

MOTIVATION FOR PROPOSED ALTERATIONS  
to  
GLEN DIRK HISTORIC CISTERN  
Erf 10373 Klaasens Road, Wynberg

Rod Gurzynski Architect

**Description**

Measuring 20m x 17m at the base and covering 345m<sup>2</sup>, the cistern is partly sunken into the ground and partly contained by an earth embankment. On the lower, southern side there is a doorway, a later intervention made for access for storage. Apart from that, only a screeded vaulted brick roof is visible from the top of the embankment. The roof is supported by mass concrete arches which are visible internally as a consequence of the access door. Prior to that, the only access was by way of a service hatch.

The cistern was built as a temporary water reservoir to store potable water while the main reservoir was being cleaned. It fell out of use early in the 20<sup>th</sup> century and was sold to Glen Dirk Estate by the City of Cape Town in 1989 for the purpose of redevelopment.

A detailed description of the reservoir is given in the Heritage Statement by Graham Jacobs, submitted to HWC as an NHRA Section 34 application for the proposed alterations .<sup>1</sup>

Cistern: view of north side



Cistern: view of south side with doorway



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<sup>1</sup> Glen Dirk Estate Historic Reservoir, Erf 10373 Klaasens Road Constantia: Heritage Statement and Motivation for Proposed Works. Graham Jacobs, 8 April 2015.

Cistern: view of roof



Cistern: view of interior.  
Note structural crack running through the vault at mid-span, through piers and perimeter wall.

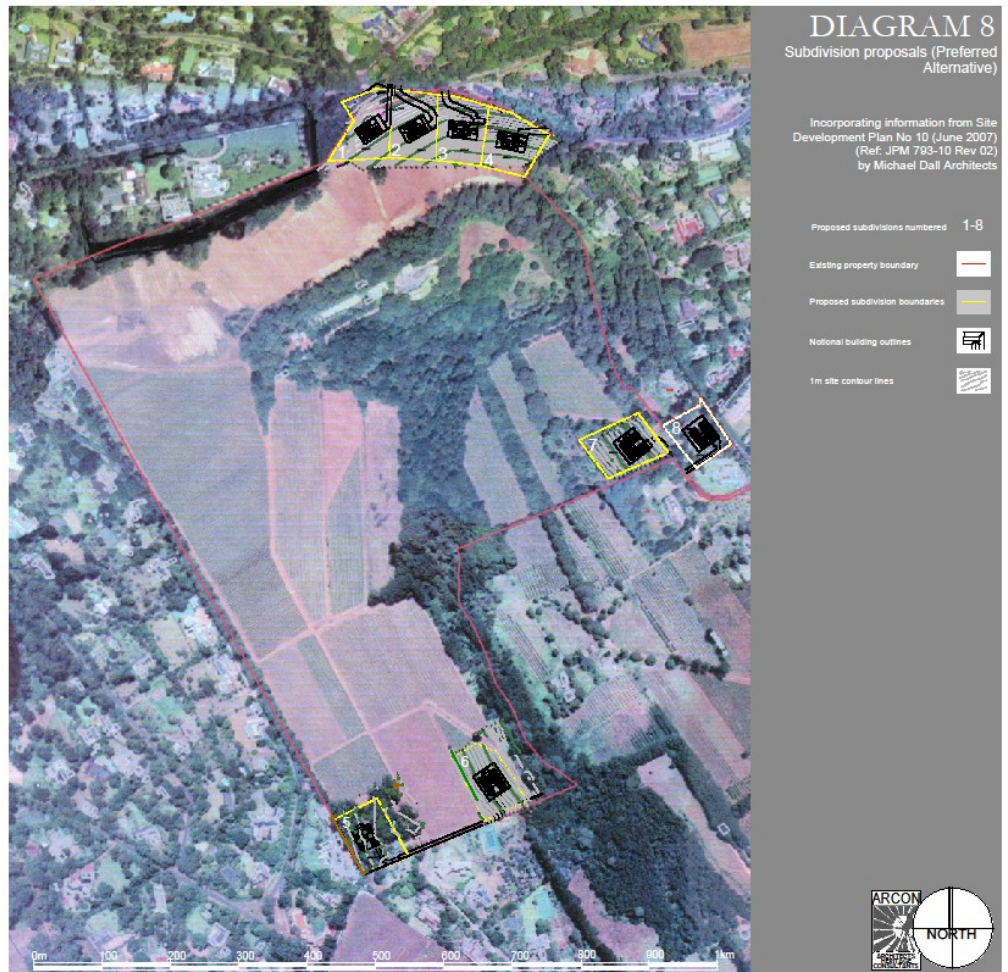


## Site context

The cistern is situated on Glen Dirk Estate erf 10373, close to the gated entrance to the farm and 13m from the boundary to Klaasens Road on a piece of land sandwiched between two residential erven.

The part of the Glen Dirk Estate where the cistern is located is one of the portions that was recommended for subdivision along with 6 other portions described in the Basic Assessment Report and the Final Heritage Impact Assessment<sup>2</sup> submitted to the South African Heritage Resource Agency as part of the Environmental Impact Assessment process. (Portion 6 was not recommended). The Department of Environmental Affairs and Development Planning gave its record of decision in favour.

The portion is identified as no. 8 in the diagram below, which shows a notional building outline in the middle of the property.



Glen Dirk Farm HIA: subdivision proposals (preferred alternative), diagram 8<sup>3</sup>

Subsequently, a rezoning application was approved by the City of Cape Town. The Constantia Property Owners Association made a court application against the decision of the City, which put the rezoning of portions of erf 10373 on hold, which is the situation at the present time.

This proposal is for a new residence and alterations to the cistern on an undivided portion of erf 10373, on the site of portion 8 on diagram 8 which has been identified and approved for use for a domestic residence.

<sup>2</sup> Final Heritage Impact Assessment Report: Proposed Subdivision and Rezoning at Glen Dirk Farm, Erf 10373 Constantia by ARCON Architects and Heritage Consultants (2009).

<sup>3</sup> *ibid*

## Design approach

Due to the circumscribed nature of the site, it is inevitable that the house would be in close proximity to the cistern. The design approach treats the house, the cistern and the immediate environment as belonging to one ecosystem rather than as disparate objects.

The cistern is a historic structure. It has value especially from a structural point of view. Although the inside of it could potentially be re-imagined as architectural space, this is not the intention of the owner, which is to build a residential dwelling. The design approach is therefore that the cistern be put into use again as a utility structure in support of the residential dwelling, which corresponds with the original intent of the cistern.

The brief to the architect was to develop a plan for a house that was to be "independent" or self-sustainable within practical constraints. This implied that the house should be a very low consumer of energy, employing passive light, ventilation and heating strategies and from its immediate environment obtaining much of its own energy, water and food. It is in this light that the cistern, as a service structure, is seen as an opportunity as much as a constraint.

Firstly, the cistern is an ideal location for the water tanks and purification plant which would be needed to store and recycle rainwater from the house (or indeed from its own roof). Roughly a quarter of the cistern floor area is required for this purpose.

Secondly, with its barrel vaults aligned true north-south, the cistern is perfectly oriented for the location of photovoltaic panels. Half of the total roof area is required for this. Using the cistern roof in this way solves the problem of locating PV panels since the roofs of the house are not aligned to north (the plan of the house is aligned to the view). This also removes the problem of an aesthetic mis-match between the scale of the solar panels relative to the small scale of the house roofs.

Thirdly, the creation of a sunken courtyard kitchen-garden in part of the cistern could solve the problem of a visual mis-match between scale of the cistern relative to the house while further improving compatibility of use. If the cistern externally is treated only as an historic artifact it would have no functional relationship to the house. A sunken, walled space protected from wind is ideal climatically for the production of vegetables and food and in this way helps to answer the design brief.

The different orientations of the house and the cistern, with the house oriented to the view and the cistern where it is, is not considered a problem. The cistern should rather be seen as an opportunity in the same way as the orientation of a mosque contains the potential for a richer spatial configuration. The creation of a sunken courtyard responds to this potential.

## Structural intervention

The cistern is damaged due to ground settlement and cannot be safely used without major structural repair.<sup>4</sup> The structural crack is the result of movement of the foundations.

It is proposed therefore to create the sunken kitchen-garden by removing part of the cistern's vaulted roof, starting from the line of the structural crack mid-way through the length of the vaults and stopping short of the vaulted wall on the north side. The shape of the brick vaults would thereby be made visible in elevation, emphasized further by means of vaulted brick segments cantilevered over the walls on both sides of the courtyard by 300-400mm, as if in section. This is all as recommended in the Heritage Statement.<sup>5</sup>

A pre-cast concrete floor system would be inserted 1.2 metre down from the top of the cistern walls, with a brick ramp and some stairs leading down from the house patio. The ramp, stairs and the new wall along the cut line would be faced with brick from the demolished portion of the roof. The external walls of the cistern forming the internal walls of the sunken courtyard kitchen-garden would be retained as-is. The kitchen garden would be housed in hardwood timber boxes.

By this means, the cistern would be repaired, including underpinning of the foundations. If this is not done, settlement will continue and the cistern would in the future have to be closed off for safety reasons.<sup>6</sup>

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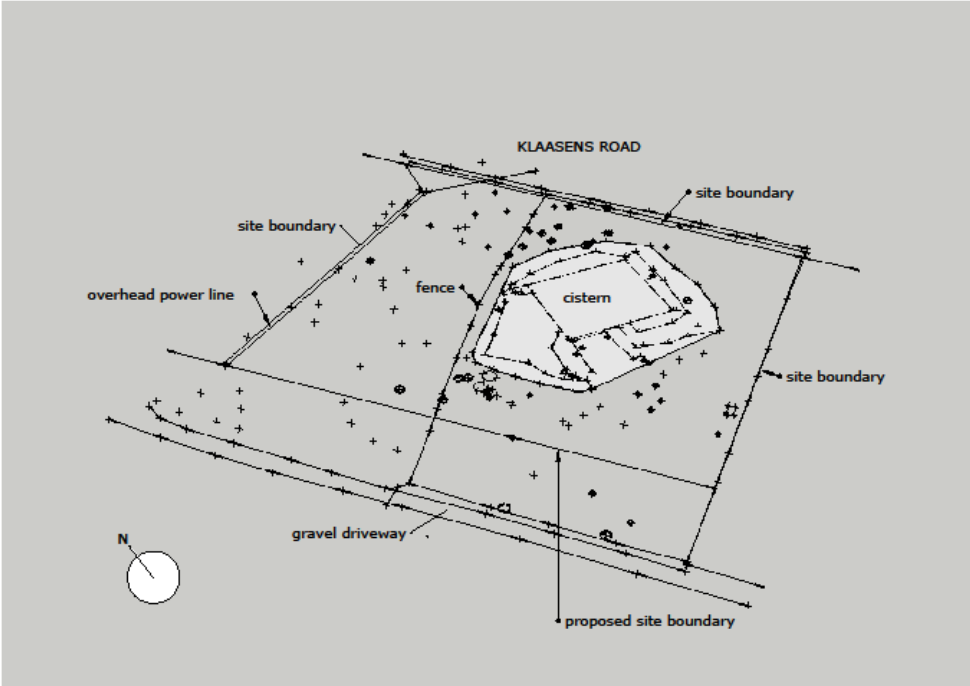
4 Appendix A: Structural Engineer's Report.

5 Heritage Statement and Motivation for Proposed Works by Arcon Architects & Heritage Consultants (2015). NHRA Section 34 Application for Proposed Alterations: Glen Dirk Estate Historic Reservoir, Erf 10373 Klaasens Rd, Constantia.

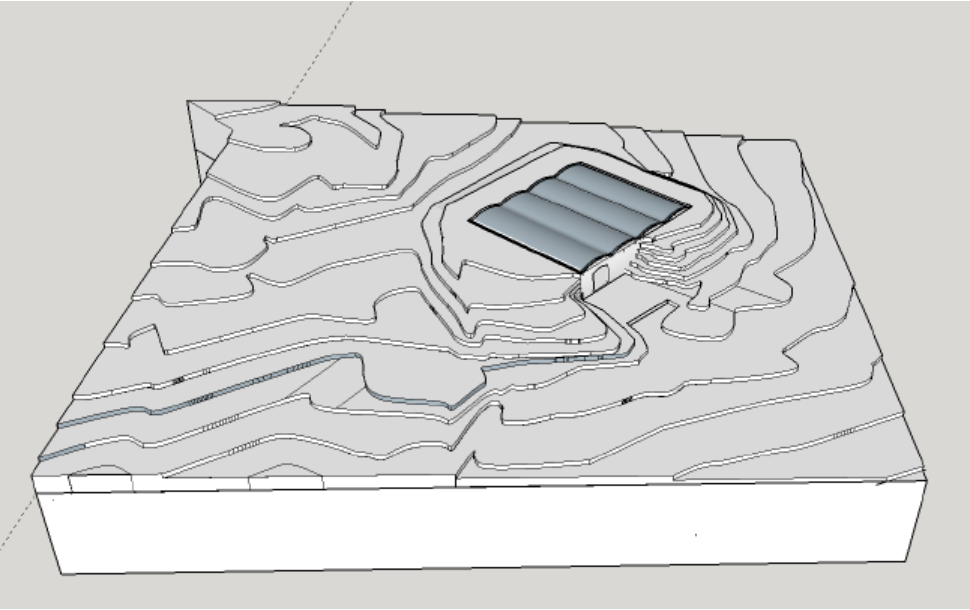
6 Appendix A: Structural Engineer's Report.

EXISTING SITE CONDITIONS

The view below shows the area of portion 8 with three actual boundaries and a proposed or notional boundary. The cistern together with its earth embankment is the lightly coloured area. The north east boundary is on Klaasens road and the other two boundaries are between the site and separate residential erven. The southwest boundary is the proposed cadastral boundary between the site and the farm, as surveyed for the rezoning application. A gravel road leading to the rest of the farm limits any further use of the site to the southwest. The land falls gently from north to south.



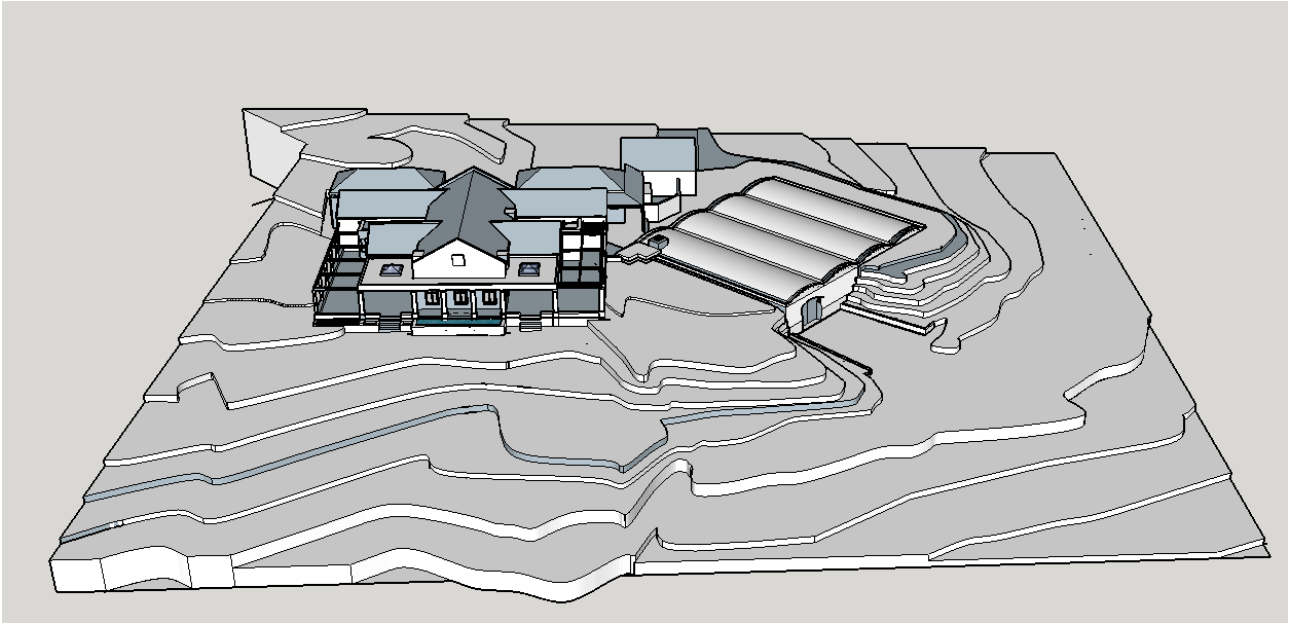
Site plan view



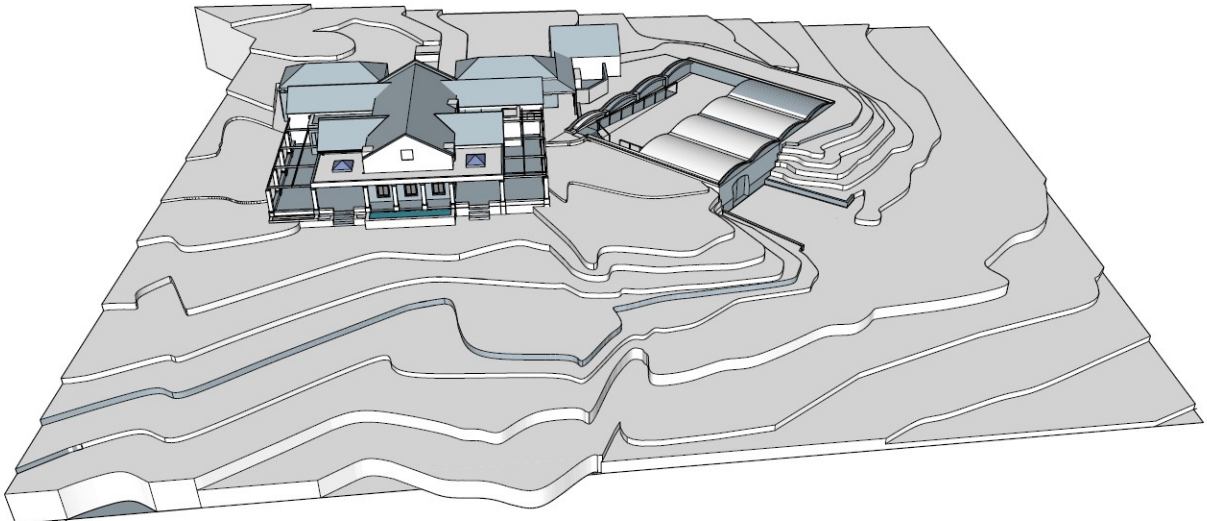
Site topographical view

## PROPOSAL

The views below show the house in relation to the cistern, with the cistern as-is and with part of the roof removed to create the sunken courtyard kitchen-garden.

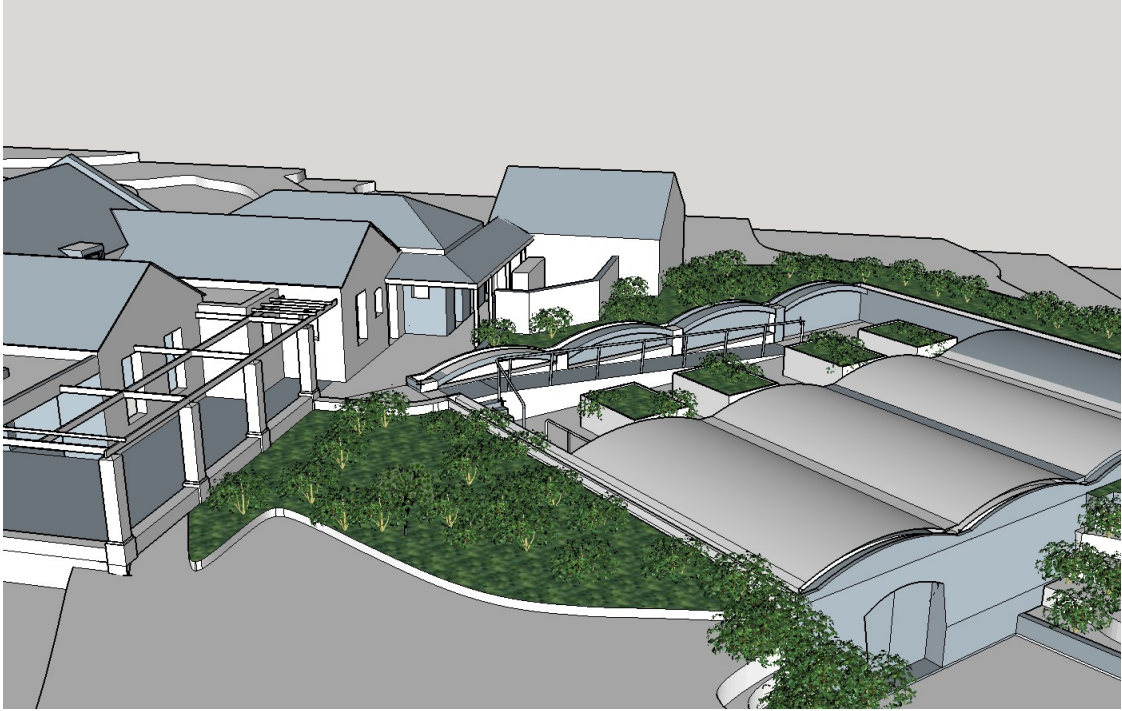


Birds eye view of house and cistern without intervention

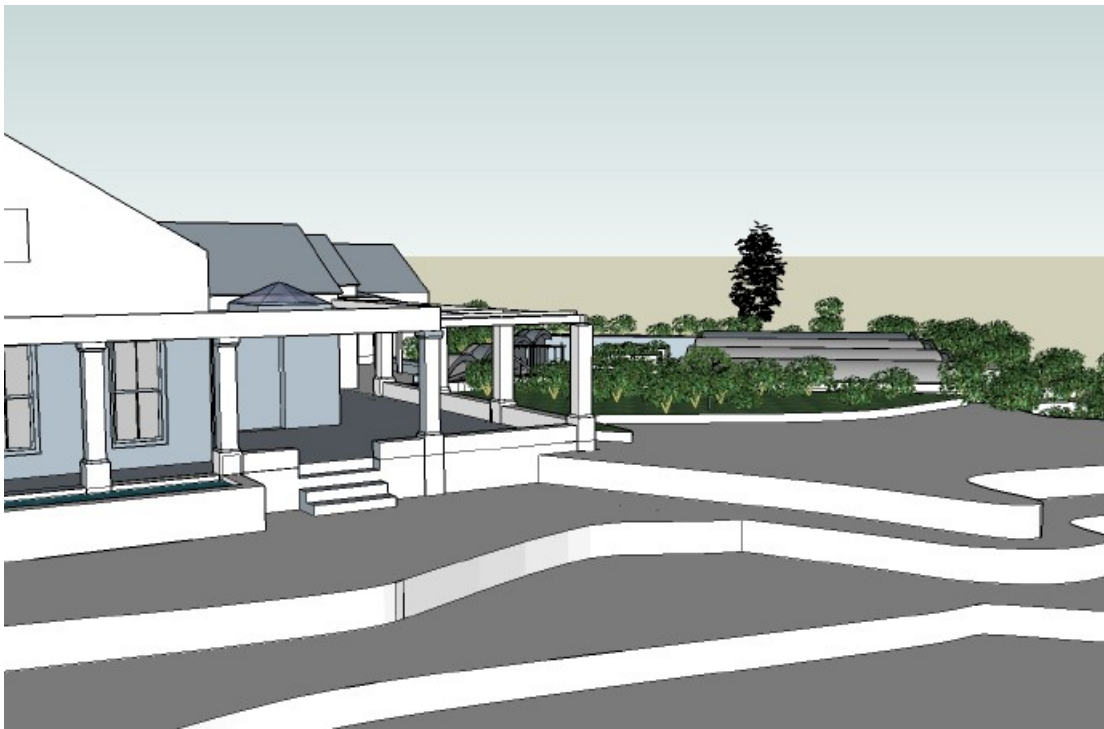


Birds eye view of house and cistern with sunken courtyard kitchen-garden

VIEWS



Birds-eye view from southwest



View from west

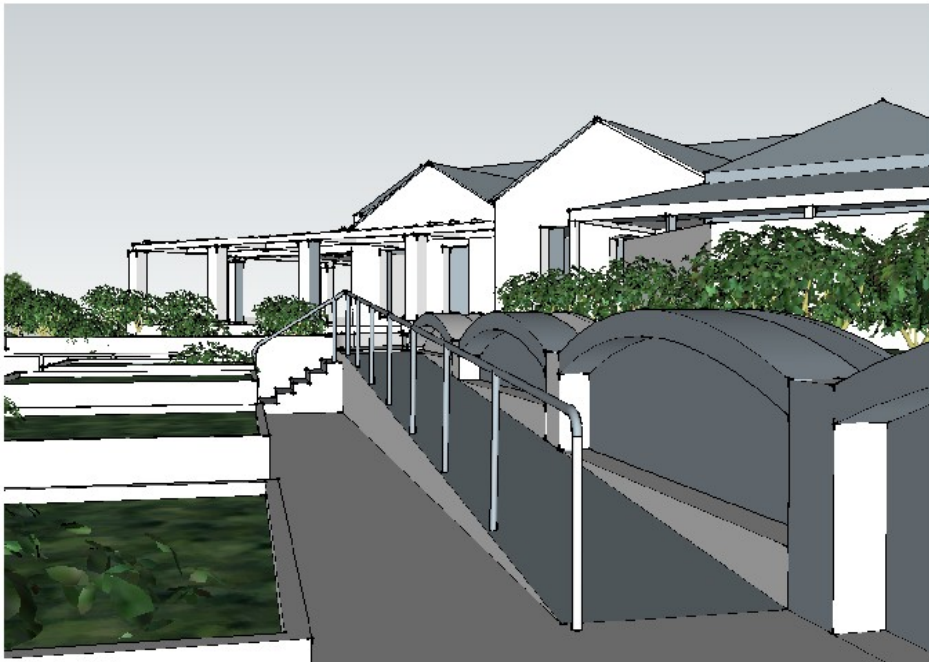


View from south of cistern



Birds eye view from east

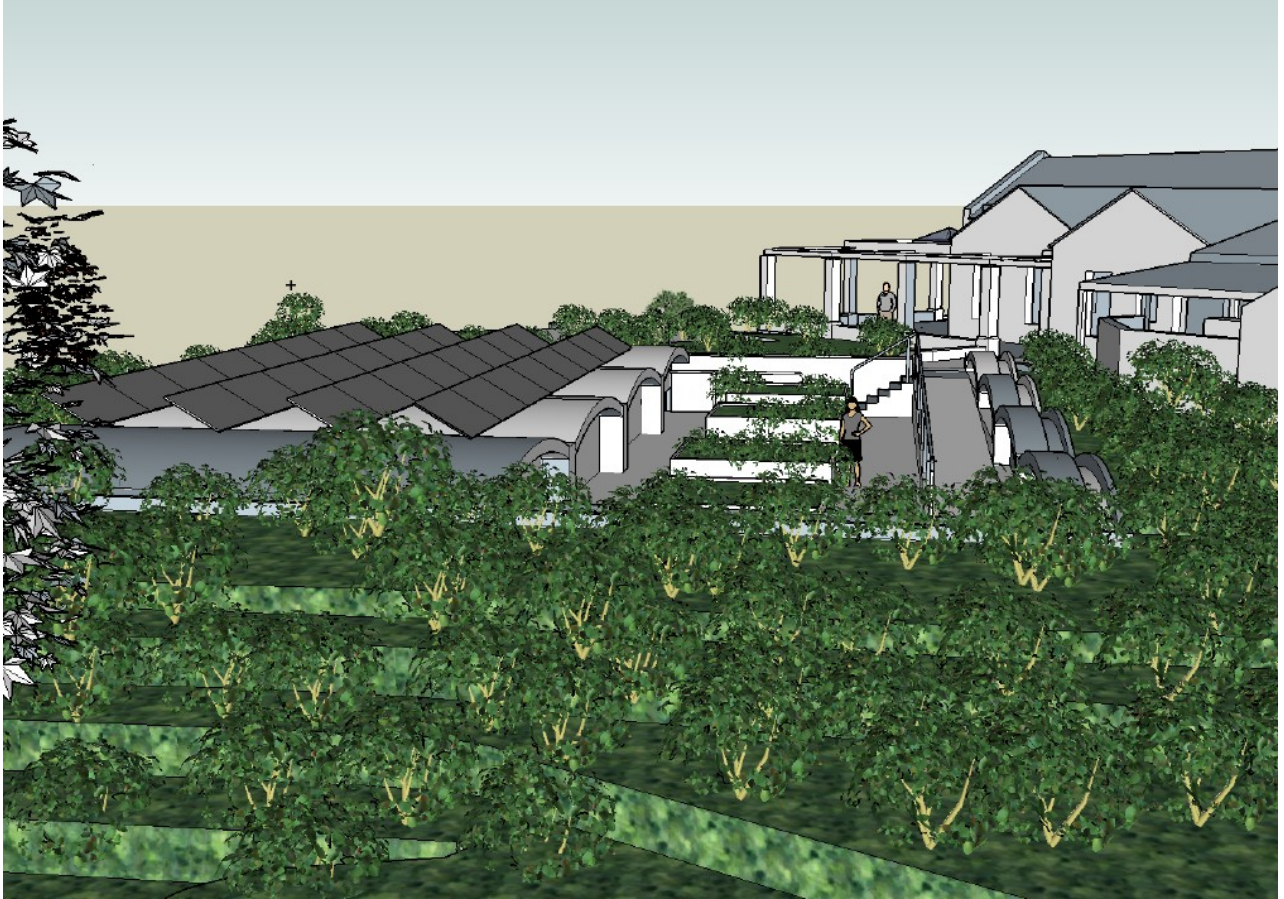




View from cistern kitchen garden to house



View from house toward cistern and kitchen-garden



Birds eye view from east, with PV panels.

### **Summary motivation for partial demolition + repair of historic water cistern**

1. The site has been defined by the HIA and approved by SAHRA and DEADP as a suitable location for a domestic residence.
2. The proposal to demolish a portion of the cistern is in order to lend compatibility of scale and of use between the cistern and the domestic residence.
3. The proposed line of the cut corresponds with a structural crack that runs through the roof from west to east, through the concrete support arches and external wall. This intervention will include underpinning the foundations thus ensuring that the cistern is saved from collapse.
4. The brick vaults together with the projecting brick vaulted segments on both sides of the courtyard together with retention of the perimeter walls of the cistern make up in total 70% of the roof area relative to the existing coverage.
5. The dimensions of the sunken courtyard follow from points 3 + 4. The size and spatial proportions are suitable to the purpose. To reduce the size of the sunken courtyard would make it unviable as a kitchen-garden, in which case the cistern would be left as it is.
6. It is proposed that the sunken courtyard floor be constructed from pre-cast elements that would allow it to be removed reasonably easily and without damaging the surrounding historic fabric. The ramp and stairs, built onto this pre-cast floor and separated by a gap from the existing walls, can equally be removed.
7. The PV panels, a contemporary energy solution, would be fixed on a floating structure that avoids penetration of the vaulted brickwork and which can be removed at the end of its working life.
8. The portion of retained vaulting along the north side of the structure together with the large area of vaulting on the south side addresses the historical legibility of the structure as a contemporarily modified artefact. The proposal introduces a viable new use to what will otherwise remain a derelict structure.

Rod Gurzynski  
Professional Architect  
CIA SAIA SACAP

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