O.R. TAMBO HOMESTEAD

STRUCTURAL IMPACT ASSESSMENT REPORT OF EXISTING STRUCTURES

RONDAVELS

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1. RONDAVELS - GENERAL

The original rondavels at the O. R. Tambo Homestead have been designated as bulleted below:-

- Number 1 - Family Museum
- Number 2 - Agricultural Storage
- Number 3 - Meeting Room
- Number 4 - Accommodation

This report was based on the O. R. Tambo Homestead site, where we carried out a structural assessment with emphasis on the existing structures, in this case the rondavels as listed above.

This report looks at specifics on each rondavel structure and states the various alternatives which will be followed to achieve a sound structure.

The possible categories looked at were, as bulleted below, in order of importance, but with the understanding that all the structures required some attention.

- The structure was only in need of general repairs, and it was generally in good condition.
- The structure requires parts to be removed and re-built, such as roofs.
- The structure requires major portions to be removed and re-built.

As a heritage site it was understood that these structures were all to be refurbished and maintained as per their original form. The repairs mentioned above would therefore always aim to restore the structures. We will ensure the stability of the structure whilst the Architect will ensure the aesthetics are maintained.

3. REPORT

RONDAVELS

The rondavels were all in poor condition except for one which seems to have been a more recent addition to the homestead. They will all require attention during refurbishment of the homestead. At present they are not a danger to anyone but given time they are a potential hazard. We have dealt with them here in a lumped manner due to the fact that they all exhibited similar faults and to save repetition in our reporting and recommendations.

The photographs which follow highlight the present state of these structures. These structures all require attention. We will be taking the route of saving as much as possible and replacing only where necessary to achieve full refurbishment of all the rondavels.

The walls exhibited cracking throughout due to various materials being used to repair and some with too much clay content resulting in shrinkage cracking taking place. We recommend that the walls and foundations be checked first for

strength and quality of the wood used in them as replacement of rotten and damaged pieces will be the first step in repair. The next step will be to get the correct material and mixture to achieve a decent finish, under the Architect's and Engineer's direct supervision.

The timber doors and frames and window frames should be replaced only where necessary, as the restoration of these would be the first priority.

The next major item to be added on all the rondavels will be the thatching. The gum-pole roof structures will be preserved as far as possible. Rotted or split pieces will have to be replaced. In some cases the gum-poles are missing, causing pressure on the walls. There were sagging members as well which will have to be replaced. The pitch of the roofs were varying as well, so getting them all to a uniform pitch may be necessary, as some have 'sunk' due to sagging elements. All the rondavels will be uniform when completed.

The floors were all in varying condition, from no floor to cracked and uneven floors. These will have to be replaced, under the Architect's and Engineer's specifications and supervision.

RESTORATION OF RONDAVELS

As outlined above, all the rondavels will require complete restoration. We will have to ensure that we deliver the correct methodology for restoration of the rondavels. We will also be specifying locally used materials as much as possible. With this in mind we outline the following particular areas and indicate how we will be getting the specific work done.

- FOUNDATIONS

  The foundations to all these structures are shallow and therefore will be easily checked by exposure from the sides. This will be done in order to confirm the status and future stability of the foundation of the structure. Should there be any defects here, we will be instructing the contractor to use the type of material used in the original foundations and repair the defects. Due to erosion and time, some of the earth which covered the sides has exposed parts of the bottom ring. This will be rectified by reinstating the earth around and ensuring it is grassed to prevent erosion taking place. The foundations are expected to be rammed earth. Any necessary repairs will include the use of originally used materials. These would include rock, sabunga and cement stabilized soil. The use of any other material will require approval. Therefore the contractor will reinstate the fourndation areas by hand ramming or the use of a mechanical pad foot compactor. Following this the foundations will be covered with the excavated material and any shortfalls obtained from the immediate vicinity. Finally the earth around each rondavel will be shaped such that storm water will be deflected around and away from each rondavel. This will be achieved by placing topsoil around each rondavel such that it is high at the back and low at the front in a more or less horseshoe shape. Finally local grass will be reinstated.

- GROUND FLOORS

  The floors to all these rondavels will be restored by using traditional methods. Typically they will consist of a mixture of cow dung, anthill soil and soil. The soil generally will be sub-soil and not topsoil. This mixture will be rammed down at optimum moisture content in order to achieve the best compaction. The finish will be smooth, achieved with an abrasive stone. We will take local experience in the area to advise if there were any differences to this practise. The method above applies to Rondavel 1. The other rondavels have mortar type floors and will be repaired with the same material in order to leave it the same as it was. The damaged areas will be exposed and compacted where necessary and then filled with a 20MPa mortar mix and finished to a similar roughness as is there.

  The floor in rondavel 1 must be strictly traditional. The use of sand and cow dung mixed together and stamped down will be recommended.

  Rondavel 2 floor should also be maintained as traditional, but must be repaired to a rough finish.

  Rondavels 3 and 4 have cement based floors and should be repaired as such. There will be no need to remove and re-build, just re-seal to an acceptable hand trowel finish.

- WALLS

  The walls on these rondavels show that they were constructed of soil bricks and plastered over by a mixture of soil and water, originally, but with the addition of cement more recently. We will maintain the same materials and carry out repairs all round the walls. The main faults, to the walls, reported above and indicated in the photographs below, show cracks, shrinkage cracks and weathering generally. We intend to totally restore the walls with the ultimate intention being stability. All cracks will be exposed and methodically repaired, using the same materials originally used. The cracks will be packed and closed up. Where there are “bricks” missing we will replace them with the same type of brick made on site by the contractor. The walls will also be resealed all round with a sub-soil, some clay soil and water mixture, mixed to a plastic consistency. Some traditional practise also adds cow dung to bind the mixture. In this case we will use a small percentage (10 to 15%) of cement as it has already been done as such. We will refer to local expertise to confirm the final mixture. The colour seems to be a coloured lime which will be added at the end to the Architect’s specification.

  The walls to all the rondavels require extensive repairs except for rondavel 3 which is a more recent structure and therefore less affected.

  Rondavel 1 will have its inner wall repaired only where there has been cracking. The crack will have some 35mm to 50mm diameter timber poles tied to either side of the crack and have mesh fixed in between the timber. The crack will then be closed up using mortar made of sand and some cement. The external portion of the wall will be stripped of all paint and loose mortar. Then a mesh screen (100x50x2.5) will be fixed all around to the underlying ‘building blocks’ using ‘u’ nails. Mortar will then be applied to all the gaps and the whole exterior wall. The mortar mix will be of sand and cement, but not

exceeding a ratio of 1 cement to 4 sand. The use of any more cement will not be accepted as it will not have the muddy look which is required.

Rondavel 2 will have both the outer and inner walls stripped of all paint and loose mortar, due to its poor condition. As for rondavel 1, a mesh screen (100x50x2.5) will be fixed to both the inner and outer wall surfaces of the exterior wall. The walls and cracks will all be filled in and plastered using the recommended mortar.

Rondavel 3 will require nominal work to the walls as they are in better condition than the rest. All surface cracking and any other defects will be sealed up using the recommended mortar.

Rondavel 4 will require more external treatment than internal. Once again the paint and loose mortar will be removed. Then fix the mesh to the external face, followed by the application of the recommended mortar. Internally the paint and loose mortar are to be removed. The use of mesh will be decided based on the condition during removal of the loose mortar. If a major portion of the mortar comes off easily then the use of mesh is recommended.

- ROOF STRUCTURES

As reported the roof system in all cases consist of gum-poles and thatch with a galvanised cap at the apex. Their condition generally is not acceptable. This particular system is a shallow type (about 30 degree pitched) such that the cone is divided into four quarters by two stabilising members going across. These are missing in some cases and will be re-instated with similar sized members. The existing roof pitch will be maintained in all cases. The thatching grass will have to be removed totally to expose the system under such that we can decide which members are in good condition or not. We will also inspect the “lathe” work and recommend solutions, together with local expertise as well. There were gaps and weak areas to both the lathe work as well as the main carriers.

Once the main framework is restored by using as much of the in situ members and replacing only where necessary, it will be ready for the thatch. We noticed that the thatching in place is a thinner type than some other areas. Knowing this and getting local information that the thatch used is indigenous to the area, it will be the thatch of choice. The bottom layers may be of a heavier nature, brought from other areas, but the topping should be the same as we have seen from the photographs. Finally the caps at the apices should be closely inspected for corrosion and restored if possible or replaced if necessary.

The following specifics will apply when carrying out this work. Rondavel 1 will remain with its present thatched roof, with necessary repairs only being carried out. All timber to be thoroughly checked to confirm its stability and to ensure that there is no decay present. The underside is to be left untouched as far as possible.

Rondavel 2 has to be re-built as it is collapsing. The gum-poles will be renewed where necessary and the frame re-built. The thatch will also be replaced.

Rondavel 3 will remain as is too a large extent except for the addition of more members in the roof frame. The main reason for this was the evidence of sagging that has taken place in a couple of areas. The new type of thatch will also be added on top of the existing thatch.

Rondavel 4 requires repair to the roof frame and fixing of the new type of thatching grass.

- RONDAVEL 1 - MUSEUM
  All the rondavels will be repaired and renovated similarly except for Rondavel 1. This rondavel will be preserved as a museum and therefore will require additional care and attention. This will apply to all the elements mentioned above. The floor will be repaired and preserved as much as possible. The internal wall will be preserved as is except for the repair of cracks. The reason for this is to preserve the paintings on the wall itself. The external portion of the wall will be treated the same as indicated above for the other rondavels. The roof system will also be preserved, but it does require some repair and it is missing some members, which will have to be replaced with similar sized members. The apex cap will be preserved if not too corroded. The thatching on the roof will also be of the same type of locally available grass.

4. CONCLUSION

In this report we have explained the status quo at the O. R. Tambo Heritage site, and advised on the possible measures we will be taking to ensure the delivery of a stable set of structures with the least structural and environmental impact. We have also identified risks for the client to understand and provided measures to minimise them. This would require good supervision and communication with the contractor, during the construction phase. Our recommendation is that all the rondavels need to be completely refurbished to ensure their stability. The long term intention is, to deliver durable rondavels, which, with proper maintenance will remain sound, well into the future.