concrete, and subsequent repair. Making the cuts from the inside would be more disruptive to visible original surfaces.

- Install a new doorway (leading from the Rabbit Hole entry). This may require a new frame, but further examination is recommended. The new door should match the proposed entry door to the lower chamber (E) and be rustic in appearance.
- The rough-cement area over the top of the cave currently has no use, but has the potential of being useful, if it was to be made level. The function of the wooden 2-x board bolted to the wall is unclear, but it's removal would help increase options for use. A discussion with Valley of the Moon staff is recommended to come up with a programming solution to use this space more effectively. One possibility is to level-off the area by raising the two edges with wood or concrete to create a level wooden platform from wooden planks for displays, etc.
- Repair the crack near the southeast corner. A structural engineer should evaluate how the wall needs to be supported, and include drainage considerations (see landscaping section, p.44).
- Assess electrical and lighting systems, and upgrade where needed.
- The small stone fountain located in the corner opposite the door is non-functional. Unless there is a programming need to re-activate this water feature, it is recommended to leave it as is.
- The bricked-up doorway that once led to the Yellow Room should likely remain as such (at this time). Opening this up would create an additional circulatory corridor and eliminate valuable interior storage serving the Enchanted Garden complex. This item is certainly up for discussion with the Valley of the Moon staff, as programming needs may benefit from additional mobility within the complex – based on events taking place in the garden itself.
- Clean all old paint from wall surfaces using a crushed walnut shell system.
- Upgrade lighting consistent with Room (E).

Cost Estimate: **$ 6,600**

Photographs:

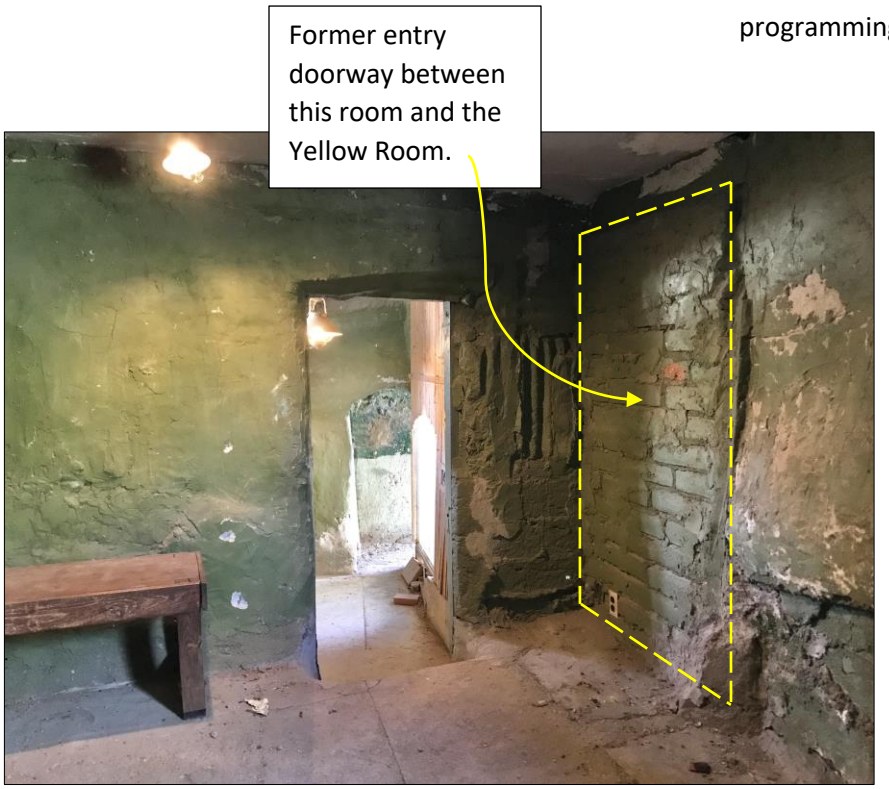
Above: View into the room **(F)** from Room (E). The mound seen at right is over the cave (outside) and the entry door from the Rabbit Hole entrance.

Removal of the green paint in both rooms is recommended.

Above: The openings are window of different sizes used in Legler's story-telling narrative. The large window has broken glass which needs replacing.

Above: View of the plywood door over the Rabbit Hole entry. The door is currently screwed closed for safety and security reasons.

Above: The roughly made concrete form see here covers the top of the stone cave below. If this were to be made level (or stepped) it could provide increased programming and/or display opportunities.



Left:

View from Room **(F)** toward Room (E). The rough brick infill indicates the closure of a doorway connecting this space to the Yellow Room.

The difference in height between this floor and the floor of Yellow Room has not been determined at this time.

iii. Yellow Room **(D)** on Plan, p.7)

Condition:
The Yellow Room is reached by turning left along a high-walled passageway located next to the main flush panel entry door to the Enchanted Garden. It contains a single has a single steel-frame window with opening sash (non-operational until serviced). On the wall opposite the door is the bricked-up entry to rough solid masonry, and at one time was accessible from the upper adjacent chamber **(F)**, however this doorway opening is now blocked-off. To the right of the bricked-up doorway is a damaged plasterboard-covered wall built on a 2x frame. It is possible this wall is not original and was originally open to George's Bedroom, but only further examination during repair work will clarify this.

Overall, the room is quite dirty and has electrical work that requires repair and replacement.

The original use of the Yellow Room is unclear but is now used for occasional storage, but during rehabilitation of adjoining rooms (E) and (F), a revision of its use as a storage area may become apparent.

Repair Strategy:

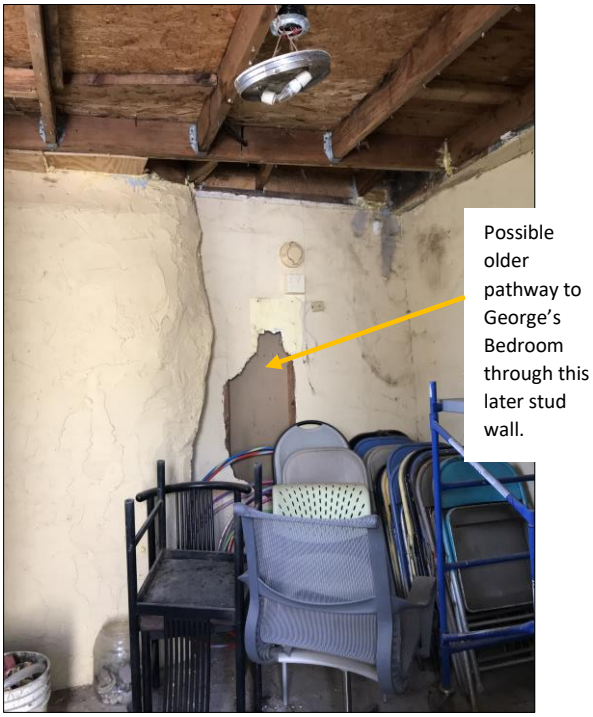
- Clean out the room.
- Remove wall board over framework in concert with repair work in Room (E) Georges Bedroom to determine extent of repairs necessary to both rooms.
- A decision can be made at this time whether to make an entry into the bedroom or not.
- Service steel window by removing rust and built-up paint. Remove and service mechanisms, re-glaze and repaint as needed, and install new replacement screens.
- Repair or replace non-functioning or damage electrical fixtures, including a new ceiling fixture of suitable deign.
- Install a new frame and door to match rustic door to Enchanted Garden (so they match). Install a latch similar, but also install a keyed deadbolt for security.
- Following decisions for use, install fittings such as shelving to make the room more conducive to operations.
- Covering the ceiling with drywall is recommended, after ensuring the closure of gaps which currently allow insect and rodents to enter.
- Paint all interior plaster surfaces white.
- On the exterior, apply compatible-with-original masonry fillers to gaps leading to the garden to reduce pest entry. Some experimentation and guidance should be expected. Treat metal components with rust inhibitor.

Cost Estimate: **$3,500**

Photographs:

Above: Entry passage to the Yellow Room. To the right is the wooden entry door to the Enchanted Garden. Concrete work around the doorway needs repair due to cracking and material loss.

Above: An example of the numerous materials needing careful treatment to consolidate while preserving the essential character of the materials.



Above: Interior of the room with the rough plastered wall over the brick infill to Room (F) at left. Electrical work is needed here.

Above: View of the metal framed window. Although the sash mechanisms do not work, with careful servicing this window will last indefinitely. Once work has been completed, it is recommended all wall and ceiling be painted white.

9. Structural Crack in the Arch over the Second Entry (East entry to the Rabbit Hole over the pool).

Condition:
The vertical crack above the stone arch is indicative of structural settlement from pressure above. The weight of the corner of the building bears down on a point right of center of the masonry arch, and directly over the passage to the Rabbit Hole entrance. Consequently, staff have closed this entry point due to safety concerns. Short of rebuilding the entire arch (which would be highly disruptive and costly), a solution is sought that (1) supports the corner of the building, and (2) preserves the structural and visual integrity of the arch without demolition and reconstruction. The intent is to have minimal impact on the visual quality of the structure, once completed.

Next to the pond is a metal handrail at right angles to the pathway to the immediate north. This is not original to the structure, is sloping, and engages into a small stone arch for support (if not convenience). While its removal is recommended for aesthetic reasons, this railing may be necessary to cover safety concerns.

Repair Strategy:
It is recommended a new supporting arch of metal be fabricated under and behind the existing stone arch, supported by new footings at either end. Stones above the arch hang down like jagged teeth, a theme often repeated in Valley of the Moon features. Behind these stone teeth is a space or indent, which with careful sighting, might largely hide a custom steel arch support. One terminus of the new steel arch would be on the lefthand side of the arch above one edge of the pond, the other to the right near the doorway itself. It will require careful exploration to find the correct location to build the footings.

While a vertical support immediately under the area of greatest weakness is a relatively "easy fix", doing so would break the visual flow of the arch which has several contiguous shapes surrounding it, so this approach is not recommended except as the only or last resort option. The visual quality of the entire arch and cave-like entry would also be affected.

Introducing a supporting steel arch would almost certainly mean affecting part of the pond wall; however, the <u>pond walls are already cracked in several places,</u> and it is recommended that during after structural work, the pond lining be repaired or replaced. From the inside of the cave entrance, the steel support would be fully visible, and from the exterior, minimally intrusive. **See Concept Drawing on p.38.**

Once in place, the space between the top of the steel supporting arch and the stonework above can be filled with a suitable grout, thereby reestablishing structural support and integrity. At least one stone on the face of the arch above the passageway/railing has fallen off, and a replacement one of suitable size needs to be found and attached. Adjacent structural cracks should then be filled with mortar of the same texture and color as surrounding material. A structural engineer will need to examine the feasibility of this recommendation and discuss this and any possible alternatives with the team.

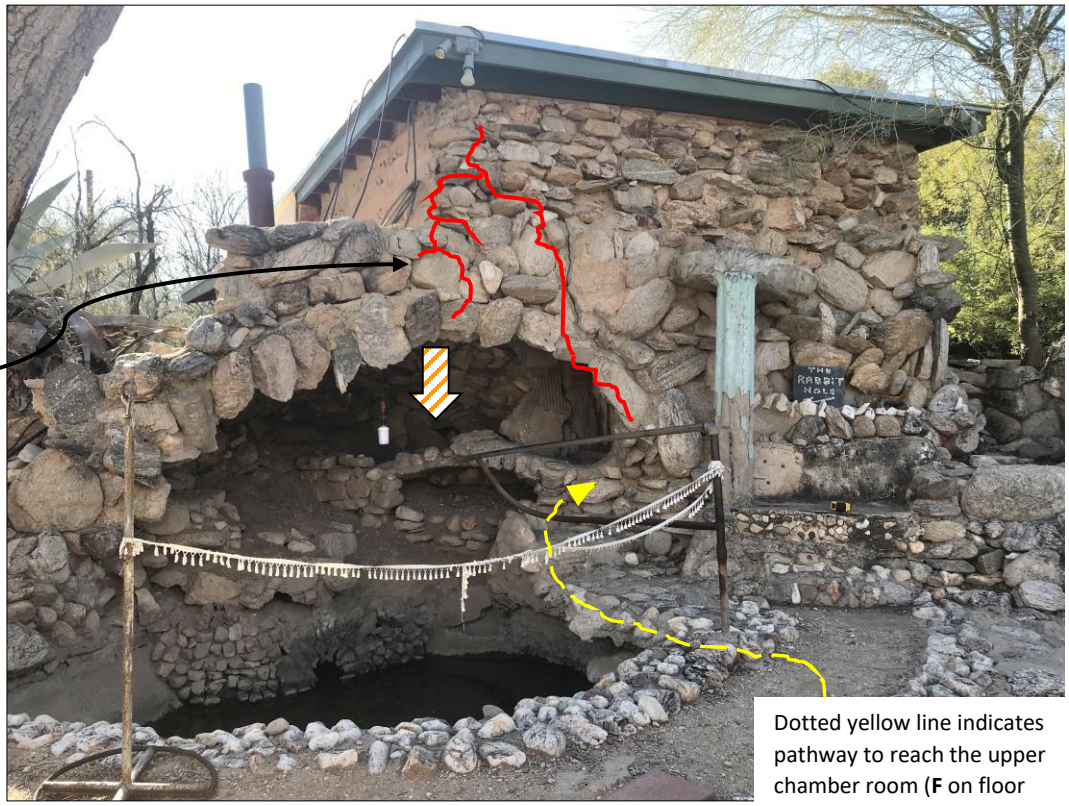
Other:

- Remove the steel pipe handrail located along the entry pathway (as noted above).
- Repair fluted concrete column supporting the plant bowl next to entry.
- It is a recommendation that the Rabbit Hole entrance at this location be made "**one way only**" (i.e. "up" to avoid the awkward and potentially dangerous climb downwards from the second chamber. The other entry from the garden side can be both exit and entrance.
- Finish-out the ceiling of the entryway above the Rabbit Hole entry steps.

Cost Estimate: **$ 24,900**

Photographs and Drawings:

Red lines indicate areas of most visible cracking, indicating a downward movement of the stonework above the arch, and the arch itself. The largest separation crack is approximately 1.25 inches (vertical space). See also insert below.

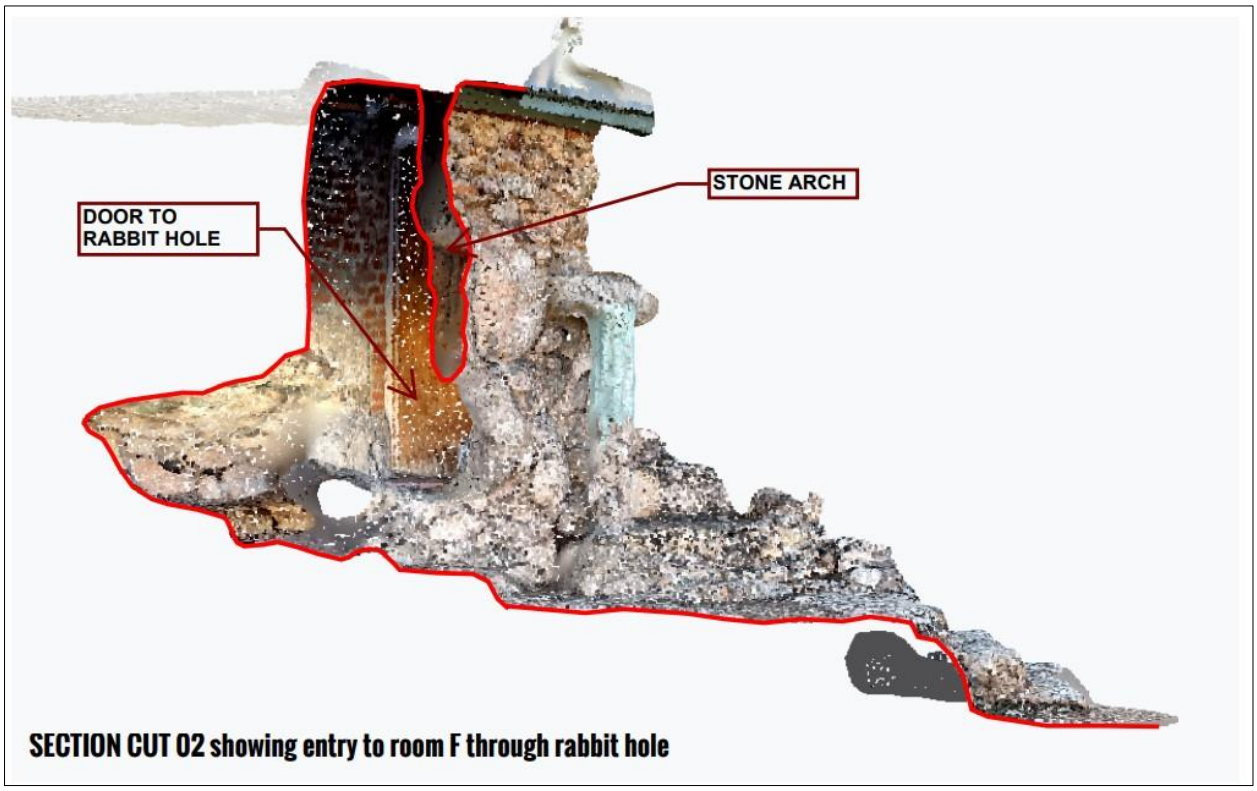


Dotted yellow line indicates pathway to reach the upper chamber room (**F** on floor plan).

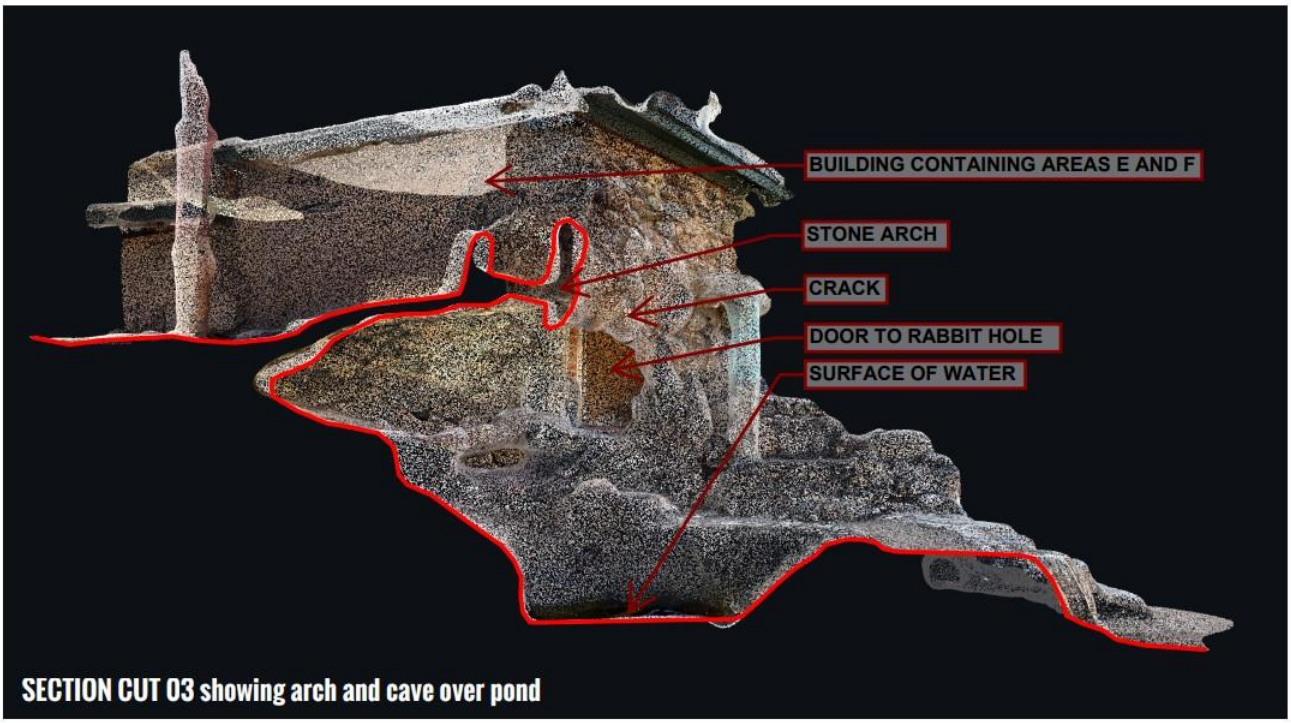
Arrow below cave arch and corner of building indicates area of downward pressure from weight above which is likely causing the cracking.

Above:
View of the arch over the pool and the Rabbit Hole entry. The fabric "rope" is there as a visual deterrent to help prevent people from accidentally falling into the pool.

Safety around many of the structures remains a concern, however one of the visitor experiences of Valley of the Moon is to place the visitor in unusual and spatially challenging environments. Therefore, making the site "100% safe" will severely dilute the intended experience developed by Legler in the 1920s and 30s.



Above & Below: 3D scan drawings showing views of the Rabbit Hole and cave configuration.
By Charle Pifer, PMM.

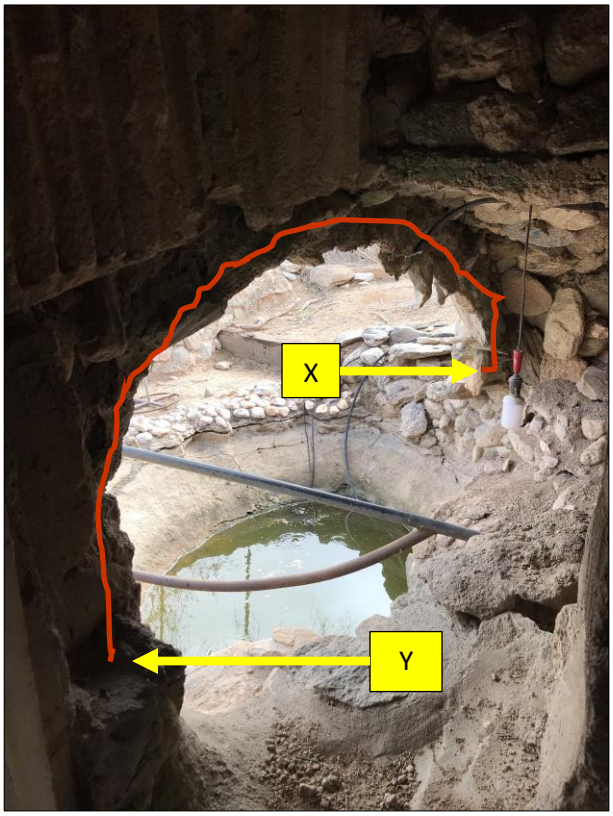


Left:

The metal pipe handrail is not original and engages the lower arch at a downward angle.

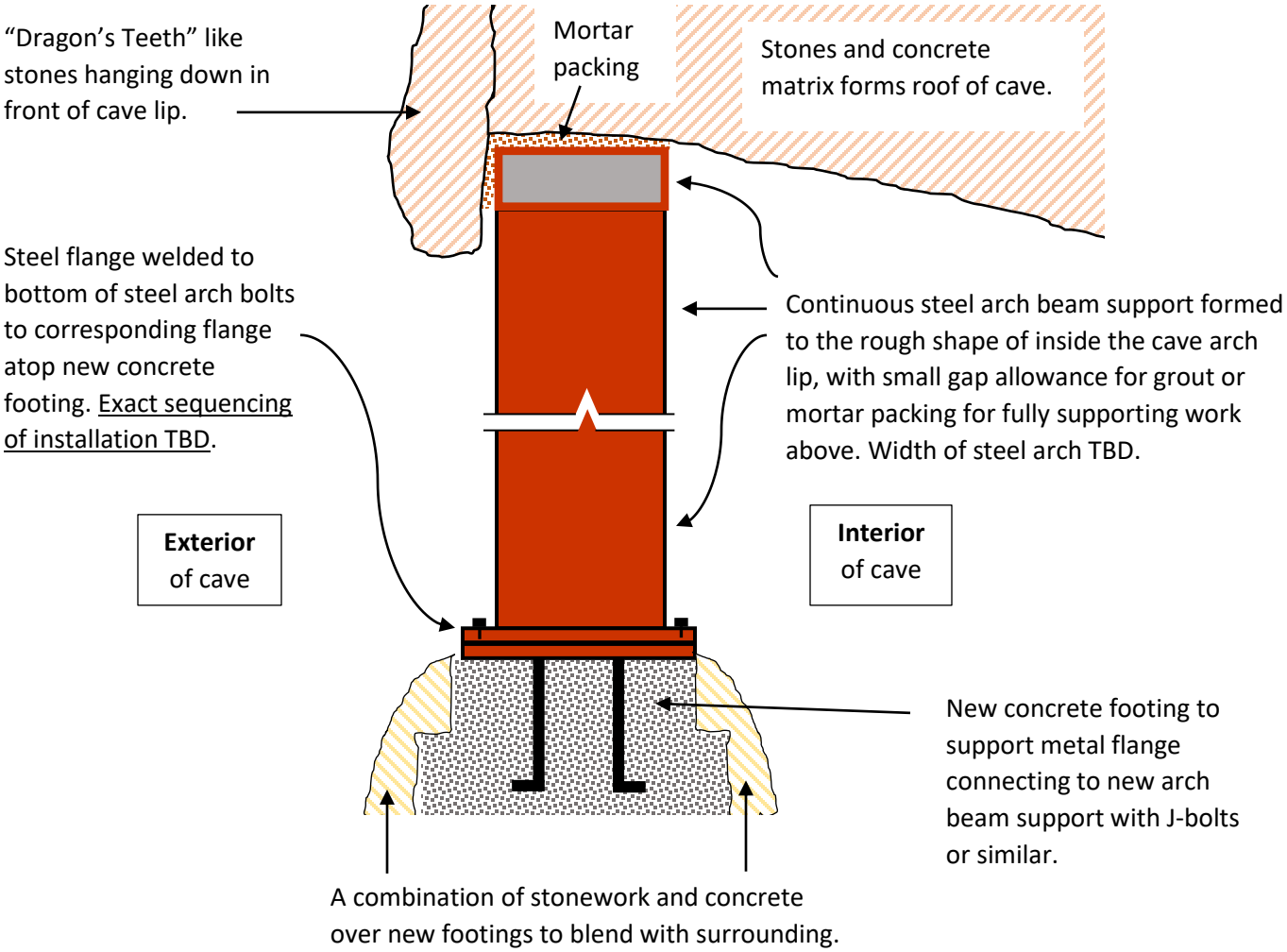
Its removal is recommended due to the visually intrusive nature of the railing.

The suggested steel supporting arch would be tucked behind the line of "dragon's teeth" – like stones covering the arch opening. A temporary support for the cave area may be necessary during work.



Above: View of the Rabbit Hole entry looking down from the entry door in Room F. Supports for the new steel arch (red line) would be located at points "**X**" and "**Y**" (which is the point nearest to the Rabbit Hole door). entrance.

Above: View of the Rabbit Hole entry looking upwards where a light fixture is located. The door frame is visible at upper left. The area above entry should be finished-off.



Concept drawing (section) of Proposed Metal Supporting Arch

Details of a proposed solution to support the stone arch over the Rabbit Hole entry and pool. Not to scale.
(By Simon W. Herbert, and **subject to engineering design/approval**).

10. Roof & Drainage

Condition:
The roof of the building is low slope containing two different roof planes, covering the three rooms. The rolled roofing is in generally good condition, but with some signs of wear of the white roof coating.

The main issue concerns the western edge of the roof over the Yellow Room, where a gap exists between the drip edge and the edge of the thin shell concrete wall. Here, water can penetrate between the wall of the building and the concrete wall. This is a likely contributor of damage and cracking to the structure above the pond area wall (see p.22).

The fascia board below the drip edge is already deteriorated and needs replacing, however there are only a few inches access and therefore insufficient room to effect proper repairs. The space is partially filled with debris, including racoon droppings.

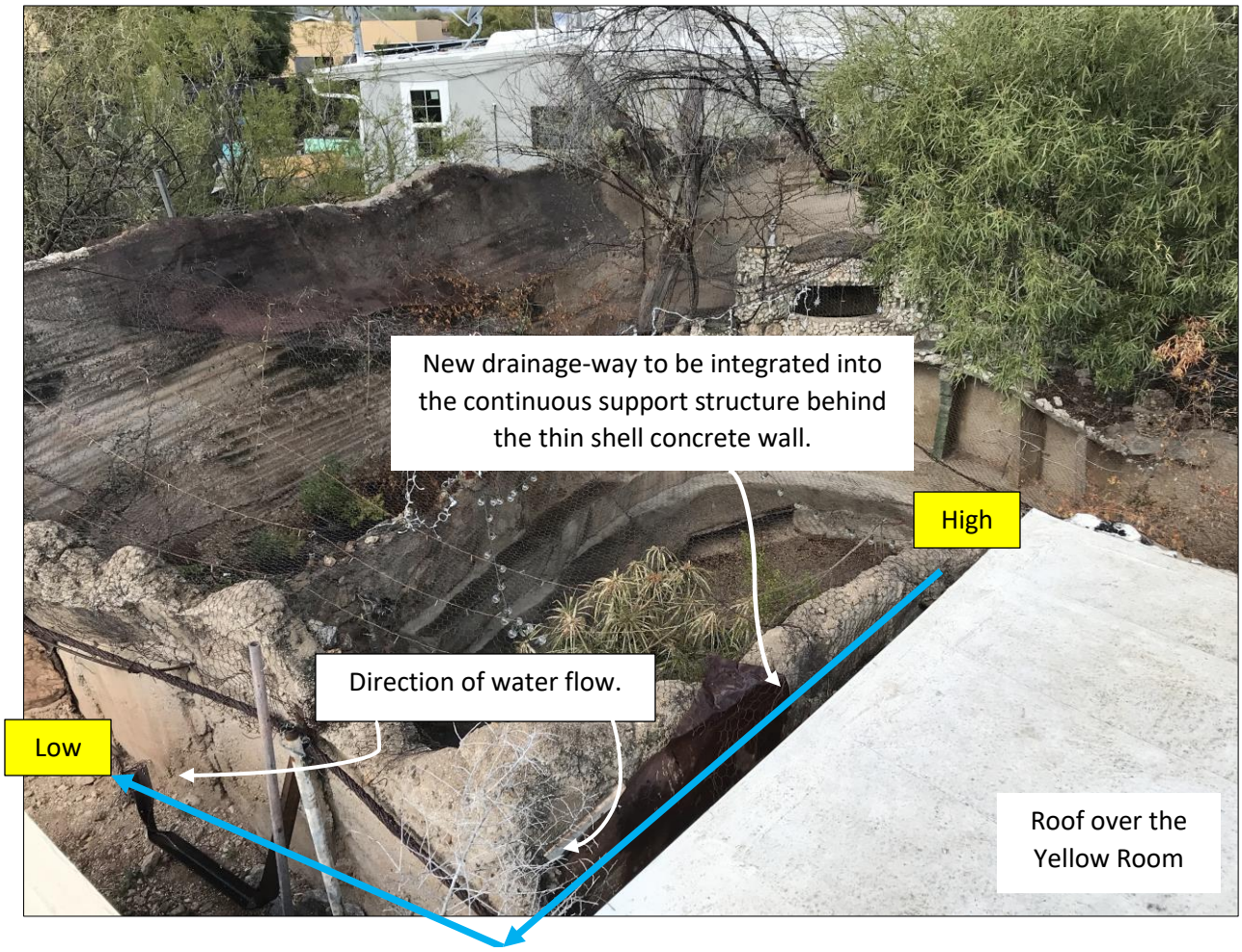
Repair Strategy:

- Remove debris in space between wall and thin shell concrete down to solid substrate.
- If possible, remove deteriorated wooden fascia (which may in turn disturb roofing and drip edge).
- Suggest an infill of mortar and brick to create a new sloping scupper between the two walls that collects and directs water away. Cover this with cement, form a clean slope, followed by a coating of roofing cement with good adhesion to surrounding surfaces including the back side of the thin shell concrete.
- Treatment of exterior wall of building can only be fully determined after exposure of materials.
- New drainage-way will need to be integrated into the new support wall for the thin shell concrete wall (see item No. 1, p.12).

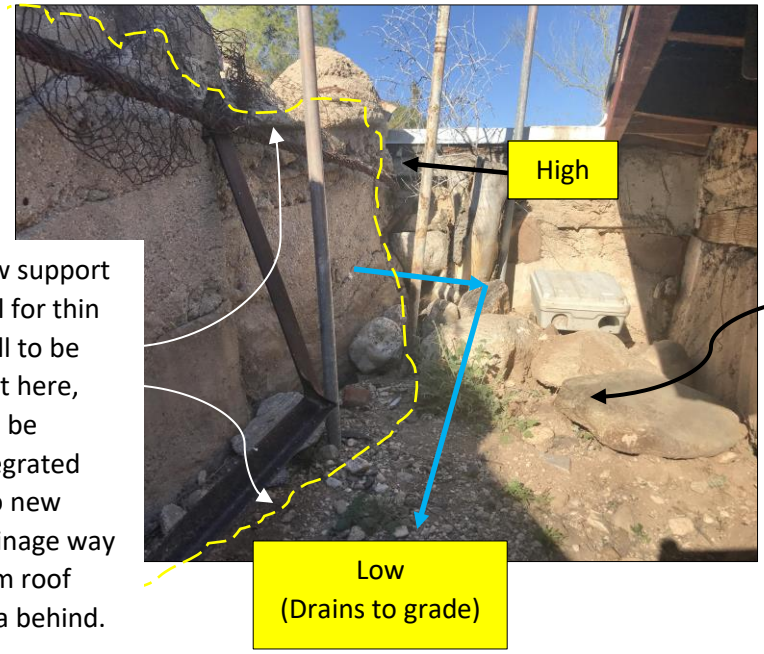
Cost Estimate: $ 5,225

Photographs:

<u>Above two photos:</u>
In generally good condition, the roofing needs some basic maintenance and re-coating of surfaces.



Above:
View of roof above Yellow Room, showing gap between building and wall with a drainage issue.



Left:
View looking up the path between the buildings and thin shell concrete wall of the garden (seen at left).

The area here also needs considerable clean-up and grading.

Above: Another view of the target repair area. Arrows in blue indicate drainage of water to grade as part of an integrated repair to the thin shell concrete wall and the space between it and the exterior wall of the Yellow Room.

Above: View up toward the drainage-way between the thin shell wall and the building. The groundwork here will need to be reinforced, likely to include terracing and proper drainage to accommodate water run-off. The remains of a retaining wall seen in the foreground is the subject of section 11 (below).

11. Retaining wall in southeast corner

Existing Conditions:

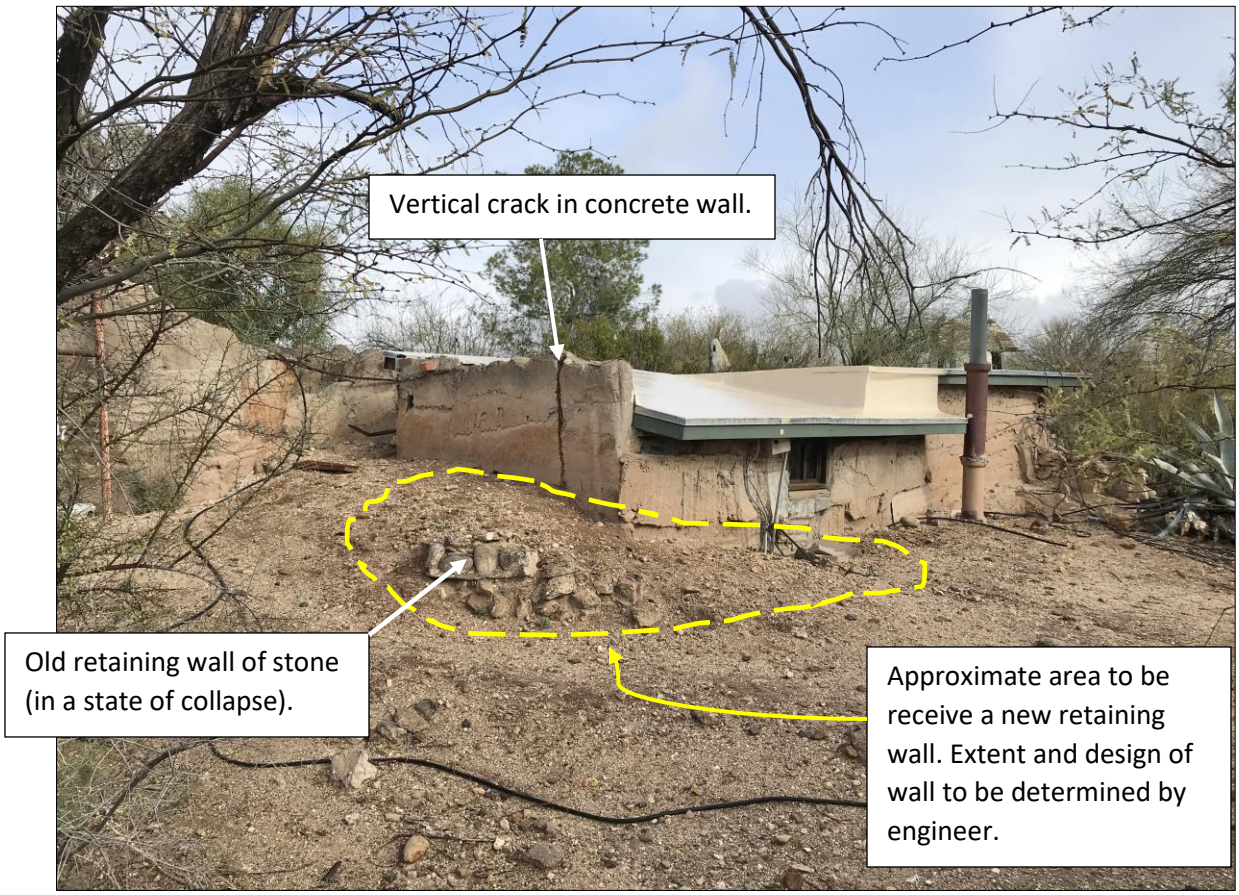
The remains a low rubble stone retaining wall are visible in between the corner of the building and the thin shell wall surrounding the garden. Over many years, wash-down and soil movement have almost obliterated the wall, which is still needed to help hold material back from around the building. This will also help stabilize the corner of the building which exhibits cracking.

Repair Strategy:

- Install a new retaining wall of suitable design which will also accommodate drainage from the roof area behind.
- A concrete wall is recommended, but this should be faced with stones (per original).

Cost Estimate: **$ 2,100**

Photograph:



Above: View of the southeast corner.

12. Electrical (general) lighting, receptacles, etc.

Conditions:
Electrical distribution to the Enchanted Garden complex appears to be from a set of electrical panels set at about 5ft. height and attached to poles just south of the complex. From these panels run electrical cables, distributed to various parts of the structure powering outlets inside the building, lighting fixtures, pumps for water circulation in the pond and pool, spotlights, and a wide variety of string lights and other decorative lighting. Numerous electrical outlets and fixtures appear damaged, with some cover plates damaged or missing. These present unsafe conditions especially if the public is within arms reach.

A complete string light plan needs to be designed and installed which properly illuminates the garden and replaces the current incremental/hap-hazard system of multiple plug-in end-to-end lights.

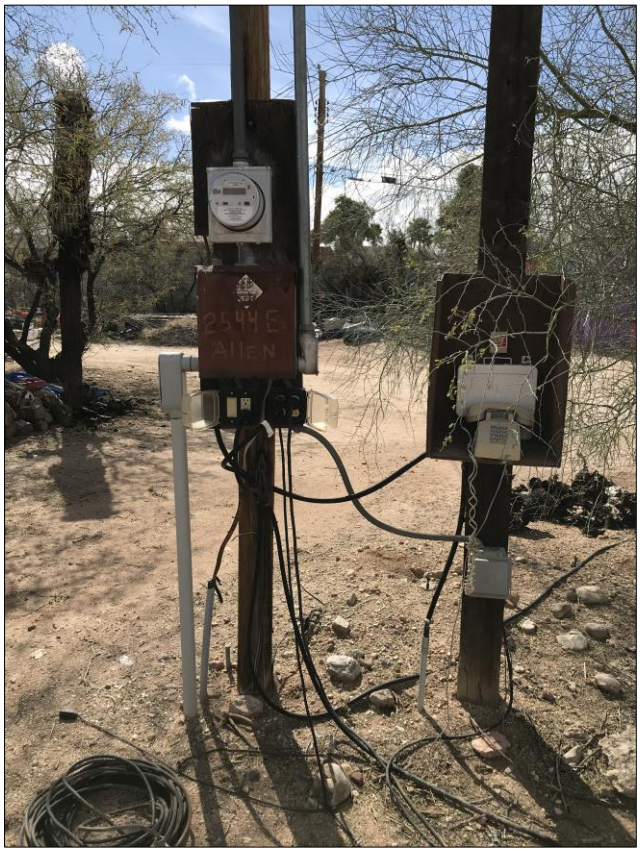
Repair Strategy:

a. Determine which circuits, fixtures, and string lights are not needed and remove them.
b. Properly repair those fixtures and systems being kept, and upgrade.
c. Replace non-LED light bulbs with LED bulbs for improved energy efficiency.

d. Ensure exterior cable runs are not a hazard to the public. If necessary, cordon-off areas or pathways where hazards may exist.

Cost Estimate: **$ 15,200**

Photographs:



Above:
Electrical Panels mounted on poles just south of the Enchanted Garden Complex. These have a profusion of underground and surface electrical feeds. Some are connected directly into the panel, while others are plugged into outlets, with extension-type cords powering needed systems.

Above:
Example of wiring routes going to the Enchanted Garden complex from the panels (and typical of electrical distribution elsewhere at Valley of the Moon).

Cables laying loose on the ground constitute a hazard to the curious public, as such areas are not cordoned-off.

13. Landscaping and Drainage.

Conditions:
While vegetation or a landscape plan is not a part of this report (as assigned), it does impact the Enchanted Garden from all sides, and is therefore worthy of mention. It should be remembered that the bottom of the garden acts like a low-point water collection, and in the event of heavy rains, is subject to occasional flooding which can impact the pathways, pond, and the lower chamber (E).

Repair Strategy:

a. Remove all dead vegetation and growth from within the garden and terraces.
b. Come up with a landscaping plan with new plantings appropriate for intended uses of the garden and environs.
c. Plantings to be suitable for the built structures and soil conditions, etc.
d. Assess water distribution, and design/install discreet water-points for hose and/or drip-feed systems.
e. Ensure drainage pathways work and do not trap water in areas which can promote erosion, or damage and rot to structures.
f. A high water-level activated sump pump may be required.
g. Continue with a care and maintenance program.

Cost Estimate: (not including new plant purchases): **$8,500**

Photographs:

Left:

Example of a dead tree in the upper terrace area. Such items should be removed. This will visually clean-up the garden and allow room for new plantings suitable to the microclimate of space.

Adobe House

Right: View of the area near the pool and Rabbit Hole Entry.

The blue arrow represents an approximate path of water moving from high to low.

According to Jenni Sunshine, this area contains an important historical water and drainage feature (since partially buried). Further examination of how this feature worked is required before determining if and how it can be re-activated. Should this water feature project be placed on hold, then an intermediate plane must be devised that does not allow water run-off (especially during monsoon rains) to damage walls and other features.

Right:
View of pool and terrace near Rabbit Hole entry.

A former waterfall feature (abandoned) is atop the cave entry, and likely was tied in with the internal water feature inside **Room F**. It is recommended this water feature **not** be restored at this time.

Due to ground slope, water run-off is directed to the pool below (white arrows). Improved terracing and directing water to plantings and drainage paths is recommended. Much of this aspect of the landscaping could be accomplished with a clear plan using volunteers under good supervision.

14. Strategy for Improving Accessibility and Public Engagement:

The Valley of the Moon facility will never be fully accessible due to the nature of its historical features. Currently there is only limited accessibility for a movement-challenged person, but it is recommended some improvements be made to increase access where impact to the historic resource will be minimal. Additionally, enhanced pathways will add significantly to programming opportunities in the future since other areas such as the Cathedral area and Witches Cauldron stage will be much better connected.

Accessibility-challenged visitors to the Enchanted Garden are faced with a steep and rocky path to the entry door but are prevented from entering the garden due to lack of a platform on which to stop (there is an almost immediate step-down to the garden main floor). As part of a limited accessibility improvement, it is proposed that the Enchanted Garden be made more accessible. **An in-depth look at the accessibility plan is included in Part 2 of this set of Valley of the Moon reports (The Cathedral Complex).**

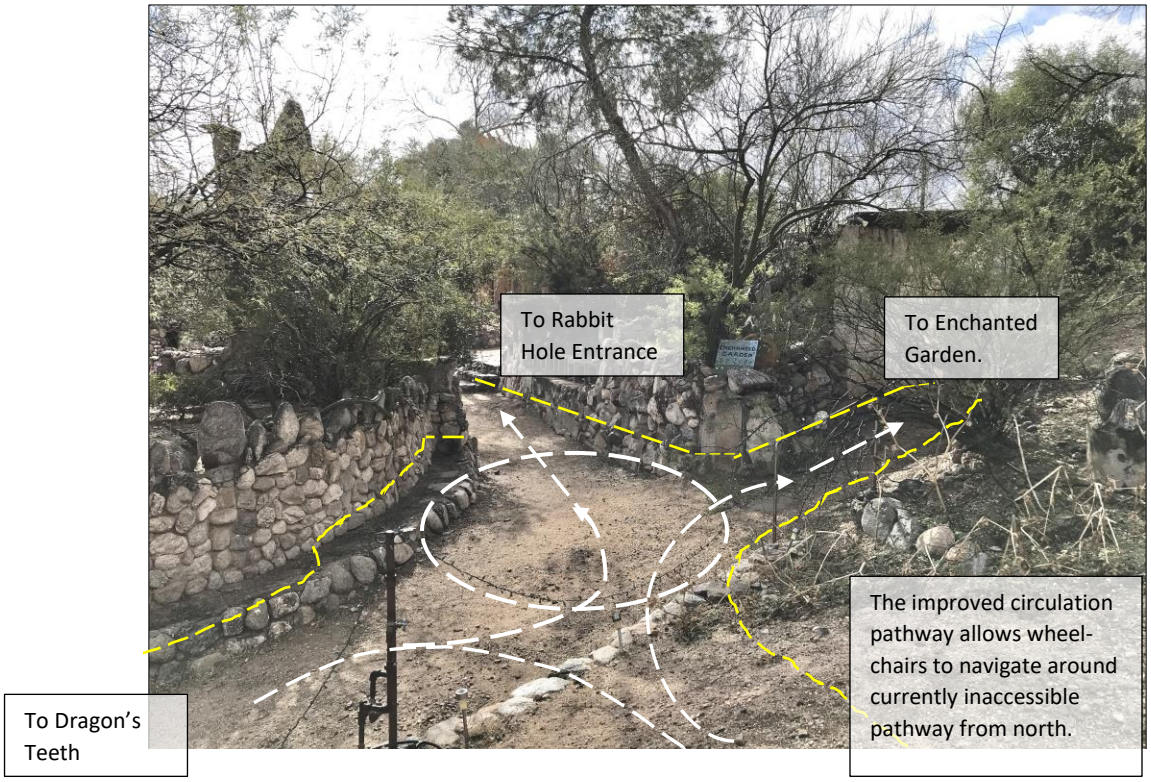
Accessibility Improvement Strategies for the Enchanted Garden

1. The current main entry ramp to the garden is steep, and uneven with protruding rocks. It is proposed this entry path (between the high walled passageway) be raised at the base of the ramp to bring it into conformance with a 1:12 slope (the minimum if a handrail is included). Some cutting of the slope and removal of rocks may be necessary and underpinning of the flanking masonry walls. Additional work to the east along the existing pathway is also recommended to help tie-in access to two adjacent areas that will also be improved for accessibility.
2. The two burnt adobe walls flanking the entry ramp will need to be underpinned (pending engineer's recommendations).
3. The adjusted path will be finished in decomposed granite or similar, with color-matching of material as close as possible to surrounding path material so it blends-in.
4. The existing rustic entry doorway is 29-1/2 inches wide and does not meet the official minimum width of 32-inches required for wheelchair accessibility. Additionally, the wooden door has a wooden "Z" bar on the back side, which adds another 1-1/2 inch of the thickness to the door, further reducing available width.
5. A possible low- cost solution involves moving the same door to the inside of the frame to hinge open into the garden to fold flat against the interior concrete wall. The existing wooden door frame is cracked and needs replacing. It is also loosely attached to the masonry side walls as the anchors are failing. Most manual wheelchairs would still fit between the jambs, although not meeting the official 32 inches of clearance. Short of changing or removing original stonework, this provides the best solution to increasing accessibility for those in a wheelchair or walker to enter and overlook the Enchanted Garden, which is currently not possible.
6. Just inside the garden immediately to the left, create a single wheelchair position inside the entry door of the Enchanted Garden. This will involve building-out a small peninsular and putting in a railing - but will only accommodate one person. When not in use by a wheelchair user, the new "platform" – an extension of the existing top step, serves as a point from which docents can speak or actors perform. The location is visible from all seating positions within the garden space.

These minimal improvements will greatly increase the ability of those with limited mobility to both access and enjoy the Enchanted Garden, although they will not be able to access the lower level of the garden or enter the chambers.

Cost Estimates: **$22,850**

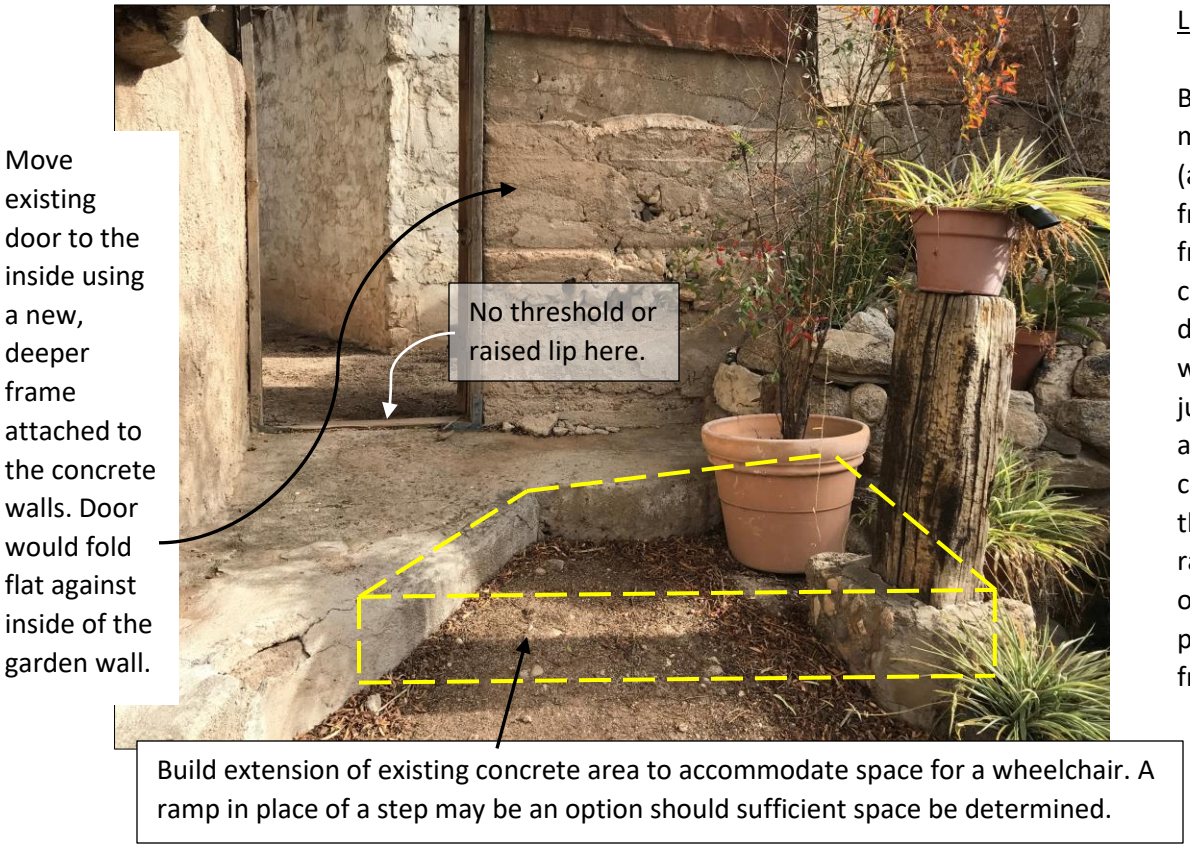
Photographs:



Left:

An approximate line (in yellow dashed) showing how a change of grade in the entry area could greatly improve the accessibility of not only the Enchanted Garden, but of surrounding features.

White dashed lines/arrows indicate circulation.



Left:

By inserting a raised masonry platform (alternatively one made from treated lumber framing and plastic composite material decking), a wheelchair or walker could be situated just inside the door, still allowing people to circulate in and out of the garden. A partial railing would be needed on the front side to prevent wheelchairs from rolling forward.

15. Cost Estimates Overview: The Enchanted Garden Complex

Providing cost estimates for a historic preservation project of this nature raises significant challenges when attempting to provide accurate figures. The Enchanted Garden complex contains a considerable number of "unknowns" which are difficult to quantify without further investigative work. It should be noted that Item No. 14 (Strategy for Improving Accessibility and Public Engagement) includes work that interconnects with other areas in the Valley of the Moon site).

Below, each section area has been assigned costs, some with cost ranges. Please be aware these ranges represent a fluid dollar amount dependent on what is discovered once work is underway. Prioritization of tasks are designated High **(H)**, Medium **(M)**, and Low **(L)**, and equate to critical, needed repair, and wish-list upgrade.

Cost Estimates by Section	$	**Priority Level**
1. Upper thin-shell concrete wall and support:	$ 19,700	**H**
2. Chicken Wire Canopy:	$ 4,900 - $ 6,900	**L**
3. Seating Area and Buttresses within the garden:	$ 2,100 – $ 3,200	**M**
4. Cantilevered Concrete Planter:	$ 720	**H**
5. Miniature architectural structures:	$ 4,800	**M**
6. Repair of crack in wall above the pond:	$ 5,100	**H**
7. Re-construct Door leading to the lower chamber:	$ 2,200	**M**
8. Interior Spaces:		
i. Lower Chamber (George's Bedroom):	$ 7,200	**M**
ii. Upper Chamber (George's Writing Room/Office):	$ 6,600	**M**
iii. Yellow Room:	$ 3,500	**M**
9. Structural crack in the arch over the Rabbit Hole entry:	$ 24,900	**H**
10. Roof and Drainage:	$ 5,225	**H**
11. Retaining wall in southeast corner:	$ 2,100	**H**
12. Electrical and Lighting:	$ 15,200	**H**
13. Landscaping and Drainage:	$ 8,500	**H**
14. Strategy for Improving Accessibility and Public Engagement:	$ 22,850	**M**
	Sub-Total Base Estimate (Range): $ 135,585 - $ 142,595	

Determining related costs:
In addition to the base estimate, several other factors must be included to cover necessary related costs. These include:

- 25% Design and Construction contingency.
- 10% Design fees.
- 7.4% Permit and Plan Check fees.
- 20% Inflation (10% per year for two years).

= **62.4% Multiplier** (applied to Base Estimate above. Multiplier information supplied by Jon Mirto, PMM).

62.4% multiplier added to Base Estimate = Total Estimate (Range): $ 220,190 - $231,574

16. Report Summary:

While this report attempts to cover all areas of concern with sufficient detail to accomplish needed repairs and upgrades, it became apparent with investigation this was going to be a near impossible task with the time and resources available. This is essentially due to the immense amount of detail which surfaced within each of the categories, akin to peeling an onion and discovering there are yet more layers. Also, and invariably, one component is intimately tied to adjacent items both large and small, and cosmetically and structurally. In terms of priorities, structural concerns need to be addressed first.

There will undoubtedly be more discoveries at almost every turn in the work that invoke the need for further analysis, a quest for answers to new questions, and discussion followed by the formulation of acceptable pathways.

While additional time could be spent formulating further studies and reports before repair work begins, it may be a more prudent use of resources to begin the repair work with the understanding that uncovering new challenges will simply be the norm, and that on-the-ground sound decision making (with accountability) will be the preferred method of moving ahead. Each step can be undertaken with a measure of "controlled flexibility" as fresh repair discoveries are made.

One of the most challenging aspects of this project is the need to respectfully preserve as much of the original material as possible.

Acknowledgments:

The following have lent invaluable assistance in both the direction and formulation of this report:

Jon Mirto	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Charles Pifer	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Jenni Sunshine	President, The George Phar Legler Society, Tucson
David Yubeta	National Park Service (retired). Tubac, AZ.

End of Report

The Wizard's Tower Complex

An assessment of
Conditions, Repair Recommendations and **Cost Estimates**
for the above complex at the Historic

Valley of the Moon

Located at 2544 East Allen Road in Tucson, Arizona.

Presented to: **Jenni Sunshine**, President
The George Phar Legler Society, Tucson AZ.
By: Simon Herbert, Tucson, AZ
June 2022

To: **Jenni Sunshine, President**
The George Phar Legler Society, Tucson
From: Simon Herbert, Tucson, Arizona
Date: June 2022

The
Wizard's Tower Complex

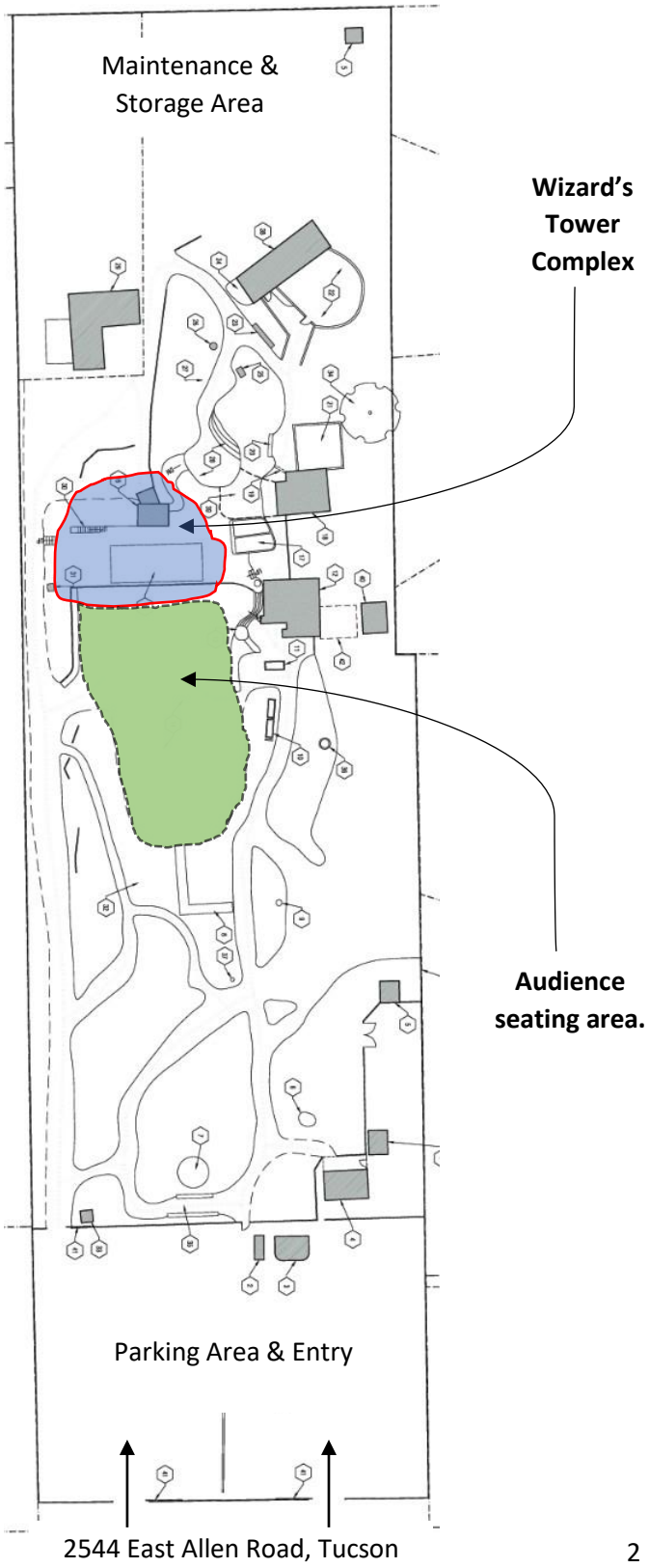
Below is an assessment of conditions, repair recommendations and cost estimates for the **Wizard's Tower** complex at the Valley of the Moon facility located at 2544 East Allen Road in Tucson, Arizona.

Right:
View of the north façade of the Wizard's Tower.

Contents **Page**

Report Overview:

The purpose of this report is to provide the George Phar Legler Society with a roadmap for repairing this portion of the Valley of the Moon facility, and covers **condition, repair strategies,** and **cost estimates**. For a contextual description of the property and how the Cathedral complex fits within it, please refer to the description in the National Park Service/National Register of Historic Places Registration Form (2011).

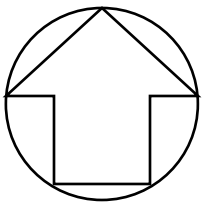


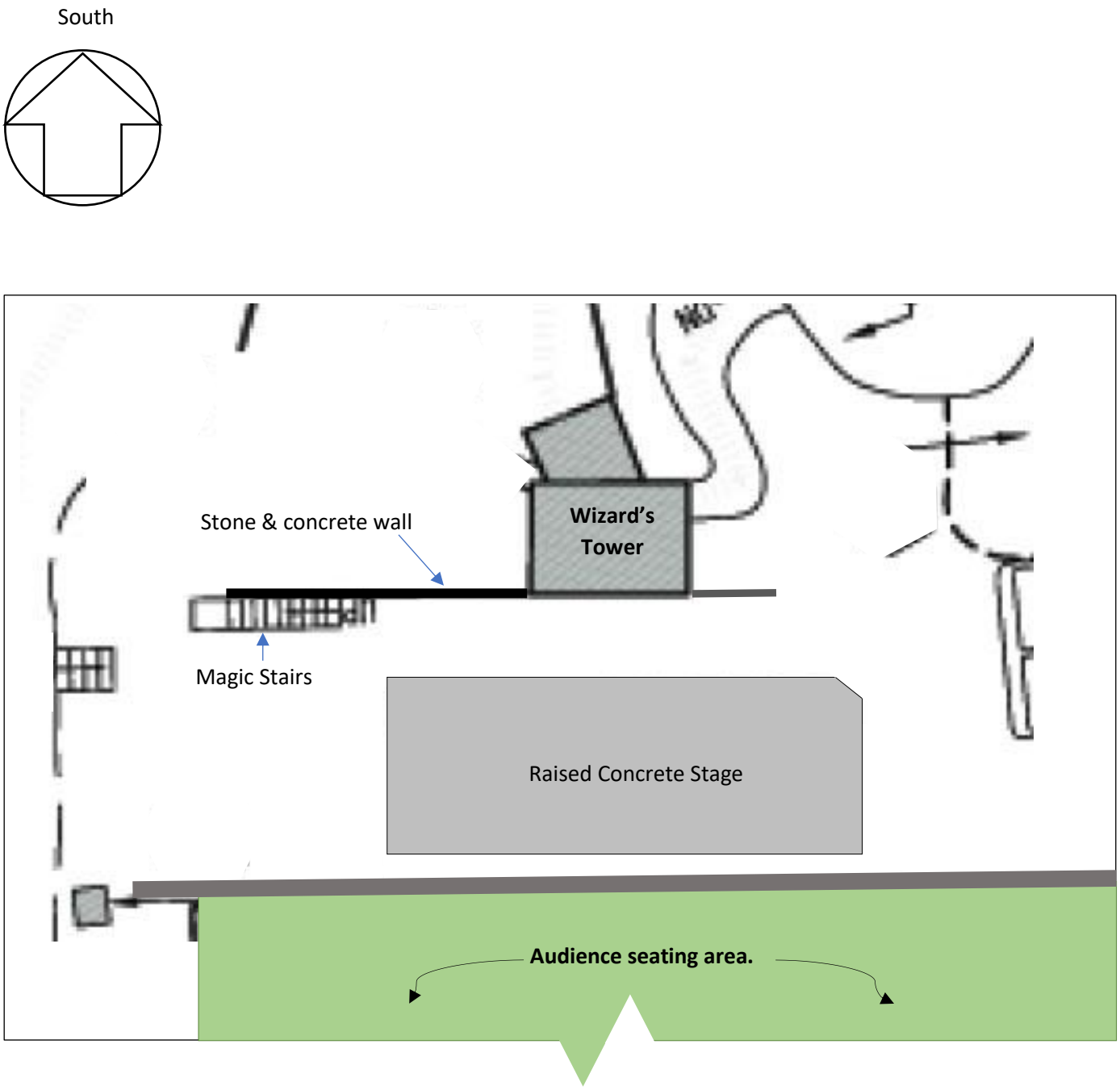
Valley of the Moon **Site Plan**

Site plan showing location of the Wizard's Tower Complex oriented as viewed and experienced by the visitor moving from north to south. Parking is shown at the bottom (north) end of the property.

Note:
The Site Plan shown here was taken from the Valley of the Moon Assessment Report by Burns Wald-Hopkins Schambach, Architects (2008) on the general condition of resources. Therefore, keys to symbols are not linked to anything in this report.

South





Enlarged Plan View of the Wizard's Tower complex.
(Not to scale)

General Description of the Wizard's Tower Complex:

Of all the features of the Valley of the Moon, the **Wizard's Tower** is perhaps the most visible and recognizable. It is also the tallest structure at Valley of the Moon, seen from almost any location. Centrally located within the site, the Wizard's Tower forms the backdrop for the main amphitheater-like performance space, capable of hosting hundreds of people for plays, musical presentations, and other events. The tower has played a role (or backdrop) in numerous theatrical performances.

The main façade of the two-story high tower faces north to the grassed audience seating area, where visitors can sit on folding chairs or on blankets. In between the tower and the audience seating area is a raised concrete stage, and a concrete wall with a drop to the level of the seating and grass lawn below.

The tower is oriented on a north-south axis with a walk-through at grade from front to rear. There is a single room above (not accessed for inspection due to safety concerns) with an open ceiling and framing supporting the hip roof. The room houses a partial bench for controlling lighting and is currently only accessible by ladder, brought in when access is needed. The door opening to the room is in the southeast corner on the south wall, with small windows on the north and west sides. On the east side of the tower's front is an impressive boulder wall that slopes down to the east, and on the west side is a similar wall, although truncated in size and scope by comparison. At the rear (south) of the tower's base is a thin shell concrete wall that curves, nave-like, to form a rounded backdrop and part entry cove. Entry and exit are through this opening, (ADA accessible), and there is an additional narrow passageway leading to/from the Pennyland performance area (which is non-ADA accessible), with both entry's converging below the raised room.

Construction materials for the tower are mixed, with wood frame, heavy mining cable, poured concrete, stone boulder, thin shell concrete, and corrugated metal. Like many structures at the Valley of the Moon, the Wizard's Tower is part of a collage of interwoven features making it difficult to separate it visually and physically from others. Below is the description of the Wizard's Tower extracted from the nomination form for the **National Register of Historic Places** (2011) and referred to here as the "Tower of Zogog".

<u>Tower of Zogog & Magic Stairs also referred to as the (Enchanted Castle or Wizards Tower).</u>

The unique building was constructed from stone, concrete, metal and wooden posts. The form of the structure is a cunningly wrought caricature of disabled antiquity. The ground level is a passageway with interior walls painted with faded murals leading from the large amphitheater stage to a dell at the rear of the building.

The second story is inaccessible but is reminiscent of an English cottage with a pitched concrete roof form that mimics a thatched roof massing. The irregular second story façade is punctuated by a single circular window opening.

Flanking the entrance to the lower story are two short, exposed rubble-stone retaining walls, the top courses of which are crafted with lighter-colored rock than the rest of this structure, providing a tooth-like array, behind which surviving desert foliage has been planted. Behind these retaining walls are two rubble-stone buttresses. The eastern buttress extends to middle of the second story, while the western buttress, much less massive, extends only to the top of the first story.

To the east, integrated into the retaining wall, are the Magic Stairs. This short flight of steps of cast concrete has been designed so that as a "pilgrim" ascends, each step tilts slightly downward, thus creating the illusion of descent while walking up. Northeast of the Magic Stairs, a cast concrete "standing stone" on a rubble-stone base towers from the foliage.

Preservation Approaches to repairing materials and features at Valley of the Moon:

Originally constructed by mostly unskilled labor, many of the building systems were under-structured when built, and nearly 100 later are showing signs of deterioration in many areas.

The goal is to preserve as much remaining original material as possible, yet be cognizant that some structural changes, material replacement, and certain other approaches are required for essential structural integrity, future maintenance, public safety, and sometimes improved accessibility. If Valley of the Moon is to remain a viable and inviting place for the public, some changes are inevitable.

Preservation of original materials is one of the key goals in the care of historic structures, but it should be recognized that many materials have a life-span culminating in eventual degradation and material loss. This necessarily leads to decisions concerning material treatment and replacement, and the National Park Service **Secretary's Standards for the Treatment of Historic Properties,** which include **Standards for Rehabilitation** providing a set of guidelines on how to approach these complex issues.

Above:
Partial view of the northwest corner of the Wizard's Tower.

Many of the materials at Valley of the Moon have reached the end of their life expectancy –having simply "aged out". When conducting repairs, great care must be taken to maintain the essential character of the site, which means being careful not to change or overly improve appearances. During the repair process, steps should be taken to make discreet improvements with detailing to reduce the mechanisms of deterioration which led to material deterioration and loss in the first place. This is a tall order, and in the case of Valley of the Moon, presents something of a "preservation minefield" since at almost every turn a new complex set of preservation questions arise. The **Wizard's Tower complex** presents some unusually complex challenges that will undoubtedly require some "hard" decisions by the preservation team. This report seeks to find the most achievable balance of repair and preservation.

Valley of the Moon operates largely on a "shoestring" budget, dependent on a small entry fee from visitors; income from special events such as performances and weddings; grants and donations; and the invaluable assistance of its many volunteers. Maintenance is provided largely by the volunteers, while larger physical improvements and more extensive repairs are a combination of contractors, volunteers, and donated services. This delicate patchwork of assistance provides the means of keeping the Valley of the Moon facility open to the public.

Condition, Repair Strategies, and Cost Estimates:

1. Wizard's Tower and integral masonry wall structures:

Description:

The Wizard's Tower is texturally and structurally complex, and visually rich. Examination of the tower's structure reveals some clues to its construction methodology, with evidence pointing to the main structure of the tower being built first using squared 4 x 4-inch timbers (posts) which lean-in slightly toward the top. Horizontal timbers then connect with these posts at the floor and ceiling levels, with more timbers forming the hip roof. Although initially an almost square box in plan, the completed structure is anything but symmetrical, and includes what appear to be random timbers thrusting outwards and upwards from the second-floor level and roof.

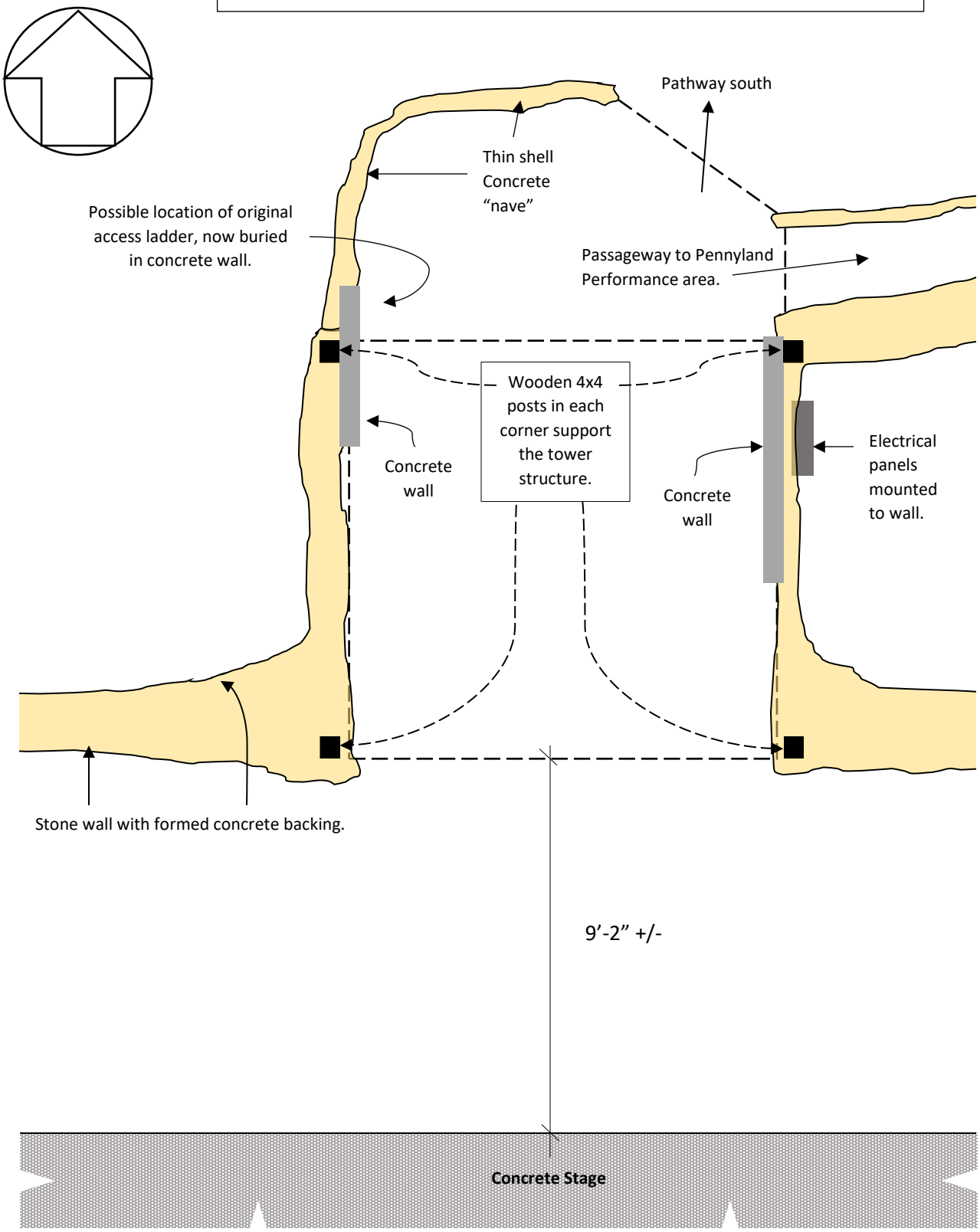
The single upper room is covered on the walls with thin shell concrete over a light wood frame on three sides, with corrugated metal on the south wall. Window openings have no covers or operable windows, and there is a door opening in the southeast corner, but no door. The hip roof has thin shell concrete on the north and west sides, and corrugated metal on the south and east sides, wrapped around and terminated onto the concrete roof.

Visible when standing at grade looking up inside the passageway, is the construction of the floor of the room above. The floor material consists of thin metal sheet over an uneven framework of both wood, and thin steel angle material. Legler's use of heavy mining cable in the construction is also visible here, with cables woven into the structure, which continue to other parts of the building and surrounding walls. It is unclear whether these cables were intended to be structural (perhaps offering some reinforcement to the matrix of other construction materials) or merely decorative in a whimsical sort of way. Given their lack of tension, they are more likely to be decorative in nature. As mentioned above, physical evidence points to the order of construction being in the following order:

a) Construction of a wooden frame using a variety of lumber sizes, including 4x4, 4x6, 2x4, etc.
b) Heavy mining cable laced into the structure and surrounding wall areas.
c) Forming of unequally sized concrete walls on the east and west sides (to a height of about 4 ft.)
d) Installation of lightweight framing for walls and roof.
e) The installation of stone rubble built around the wood post frame and formed concrete, with additional concrete "backer walls" which extend from the front plane east and west.
f) Installation of thin shell concrete for roof and some side walls.
g) Installation of corrugated metal in some areas (uncertain whether this was original or not).
h) Construction of the curved rear "nave" wall using thin shell concrete that once included the image of a cross.
i) Other connecting walls of thin shell concrete made with chicken wire and mining cable reinforcing material.
j) A non-historic "wall of doors" extending north from a concrete wall connecting to the tower complex is a recent addition. It is intended to shield visitors and activities from the service road to the east. The wall is made from old doors which have been painted in bright colors and scenes.

Plan View of central core area of the Wizard's Tower

Drawn by Simon Herbert (not to scale).



Existing Conditions:

Due to years of deferred maintenance atop an already poorly structured building, there are signs of growing deterioration in addition to evidence of structural movement in several areas. Repairs will be made more complicated as the core structural elements – the likely compromised wooden frame, is difficult to isolate because the timbers are largely embedded within the concrete and stonework. The following conditions are worth noting:

- The structural core of the wood timber frame is likely deteriorated to an unknown degree inside a harder masonry exterior.
- The tower structure is likely only still standing because the stone and concrete surrounding it acts as a series of buttresses, thereby preventing collapse.
- Structural stability is of concern due to the extensive deterioration of timbers and connectors. For example, in high wind conditions, each enclosed surface acts like a sail, threatening movement, further damage, or collapse.
- The thin shell concrete "nave" entry on the south end is in a state of partial collapse as the *very* thin concrete shell succumbs to its own weight and gravitational forces.
- There is vertical cracking of stonework on the east side of the north façade corner, suggesting downward pressure of the structure.
- There is cracking of the stone wall further east of the main tower, along with loose stones and cracks in the concrete backer wall.
- Portions of the connecting thin shell concrete wall (referred to in this report as a "nave") on the west side are in extremely poor condition with loose sections moveable by hand. Only the reinforcing wire and cable is preventing their collapse.
- Trees are damaging the stone and concrete work with their root systems.
- The electrical system needs upgrading, along with lighting and other related systems.

Repair Strategy:

The full extent of wood deterioration through rot, sun exposure and insect damage can only be guessed at until a more detail examination takes place (likely at the start of further physical investigation and/or repair work). Evidence of severely crushed and cracked wooden members suggests damage may be worse once work commences, which leads to the conundrum of how to repair the structure. From a preservation perspective, repairing the existing wood timber frame and thin shell concrete envelope is fraught with challenges (if not problems), mainly because the resulting intervention would likely result in a heavily modified original structure rather than a partial reconstruction of Legler's original intent. This point can be debated, but below are listed the following considerations for formulating a repair strategy:

- To fully expose and repair all affected timbers below the stonework would require removal of the stones down to where sound wooden material exists – which may continue all the way to the ground. Since this would be a highly destructive endeavor, an alternative approach is sought that preserves as much of the masonry as possible.
- It is unknown what footings the wooden frames were placed on, or what condition they are in currently.
- The general condition of the wooden upper structure (that which can be seen) is poor and structurally compromised.
- Continuing to preserve and patch-repair the existing timber frame is not recommended because in the not-to-distant future, the entire upper wood structure will need to be replaced due to its already poor condition. It

would be better at this stage to tackle the "big picture" structural problems than to put it off until later. This represents a potential savings and avoids doing the work twice (at roughly twice the cost).

- The thin shell concrete "wraps" much of the upper wooden framed structure (walls and roof). Replacement of the wooden frame (which should be expected) will necessitate removal of the thin shell concrete. Because this system itself is largely compromised, it will almost certainly require replacement. An alternative would be to use cement-board and cover this with stucco to create a rough surface to match the original, which would be both a cost and weight saving.
- Design a new structural framework (likely of steel) built to support the reconstructed room above the entry. Ideally, this will not rely on the existing wood frame or masonry for support and likely be visible to some degree. On this new framework reconstruct the upper room using wooden timbers and other materials per Legler's original vision but ensuring better protection from the elements beginning with the use of treated lumber.
- Adjacent walls connecting to the Wizard's Tower are a combination of concrete buttress walls, stone facing, and thin shell concrete. Some of the stone and concrete walls exhibit cracking. Once the upper room structure has been removed, cracks should be cleaned-out and carefully repaired with mortar to match surrounding material.
- The upper room will be a secure working room capable of managing the theatrical operations of performances for lighting and sound control.
- Install openable windows and a door that prevents unwanted entry of people, animals, and birds. Insect screens are also recommended, and if used in conjunction with inward-opening windows, will provide ventilation. Refer to historic photos (below, this section).
- Install a permanent set of stairs for safe access to the upper room.
- The electrical systems must be upgraded.
- Remove trees whose roots are continuing to damage the masonry work.

Likely repair steps:

- Remove the thin shell concrete "nave" and reconstruct this per recommended architect's/engineer's design (potentially using rebar, steel mesh and concrete or stucco, and replicating historical finishes and tooling). Reconstructing this portion will likely occur toward the end of all other repair work to the tower.
- After exact measurements are taken, de-construct the hip roof and upper room down to the masonry.
- Install a steel structural frame to support the upper room and hip roof. This frame also supports a new floor for the upper room, made level since this will be a working space for lighting and stage management use.
- On top of the new structural steel frame, reconstruct the timber frame for the upper room and hip roof, all tied to the steel framework. Reconstruction will include the timber protrusions to maintain the imaginative and intentional "quirky" appearance originally built by Legler.
- Re-install the thin shell concrete wall and roof (using improved systems) and include new wrap-around corrugated metal sections (per original). Re-using the old, corrugated material is not recommended because of its condition and numerous holes.
- Install a new stairway on the south side of the west stone wall that will allow safe access to the upper room.
- Custom design and install a new lockable door to the upper room and install operable replacement windows.
- Upgrade electrical systems for lighting and sound controls.
- Restore Legler-period artwork and other historical features.
- It should be noted that some features are NOT historical and should be permanently removed, including the flood lighting fixtures on the roof.

Estimated Cost: **$129,800 - $136,200**

Photographs:

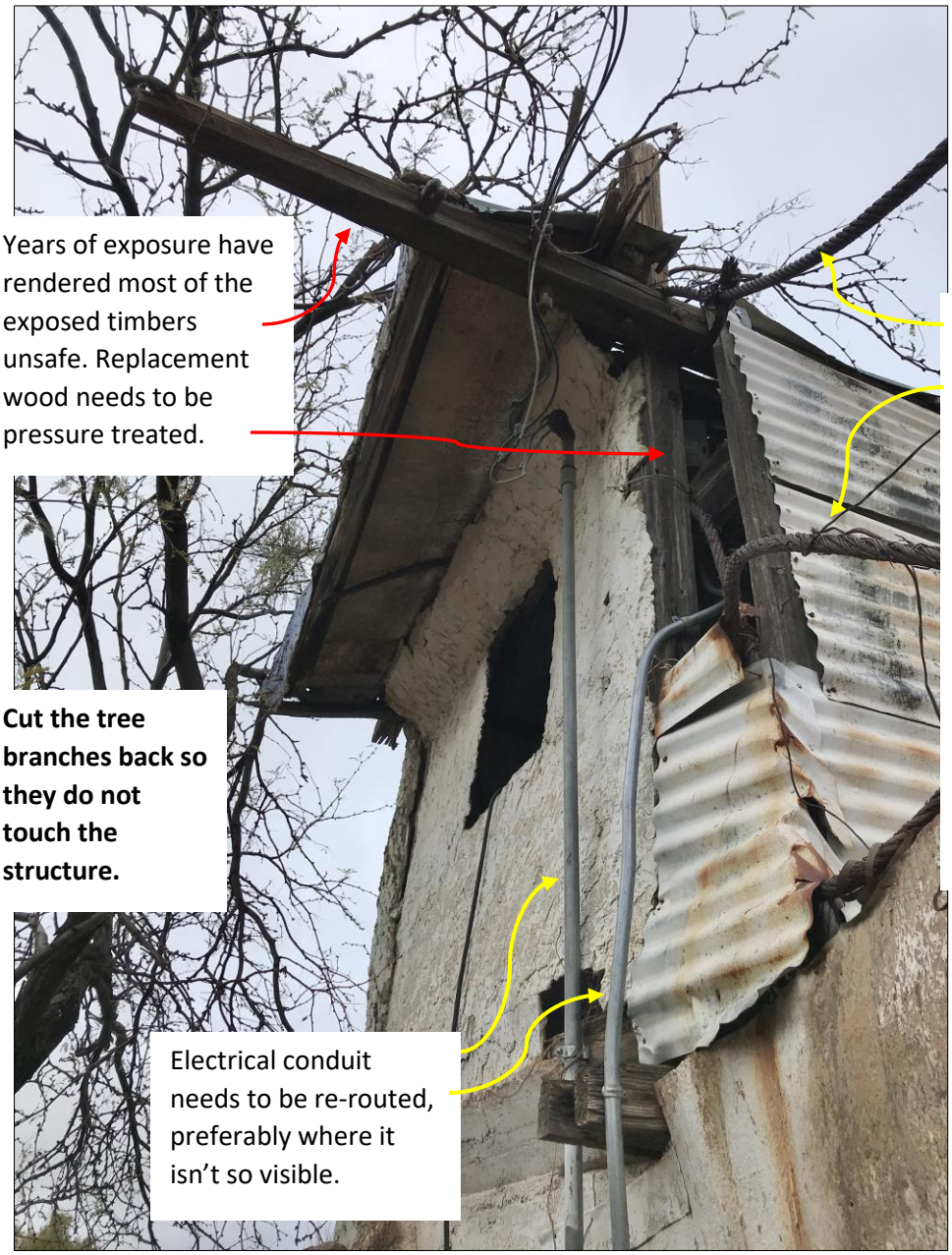
Left:
View south of the grass area below the wall and concrete stage, with the Wizard's Tower in the center.

Left:
View of the northwest corner of the front of the Wizard's Tower.

The white material is thin shell concrete that has been painted.

Branches from this tree abrade the structure and must be properly trimmed back.

Embedded within this structure is a 4 x 4 timber frame constructed prior to the masonry work.



Above: View of southwest corner.
Weather easily enters the tower's structure contributing to years of slow degradation. The repaired structure will need to be capable to keeping the interior dry, but this should also be ventilated.

Left:

View of the Magic Stairs to the left of the Wizard's Tower.

At the top of the stairs is a break in the wall allowing passage to the other side of the wall.

The stones are adhered to a formed concrete wall on the south side.

Left:

View northwest and the "rear" side of the Wizard's Tower.

Note that tree roots are undermining the wall and must be removed.

The rough-cast concrete wall helps buttresses the tower and supports the stonework on the north side.

Left:

View north of the thin shell concrete shell-like structure attached to the tower.

While the lower portion of the wall is likely salvageable, the roof portion is in a state of collapse and must be replaced. A structural evaluation will determine whether some, or all of this part of the structure must be rebuilt.

Left:

View east through the second entry into and through the Wizard's Tower.

This narrow open passageway is reached by a path from the Pennyland Performance area below and to the south.

Attached to the wall is a bank of electrical switch boxes.

Left:

View into the passageway from the front of the tower.

The combination of corrugated concrete formwork, rounded stones, and thin shell concrete provide the multitextured appearance.

Left:

West inner wall of the tower.

The painted surface is cement or concrete. Paint should be carefully removed to determine if a historic mural exists below.

Above: Inside view of southwest corner.

Supporting wood framework is a jumble of discontinuous sections in deteriorating condition. With timbers so compromised, replacement with new material is the only option. A new supporting steel framework is being recommended on which to build a new wooden frame upper structure and roof.

Left: Interior view of northwest corner.

Barely visible in the corner is one of the 4 x 4 wooden post that has been surrounded by masonry materials.

Left:
View looking up at the underside of the floor of the upper room.

The floor material is thin galvanized sheet metal over an under-structured steel bracing over deteriorating wood members.

The floor is unsafe and must be replaced.

Above: Close-up view of the typical under-floor conditions.

Of note is the mining cable that is woven throughout the structure. Although non-structural, it will be important to try and re-incorporate this where possible as this is part of its history and material character.

This Page: Views of the roof portion of the thin shell concrete “nave”. The structure is deflecting downward under its own weight and is in a dangerous condition. Many areas of the concrete material have already dislodged and are open to the elements. This portion of the structure should be rebuilt using stronger materials that retain the intended appearance.

Historic Photographs

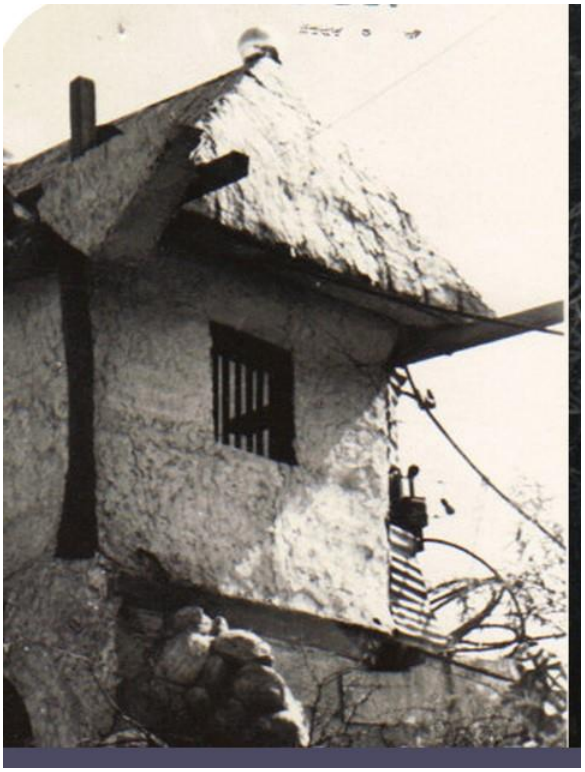
Several historic images help inform about the condition and detailing of the Wizard's Tower closer to the time it was built. These are important since repair and reconstruction will need to reference such photographs in addition to physical evidence when project documents are being formulated. Courtesy of Jenni Sunshine, Tucson Preservation Foundation, and several web-based images conducted under a general search.

Above: George Legler shown standing in front of the Wizard's Tower (undated).

At this time there were window bars, and possibly glass (based on light reflection). The triangular objects suspended from either side of the front gable roof are now missing, and it appears the front portion of the gable roof was still unfinished.

The two globes on the ridge of the roof are still in place today.

Left:
Similar view to the previous photograph (undated).

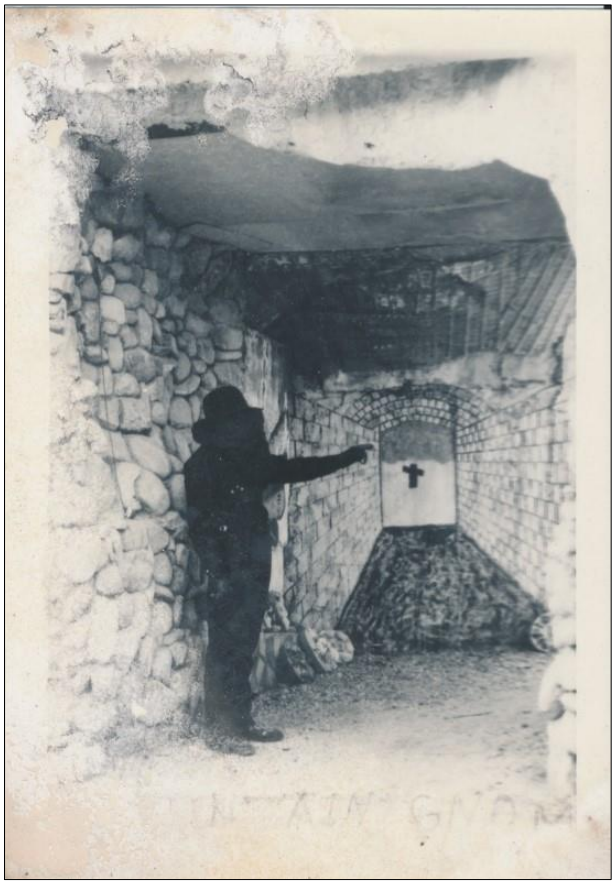


Left:

Another undated photo showing in closer detail the northwest corner of the Wizard's Tower.

Reflections in between the vertical bars imply this window was glazed.

Above: View south with a partial interior view of the passageway. Legler used a technique for making the illusion of perspective, painted on the back and side walls. Called **Trompe l'oeil**, it is a French term for "fools the eye", known since Roman times, but popularized from the 19th century.

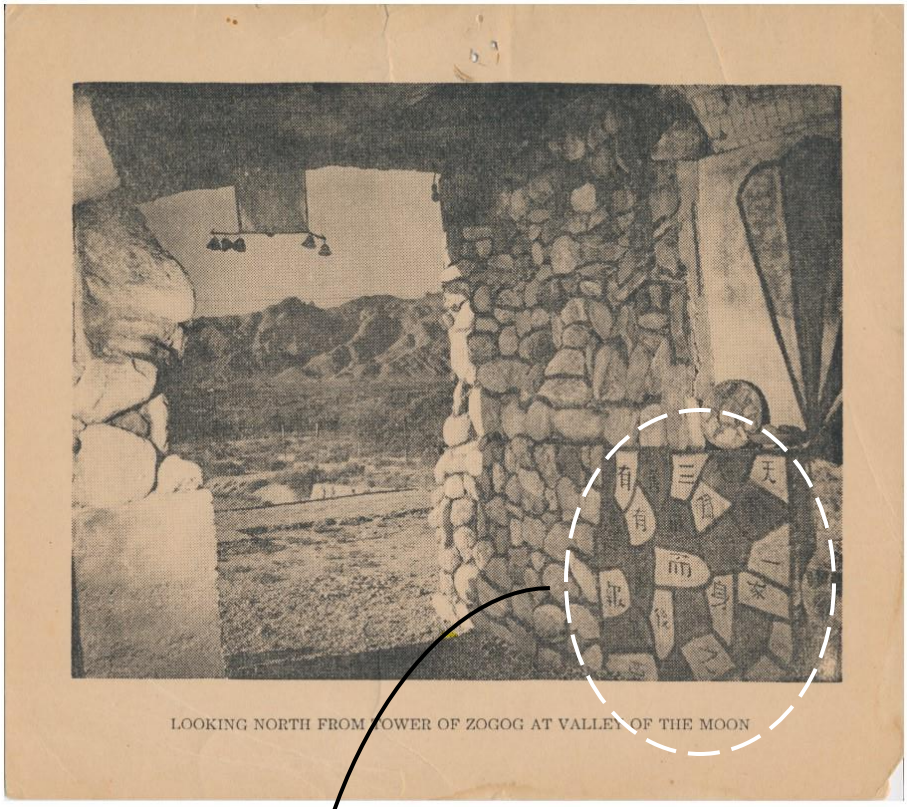


This page:

Both photos show George Lelger standing with the Trompe l'oeil painting.

The painting gives the impression of a continuing masonry passageway ending with a cross that appears to float in a sky.

Once the thin shell concrete has been repaired, this illusionary painting should be reapplied.



Above: View north looking through the passageway toward the stage area and the Catalina Mountains (undated).

The symbolism painting on the concrete wall still exists but is now faded (see photo below for comparison).

Left:

Contemporary view to the southeast of the same mural.

The brighter-colored mural above the circled one is not original and appears out of character. This should be carefully removed, hopefully uncovering evidence of earlier or original artwork. A decision can then be made to repainting it – or not.

2. Second Story Room Access:

Existing Conditions:

The second story room of the **Wizard's Tower** is little used and difficult to access. This space is not open to the public but used occasionally by staff to manage performance-related duties. It is unknown if the upper room was an any time part of a performance, however having this space more accessible opens-up greater performance opportunities.

A ladder once existed to access the second floor but was removed when it became unsafe (Jenni Sunshine communication, May 2022). The current means of access is for staff to bring in a ladder for specific use, but this method is unsafe. A more permanent solution is to build an access stair on the back side (south) of the rising stone wall on the east side of the tower. There may be evidence that in the past a stairway/platform existed here, and a hypothetical recreation is recommended.

The photo at right from a 1957 newspaper article shows two girls ascending a set of stone steps at the Wizard's Tower (courtesy of Jenni Sunshine).

These steps are not the pitched-forward "Magic Stairs" on the north side of the east wall because (a) the stairs shown here are level and not pitched, and (b) the wall shown rises to correspond to the pitch of the stairs. If such stairs existed, they are now missing.

By building a new flight of stairs, safe access will be provided to the upper room, and create additional theatrical opportunities since actors can be seen moving up and down the stairs. The stairs could be accessible to the public up to the secure doorway to the upper room, providing visitors with an extended view of the Valley of the Moon site.

Jaime and Marta and the Gnome on their way to the Tower of Zozog. This is before the water has been turned to candy. "Not too much candy," Mr. Legler says, "we don't want anybody sick. After all, it's magic anyway." (Photos by Soto)

Repair strategy:

- Design a steel or wooden frame to support a combination of steps and short platforms that conform to the pattern left in the concrete (south side of wall), to include a handrail.
- The new stairs will not be visible from the north side of the rising stone wall.

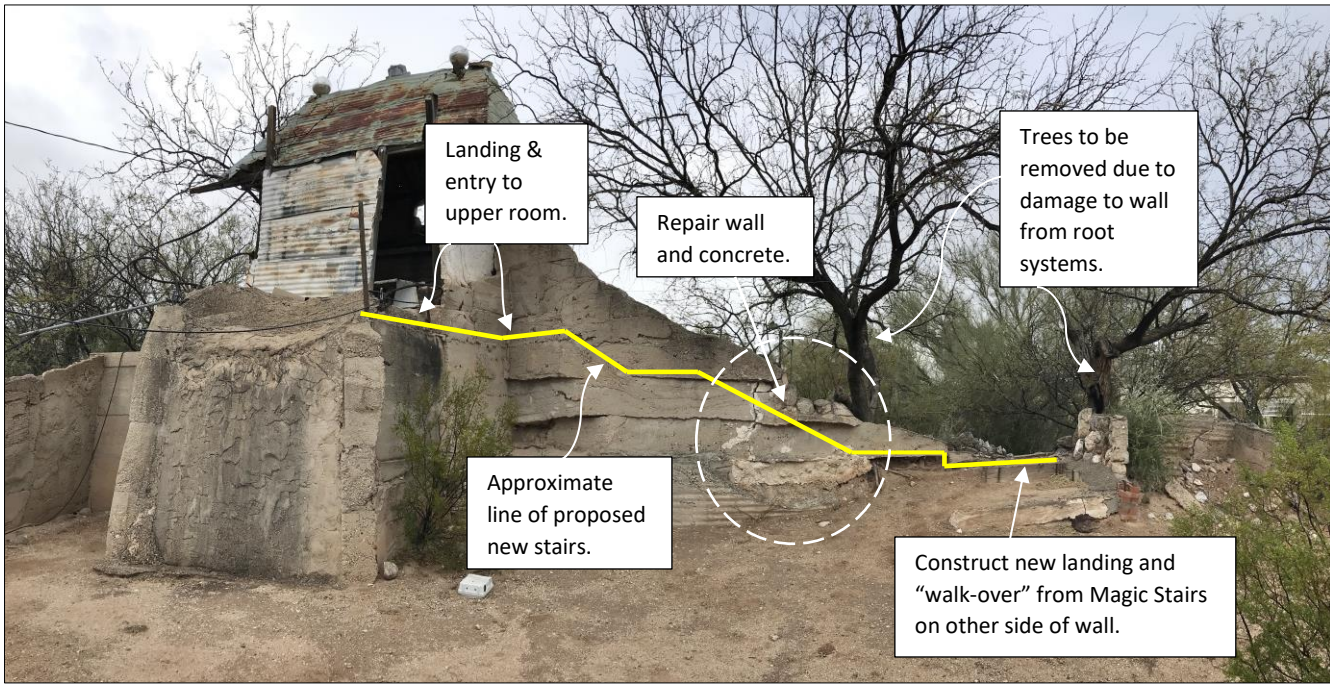
Estimated Cost: **$10,700**

Photographs:

Above: View of the stone wall extending east from the tower.
In the foreground are the Magic Stairs which are deliberately pitched downward.

Left:
Undated photograph of children ascending the Magic Stairs from almost the same viewpoint as the above image.

Compare this historic photo to the one on the previous page, indicating these are very likely different sides of the same wall.



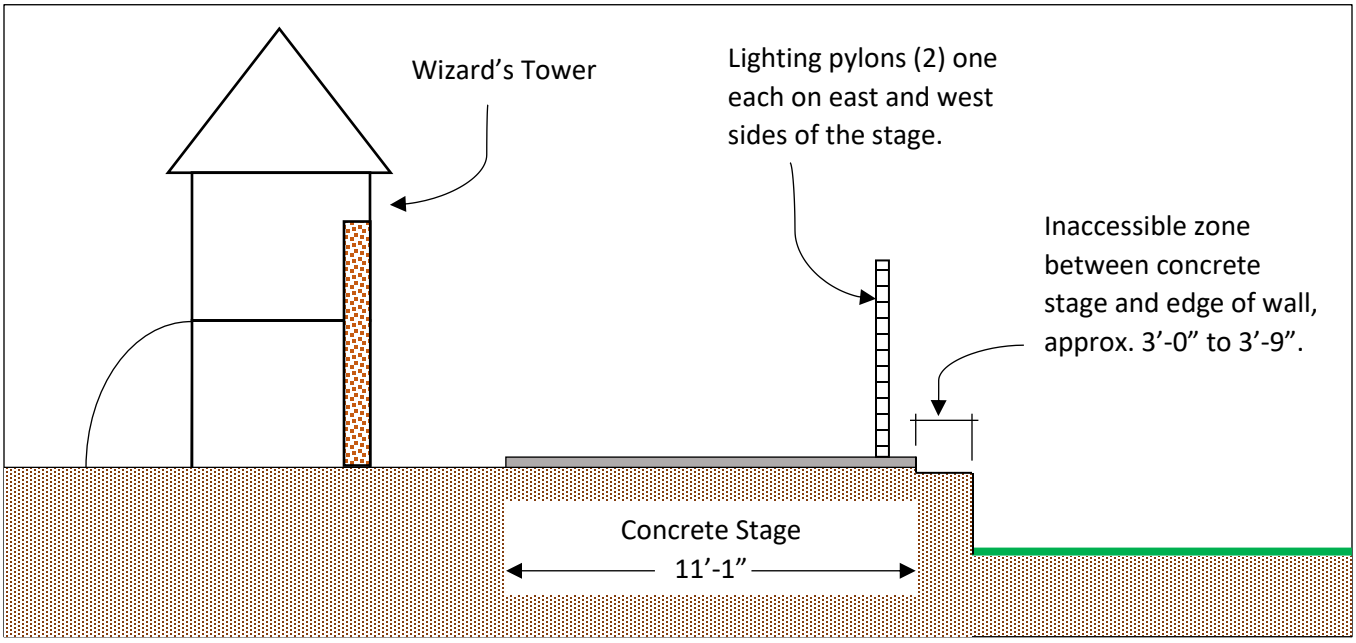
Above: Panoramic photo showing the south side of the Wizard's Tower wall.

It is recommended a new stair be constructed against the concrete wall that provides safe access to the upper room. Unfortunately, both trees will need to be removed, along with as much of their root structures as possible as they are continuing to damage the wall.

3. The Concrete Stage:

Existing Conditions:

- The stage measures 31’-8” x 11’-1”. The date of construction is unknown but may date to the 1980s.
- The slab rises some 6” above grade on the south (rear) side and pitches slightly downward to the north and the audience area, with the total height of concrete from the rear of the stage to audience grade being 6’-1” (+/-).
- There is a crack running through the slab in a north-south direction near center.
- At either side of the stage are metal pylons supporting stage area lighting. These are anchored to the concrete with additional bracing welded at the bottom. The lighting is old, with lighting fixtures and outlets susceptible to weather and rain.
- While the concrete stage offers a smooth surface for performances, is also limited by its size, especially with the drop-off around the edges. The raised stage is also a potential trip hazard for performers and public alike, especially during night-time performances.
- While the concrete slab is in reasonable condition, it raises an already high stage level even higher and includes some awkward if not potentially dangerous conditions for performers at the front of the stage.



Above: South-north cross-section showing the Wizard’s Tower, stage, and audience area (at right). Drawing by Simon Herbert (not to scale).

At one time, a tunnel ran under the stage and had an entry near the center allowing performers to suddenly appear or disappear. This was covered over when the current concrete stage was built.

Repair Strategy:

- It is recommended the existing concrete stage be removed, and the ground covered with a decomposed granite surface (or similar). The new surface should slope slightly toward the wall separating the stage from the audience area.
- Remove some of the vegetation (particularly on the west area of the stage) to open-up views.
- Built new bases for the lighting pylons (currently mounted to the concrete stage), and either reinstall the old lighting pylons or install new ones. Placement and lighting needs to be determined by Valley of the Moon staff.

Estimated Cost: (including demolition of old stage) **$4,100 – $5,300**

Photographs:

Left:

View east of the stage with the Wizard's Tower at right.

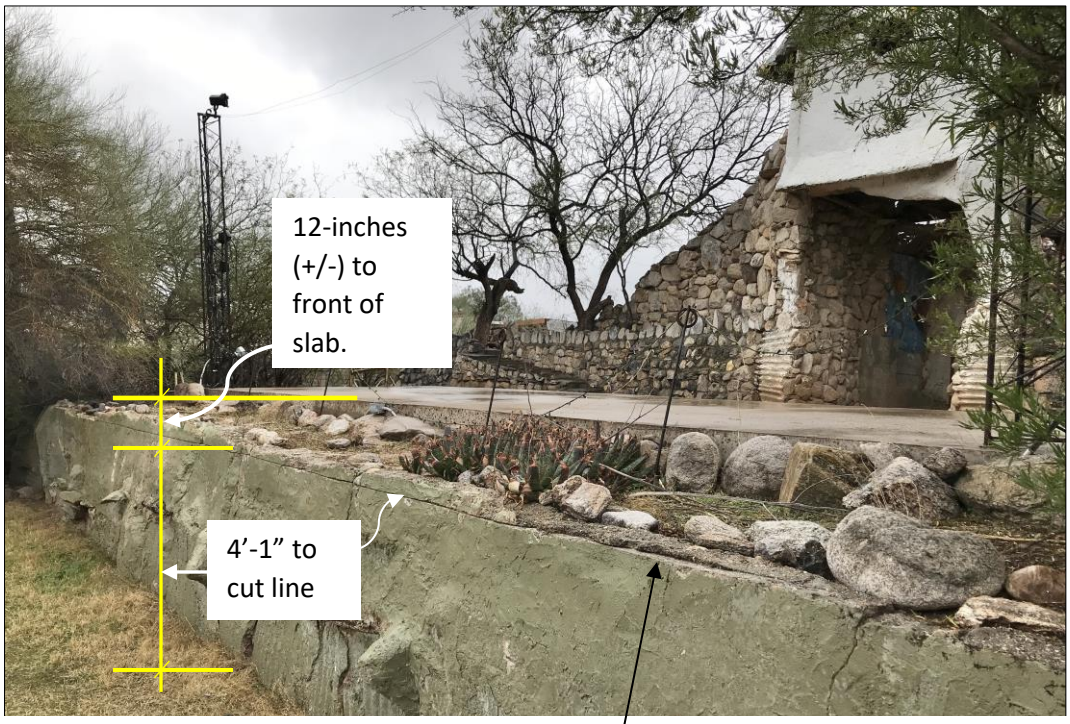
There is a 6-inch step-up to the concrete stage from the surrounding path.

Inset:
The white circle shows the north-south crack in the slab.

Left:
View northeast of the concrete slab.

<u>Inset:</u> A two-gang electrical outlet at the front of the stage. Over the years it has been stepped-on and is pulling away from the edge of the slab.

<u>Left:</u>
The front of the concrete stage was cut back in the past, exposing the aggregate. The reason for the cutback is unknown.



Above: View of stage to the east.

At one time a horizontal saw cut was made in the wall about 4'-1" from the grass, possibly as an effort to lower the height of the wall. Total height from existing concrete stage at rear to grass area below is **5'-1"** (approximately). The concrete stage ends some 36-inches from the wall, preventing performers from getting close to the edge.

Left & Right:
Both the west lighting pylon (above) and the east pylon appear to be re-purposed welded towers and contain a variety of lighting fixtures. Much repaired over the years, they could continue to serve, or be replaced.

4. The Concrete Wall between stage and grass seating area:

Existing Conditions:

- The approximately 70 ft. long retaining wall runs in an east-west direction and separates the performance area from the audience area on the grass area, with an approximately 5'-1" drop.
- The retaining wall is of an intentionally uneven masonry construction made from stone, concrete, and thick steel mining cable woven into the matrix of materials. Its thickness was not determined.
- The distance between the concrete stage and the edge of top edge of the wall to the north is an average of 3'-9" with a rough, uneven surface to the drop-off, which makes it nearly impossible for a performer to reach the edge of the wall.
- Most of the lip of the wall has rounded stones at the edge which create a visual and physical relief from what otherwise would be a hard edge.
- The wall contains approximately five vertical cracks running top to bottom, and in places there is undermining of the footing area.
- One section of wall to the west of center stage is leaning outward, suggesting a pivoting foundation.
- In the central portion of the wall roughly 4'-1" up from the base is a nearly horizontal saw cut. It does not run continuously and may have been an attempt at one time to lower and re-define the height of the wall to bring the whole stage lower to the audience.
- The total height of this stage (when measured from the rear/south end) to the audience seating area is approximately 6'-1". This is quite high for an audience area of this size. According to preliminary research, stage heights can vary from beginning heights of 3'-0", and range higher depending on the depth of the audience area and slope of the seating area. **Note:** The current height of the stage meets the Valley of the Moon performance requirements, so no changes are being proposed.
- The total depth of the audience area is 95'-00 measured from the existing stage wall, and slopes gently upward toward the north at the far end.
- Several small trees impinge on the view to and from the stage. These trees also threaten the stability of the wall.
- The front of the wall was painted dark green (not original).

Repair Strategy:

There are **two avenues** to approaching this repair.

Approach One: (more invasive & costlier)

- Preserve and repair the existing wall by digging a trench on the back side (south) and pouring a new concrete wall behind it that ties old and new walls together.
- This approach has the benefit of keeping historic material but will be more difficult and costly to achieve.
- Install a full-length French drain at the base of the wall to alleviate water build-up. This will entail additional work to repair and underpin the existing wall, especially where undermining is already evident.
- Remove all green paint from the wall surfaces.

Estimated Cost: **$21,400 - $27,000**

Approach Two: (less invasive & less expensive)

- Demolish the existing wall and reconstruct a new wall to include most of the visual references to embedded stones and undulating "bumps" along the front, and to include the various shuttering methods in the original wall.
- The new wall is to be left natural and unpainted.

Estimated Cost: **$12,000 - $15,000**

Other:

- Both scenarios would include the use of rounded stones across the top of entire wall. These stones already exist along much of the top of the wall, and aid to visually soften the stage edge with a decorative lip. This would have the added benefit of preventing a run-away wheelchair from falling-off the edge. A review of safety protocols needs to precede this decision.
- Remove trees that in the view sightlines or are a threat to wall stability.

Photographs:

Left: Front of the wall view to the southwest.

The entire length of the wall is approximately 72ft. section with the center "exposed" center section approximately 62 ft.

The wall was painted a dark green but was originally exposed concrete with natural stones protruding.

Left:
Detail of part of the wall with the horizontal saw-cut showing. Portions of the upper cut of material have been removed.

Left:

Detail of the wall showing rough formwork for the concrete, with additional stucco applied to the outer surface (likely non original).

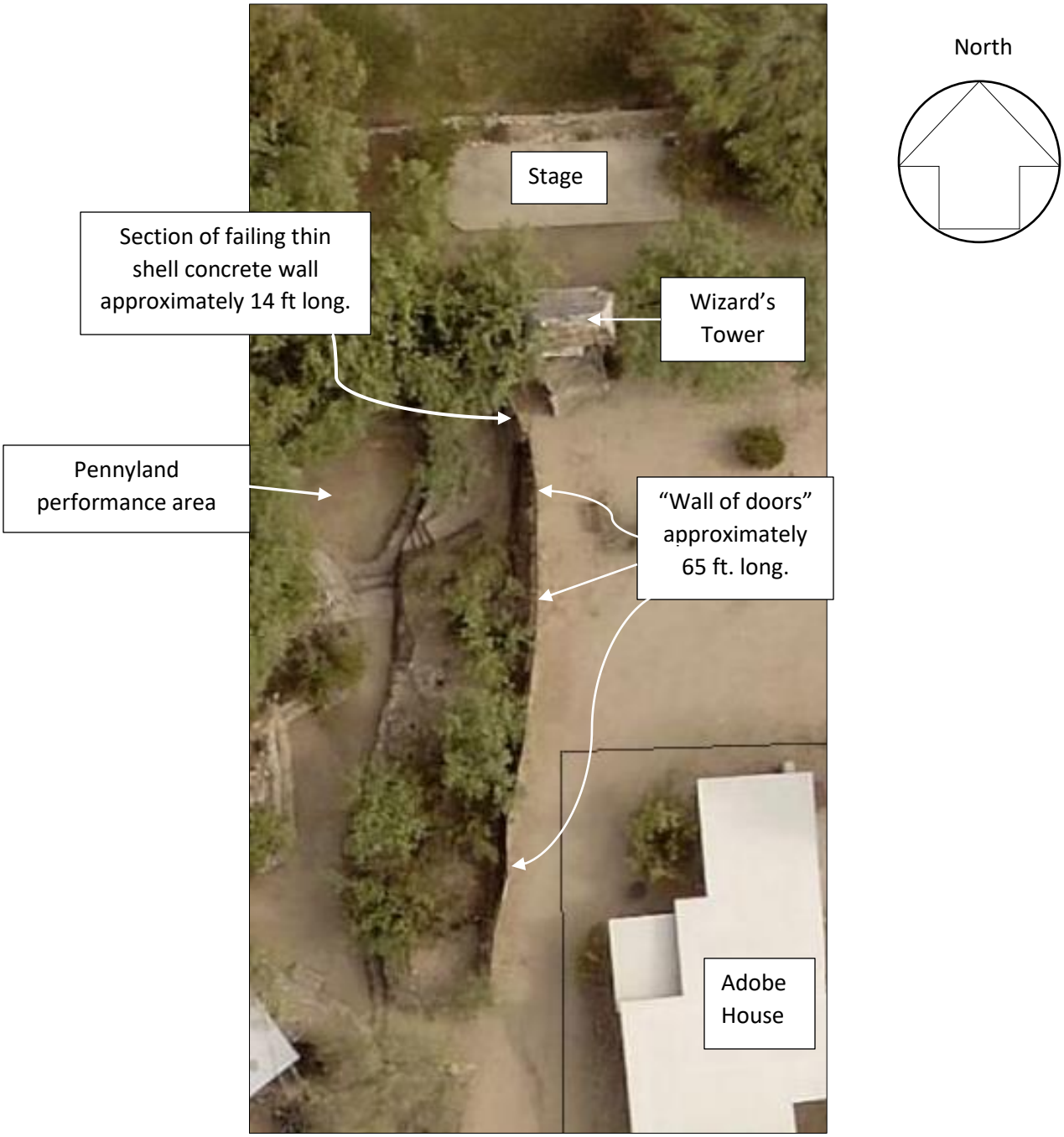
Heavy mining cable can be seen weaving in and out of the wall. In the reconstruction (Option Two), it is recommended this not be re-used, as the cable is rusted and frayed and potentially dangerous to the public, especially children.

This Page:

Detail of deteriorated section of the wall (toward the west side).

Vertical cracking, undermining of the footing, and multiple patch repairs indicate movement and weakness of the wall.

5. Concrete wall and “wall of doors” extending south.



Above: Aerial view (from Pima Maps) showing the wall separating the service road from the Pennyland performance area.

Existing Conditions:

This wall is made up of an approximately 14 ft. section of historic thin shell concrete wall that attaches to the Wizard's Tower structure on its northern end, and an adjoining section of old doors attached to a metal pole fence that extends south for approximately 65 ft. The purpose of the "wall of doors" helps to shield views to and from the Pennyland performance area which lies just to the west. Each of the doors are painted differently, with volunteers providing personalized murals and artistic colors schemes. The doors are a combatively recent addition.

- The section of thin shell concrete wall is reinforced with heavy steel mining cable, chicken wire, and pieces of wood.
- Some of the mining cable extends north and becomes woven into the Wizard's Tower, and continues south where it drapes along the "wall of doors" ending on the ground.
- Approximately 4 inches thick, it was shuttered on both sides with formwork as the walls were raised creating a varied texture of finishes.
- Movement in the wall has created loose sections of concrete which means the wall is unstable.
- The "wall of doors" section is stable and abuts the thin shell wall.
- The doors appear as a visual distraction that is out of keeping with the tonal quality of the surrounding historic fabric.

Repair Strategy:

- Stabilize and repair as much of the remaining thin shell concrete wall as possible, possibly with masonry buttressing or additional reinforcing material on the slightly less visible east side.
- Replace the "wall of doors" with a permanent wall that retains the character with the historic thin shell concrete wall.
- Create an opening in the wall, possibly with a screened gate, that brings in a accessible pathway from the road which overlooks the Pennyland performance area (see section Strategy for Improving Accessibility and Public Engagement: from p.38 of **The Cathedral Complex,** Simon Herbert, May, 2022).

Cost Estimate: **$11,800 – $14,900**

Photographs:

Above: Two views of the wall area just north of the tower from the pathway leading up from the Pennyland performance area.

Left: The thin shell concrete wall near the tower.

The wall is in a very fragile condition, with large sections loose or missing. The section shown here could easily be moved by hand, held only by the chicken wire reinforcement. With time, this piece will fall.

Above: View east of the “wall of doors” from the Pennyland amphitheater area.

The doors shield views to and from the space but are something of a visual intrusion. It is recommended this wall be constructed of formed concrete (similar in character to the deteriorating historic section to the north). Native plantings will further reduce any impact and “soften” the area.

6. Electrical:

Conditions:

- The Wizard's Tower complex has an overhead electrical line which attaches to near the top of the Wizard's Tower roof. Power is run to a main electrical panel which sits in a narrow area located behind the west wall.
- Power distribution is in in both ridged pipe and flexible shielded cable. Additional heavy extension cables providing further lines of distribution on the ground and above.
- The main panel is difficult to access, and in an area containing debris, trash, and multiple cables and extension cords, some plugged into unprotected outlets. This is a dangerous situation that must be taken care of as part of the electrical upgrade.
- Lighting fixtures of various styles are intended to illuminate the complex, however many of these were observed to not have bulbs and are exposed to weather.
- The system was not checked further or otherwise evaluated.

Repair Strategy:

- Have the electrical system professionally evaluated.
- Develop a lighting and electrical plan that meets present and future needs for the complex.

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1. **Cost Estimate:** **$13,200 – $15,100**

Photograph:

Right:
A multitude of electrical cables plug into sockets below the panel.

There is an urgent need to upgrade the electrical system and make it safe for users and the public.

7. Cost Estimate Overview: The Wizard's Tower Complex

Providing cost estimates for a historic preservation project of this nature raises significant challenges when attempting to provide accurate figures due to the anticipated "unknowns". These are difficult to quantify without further investigative work, much of which will be uncovered during repair work.

Below, each section area has been assigned a range of cost. Please be aware these ranges represent a fluid dollar amount dependent on what is discovered once work is underway. Prioritization of tasks are designated High **(H)**, Medium **(M)**, and Low **(L)**, and equate to critical, needed repair, and wish-list upgrade.

Cost Estimates by Section:	**$**	**Priority Level**
1. Wizard's Tower and connecting wall structures:	$ 129,800 – 136,200	**H**
2. Second Story Room Access:	$ 10,700	**L**
3. Concrete Stage:	$ 4,200 – 5,300	**L**
4. Concrete Wall between stage and grass seating area:		**M**
Alternate 1: (Repair wall)	$ 21,400 – 27,000	-
Alternate 2: (Replace wall)	$ 12,000 – 15,000	-
5. Concrete wall and "wall of doors" extending north.	$ 11,800 – 14,900	**H**
6. Electrical:	$ 13,200 – 15,100	**H**

Sub-Total Base Estimate (Range): $ 181,700 – $209,200

Determining related costs:
In addition to the base estimate, several other factors must be included to cover necessary related costs. These include:

- 25% Design and Construction contingency.
- 10% Design fees.
- 7.4% Permit and Plan Check fees.
- 20% Inflation (10% per year for two years).

= **62.4% Multiplier** (applied to Base Estimate above. Multiplier information supplied by Jon Mirto, PMM).

62.4% multiplier added to Base Estimate =

Total Estimate (Range): $ 295,080 - $339,740

8. Report Summary:

While this report attempts to be conclusive in all the areas of concern, such a project will undoubtedly reveal numerous additional problems once work commences. As with the other areas of the site at Valley of the Moon, **the Wizard's Tower complex** is no different. As mentioned in previous reports, the process of discovery is akin to peeling an onion and finding yet more layers. Also, invariably, one component is intimately tied to adjacent items both large and small, and cosmetically and structurally. In terms of priorities, structural concerns need to be addressed first.

- The **Wizard's Tower** by itself is a major repair task, requiring a careful dismantling of the upper portion (upper room and roof), the design and construction of a new steel framework (or "cage") to support the reconstructed upper portion, along with the creation of a workable space for managing lighting and sound (etc.). A new stairway is proposed to reach this room, located behind and south of the east wall.

- The current concrete stage needs to be removed, and a D.G. "stage" area created which slopes to the height of the wall.

- New bases for the lighting pylons will be constructed, and existing lighting pylons reinstalled, or replaced with new.

- The wall in front of the stage is cracked and deteriorating and should be replaced (in kind) with a new wall, integrated with the new stage.

- Lastly, repair the thin shell concrete wall extending north from the Wizard's Tower, and now or later, replace the "wall of doors" with a new concrete wall that also provides access to the proposed new viewpoint to Pennyland (see the report **The Cathedral Complex**), the second of the three reports in this series.

One of the most challenging aspects of this set of repairs will be to maintain the essential character and workmanship found in the assemblage of structures, while providing new measures of safety and material longevity for the future.

Acknowledgments:

The following have lent invaluable assistance in both the direction and formulation of this report:

Jon Mirto	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Charles Pifer	Poster Mirto McDonald Design, Architects and Planners, Tucson, AZ.
Jenni Sunshine	President, The George Phar Legler Society, Tucson
David Yubeta	National Park Service (retired). Tubac, AZ.

End of Report