



CIVIL/STRUCTURAL CONDITIONAL ASSESSMENT REPORT (Final – RV02)

CONSTITUTIONAL HILL PRECINCT – RAMPARTS BUILDING AND SURROUNDING WALL

11 May 2023

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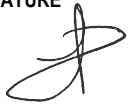
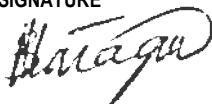

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1. INTRODUCTION

1.1 Background

Project title: **CONSTITUTIONAL HILL PRECINCT – RAMPARTS BUILDINGS AND SURROUNDING WALL**

NEW EARTH CONSULTING has been appointed by Gauteng Growth and Development Agency for the above-mentioned project for the refurbishment of Civil and Structural components of the Constitutional Hill Precinct – Ramparts Buildings and Surrounding Wall.

On the basis of this appointment, we undertook the conditional assessment of the precinct from the 23rd of March 2023 in order to identify elements of the building that requires improvement, renovations, restoration or replacement of materials.

1.2 Purpose of the report

The purpose of this report is to evaluate the current conditions of the building. The site investigation carried out was to undertake a visual conditional assessment of the building and to look into civil and structural defects, evaluate the condition of the building (functionality, layout and level of utilisation) and to provide recommendations for the renovations and repairs required in order to improve the conditions thereof.

1.3 Limitations of the Assessment and Exclusions

The scope of the investigation was limited to the visual survey of the internal and external fabric of the existing building structure and comment on the structural integrity as it appears on site.

The visual survey only includes the inspection of visible, exposed and accessible parts of the structural fabric under consideration. The conditional structural survey performed does not include any disruptive, intrusive or destructive inspection techniques or procedures.

The investigation did not include any review of the geotechnical conditions on site and the review of the adopted foundation system and the assessment whether the existing foundation system will be adequate to support the new imposed loading.

2. PROJECT SITE LOCATION AND DESCRIPTION

The Constitutional Hill Precinct is located in Braamfontein, Johannesburg, Gauteng. It falls under the City of Joburg Municipality. The coordinates of the site are 26°11'17.96"S | 28°02'36.01"E

Below is are figures the site highlighting the area inspected.



Figure 1 – Aerial Photograph of Site



Figure 2 – 3D Photograph of Site

The area considered consists of multiple blocks of buildings used for museum purposes, storage, kitchen, ablution, studio and general areas. It has garden areas, outdoor event areas and other necessities. The area inspected has a backfill of soil approximately 2 – 3 meters deep and vegetation above the concrete roof line. Some sections of the buildings have basements and tunnels.

The backfill of soil enclosing the establishment is retained by multiple stone retaining walls joined together using cement mortar.

Water supply to the property is solely by the municipality through an internal water reticulation system from the main supply to all the units and external taps. There are water storage facilities on site, however they are assumed to not be in use due to their heritage status. Black and grey water from toilets, basins, baths etc. of each unit is disposed of by an internal sewer reticulation system. This system consists of various sewer pipes which connect to the main municipal sewer line for disposal.

Stormwater is dispersed from the site using a combination of roof slopes, ground drains, channels, paving blocks and natural ground slopes.

The structural configuration of all the buildings is such that they are typical masonry constructed buildings roofed with timber trusses, IBR/Zinc roof sheets and some the area inspected is roofed with a concrete slab. The areas of the site are covered with paving blocks. Only the areas with a backfill of soil on the roof are covered with grass.

3. INVESTIGATIONS AND CONDITIONAL ASSESSMENT

3.1 Project Approach

Our team made engagements with the Client in order to have an integrated approach. Through the engagements, it was established that there were some forms of alterations, maintenance and upgrades to the buildings such as waterproofing in some areas, conversion of some rooms into a museum, a recording studio and recreational facilities, however the maintenance was not routine.

The investigation methodology to obtain information was as follows:

- In-loco inspection to obtain first-hand information by site visits, with the occupants' leadership;
- Recording of items that require refurbishment;
- Establishment of a need analysis for each unit; and
- Taking and recording of actual measurements from the existing facilities;
- Using radar devices to detect any concrete reinforcements.

The combined information was then used to evaluate the upgrading and renovation requirements.

3.2 Need Analysis

As part of stakeholder engagement of our assessment, we met with the Client's representative and the end-users of the building who presented the following needs:

- Repair cracks from walls;
- Waterproofing for concrete roofs;
- Repair surrounding retaining walls;
- Assess current stormwater pipes;
- Assess existing leaning guard towers;

3.2.1 Civil and Structural Works

3.2.1.1 Masonry, Roof Covering, Carpentry and Joinery

- Minor to very severe cracks on external guard tower buildings;
- Minor cracks on soffit of roof slab but appear to be in good condition;
- Most of the external and internal walls appear to be in a good condition and have minor cracks;

- No brick force/brick reinforcement on internal and external walls;
- No reinforcement on surface bed;
- Reinforcement exists on suspended slab;
- Deteriorated waterproofing on concrete roof slab causing severe water leakages;
- Worn out paint on steel window frames, structural steel beams and soffit of concrete slab and brick walls;
- Air shafts going into basements causing severe water leakages;
- Surrounding retaining wall collapsing, deflecting in some areas and showing severe movement cracks in risk of collapse;
- Surrounding retaining wall showing no signs of drainage;
- Elevated water tank generally in good condition but showing surface rust on structural steel and bolts and nuts;
- Elevated water tank pad footing support showing settlement cracks;
- Guard tower 1 showing severe vertical and diagonal cracks due to retaining wall movements;
- Guard tower 2 and 3 showing very severe cracks due to differential foundation settlement;
- Partial waterproofing on roof stormwater drainage channel;
- Blocked stormwater drainage pipes;

Photos of the visual inspection are as follows:



Figure 3 – Minor to severe diagonal and horizontal cracks on guard tower due to retaining wall movements



Figure 4 – Minor diagonal crack on guard tower brick (1mm – 5mm) due to retaining wall movements



Figure 5 – Severe horizontal crack on guard tower brick (15mm – 25mm) due to retaining wall movements



Figure 6 – Minor diagonal crack on external fabric (1mm – 5mm) of the western building



Figure 7 – Radar device indicating no brick force/brick reinforcement on retaining wall on western building

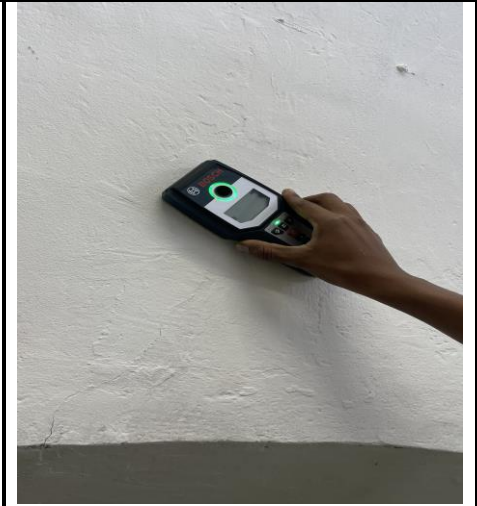


Figure 8 – Radar device indicating no brick force/brick reinforcement on external wall on western building



Figure 9 – Minor cracks (1mm – 5mm) on suspended slab due to water leakage at entrance of southern museum building; Surface rust on structural steel of southern museum building



Figure 10 – Surface rust on structural steel on soffit of basement slab of southern museum building; Minor cracks on suspended slab due to water leakage of southern museum building



Figure 11 – Stained wall due to water leakage above slab in basement of southern museum building



Figure 12 – 9m air shaft causing severe water leaks of southern museum building



Figure 13 – 9m air shaft causing severe water leaks of southern museum building



Figure 14 – Blocked stormwater pipe of southern museum building



Figure 15 – Minor cracks (1mm – 5mm) on suspended slab due to water leakage of southern museum building



Figure 16 – Minor cracks (1mm – 5mm) on suspended slab due to water leakage of southern museum building



Figure 17 – Water stains on suspended slab and brick wall in museum area of southern museum building

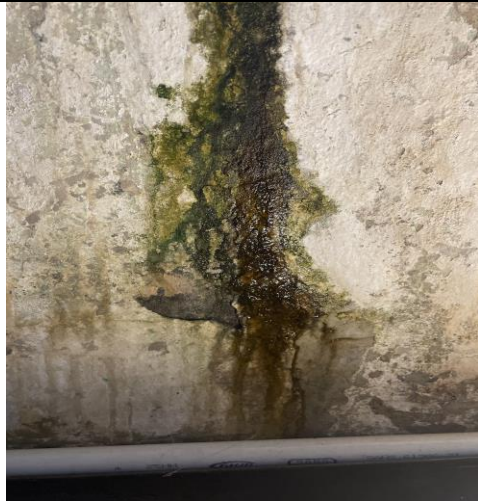


Figure 18 – Water stain on wall indicating water leakage of southern museum building



Figure 19 – Radar device indicating no brick force/brick reinforcement on surface bed of southern museum building



Figure 20 – Collapsing retaining wall with no visible drainage next to southern museum building



Figure 21 – Collapsing and loose retaining wall with fallen pieces of rock next to southern museum building



Figure 22 – Severe horizontal crack on retaining wall (15mm – 25mm) due to retaining wall movements next to southern museum building



Figure 23 – Very severe crack (>25mm) on retaining wall next to southern museum building



Figure 24 – Retaining wall leaning next to southern museum building



Figure 25 – Deflecting and loose retaining wall next to eastern studio building



Figure 26 – Leaning guard tower 2 (north-eastern) due to settlement



Figure 27 – Very severe crack (>25mm) on guard tower 2 (north-eastern) due to settlement



Figure 28 – Elevated water tank in good condition but with surface rust



Figure 29 – Crack on suspended tank footing due to settlement ; Bolts and nuts of suspended tank in good condition but with surface rust



Figure 30 – Stormwater drain



Figure 31 – Sagging, uneven and missing pavement blocks; Soil backfill and vegetation on rampart walk embankment

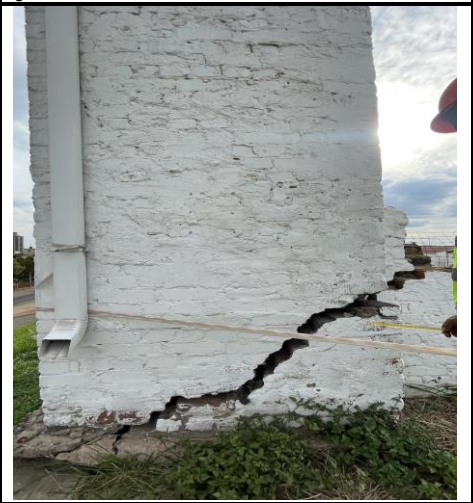


Figure 32 – Leaning guard tower 3 (north-eastern) due to settlement



Figure 33 – Very severe crack (>25mm) on guard tower 2 (south-eastern) due to settlement



Figure 34 – Roof stormwater drainage with partial waterproofing above southern museum building ; Soil backfill and vegetation on roof top of southern museum building

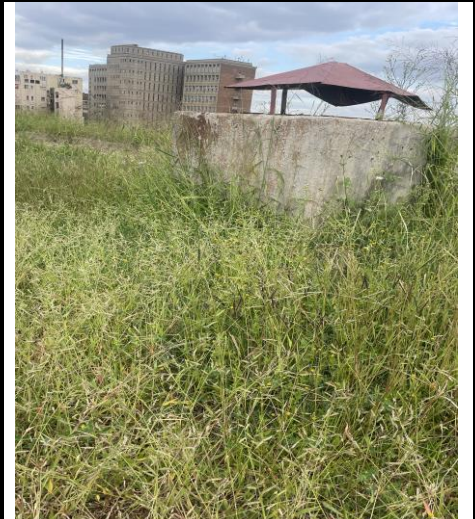


Figure 35 – Vent shaft opening causing severe leaks in basement area of southern museum building; Soil backfill and vegetation on roof top of southern museum building



Figure 36 – Vegetation growing on roof stormwater drain channel of southern museum building



Figure 37 – Cracks on retaining wall; Loose stones on retaining wall; No drainage on retaining wall of south-western area



Figure 38 – Blocked drainage pipes on southern museum building

4. RECOMMENDATIONS

It should be noted that:

1. All works, demolitions and procedures to be in accordance with the method statements and drawings provided by the project Engineer and Heritage Architect;
2. No existing structures or components shall be removed, demolished or tempered with prior to approval by the project Engineer and Heritage Architect;
3. All materials and samples of work to be approved before work commencement;
4. All works planned or additional must be strictly approved by the project Engineer and the Heritage Architect;
5. All excavations exceeding 400mm shall be done with the monitoring of the project Heritage Architect and Archaeologist;
6. All new finishes must match the existing in all aspects. Project Heritage Architect to approve all finishing works prior to commencement;
7. No crack repairs on the internal fabric of the structure shall be undertaken, only loose paint and flakes shall be brushed off lightly off the surface. See method statement by project Heritage Architect;
8. All landscaping and vegetation altered during implementation of the project shall be rehabilitated and restored to original condition;

The following is a list of recommendations for various components:

No.	Item	Detail of Defect	Severity		Recommendation
			M	S	
Civil and Structural works					
1	Fine Cracks	<1mm cracks on fabric of wall and concrete (Category 1)	X		<p>Cosmetic Repairs (<i>external only</i>)</p> <p>Remove all loose and flaking paint. Fill larger cracks with an appropriate non-shrink propriety filler in accordance with the manufacturer's instructions. (An external grade acrylic filler containing no gypsum should be used on external wall surfaces). Sand the filled area to achieve a smooth finish, if necessary.</p> <p>Ensure that the surface is clean, dry and free of dust. Apply a horizontal strip of paint above the area to be repaired from which to hang the fibre glass/ polyester strip.</p> <p>Stick the fibre glass/polyester strip to the wet painted strip, ensuring that the drop is vertical and even. Smooth the fibreglass strip against the dry surface.</p> <p>Apply a generous coat of paint through the fibreglass strip/polyester to cause it to adhere to the wall.</p> <p>Repeat step 2 and 4 and hang successive drops of fibreglass until the area is totally covered.</p>

				After the coat has dried, the fibre pattern of fibre glass/polyester strip will be visible. Apply a second coat of paint and thereafter repaint the entire wall
2	Minor Cracks	1mm > 5mm cracks on fabric of wall and concrete (Category 2)	X	<p>Cosmetic Repairs (<i>external only</i>)</p> <p>Remove all loose and flaking paint using a carborundum disk into a v shape 1mm bigger than the existing crack. Wet the crack and fill larger cracks a damp 1:4 cement/sand mortar properly compacted into the cracks). Float the filled area to achieve a smooth finish, if necessary.</p> <p>Ensure that the surface is clean, dry and free of dust. Apply a horizontal strip of paint above the area to be repaired from which to hang the fibre glass/ polyester strip.</p> <p>Stick the fibre glass/polyester strip to the wet painted strip, ensuring that the drop is vertical and even. Smooth the fibreglass strip against the dry surface.</p> <p>Apply a generous coat of paint through the fibreglass strip/polyester to cause it to adhere to the wall.</p> <p>Repeat step 2 and 4 and hang successive drops of fibreglass until the area is totally covered.</p> <p>After the coat has dried, the fibre pattern of fibre glass/polyester strip will be visible. Apply a second coat of paint and thereafter repaint the entire wall</p>
3	Moderate Cracks	5mm > 15mm cracks on fabric of wall and concrete (Category 3)	X	<p>Partial Masonry Replacement</p> <p>Carefully remove damaged brick work and store for later re-use.</p> <p>Augment existing foundation by underpinning as per engineering design.</p> <p>Reconstruct demolished area of the building using the same bricks. Replace damaged or broken bricks with similar.</p> <p>Reconstruct building using the same roof structure. Replace damaged or broken roof members with similar.</p>
4	Severe Cracks	15mm > 25mm cracks on fabric of wall and concrete (Category 4)	X	<p>Rebuilding of Masonry (<i>refer to detailed method statement</i>)</p> <p>Carefully remove all brick work and store for later re-use.</p>

					<p>Demolish existing concrete foundation and cart away. Construct new concrete foundation as per engineering design with careful consideration to earthworks backfill to avoid future settlement.</p> <p>Reconstruct building using the same bricks. Replace damaged or broken bricks with similar.</p> <p>Reconstruct building using the same roof structure. Replace damaged or broken roof members with similar.</p>
5	Very Severe Cracks	>25mm cracks on fabric of wall and concrete (Category 5)		X	<p>Rebuilding of Masonry (<i>refer to detailed method statement</i>)</p> <p>Carefully remove all brick work and store for later re-use.</p> <p>Demolish existing concrete foundation and cart away. Construct new concrete foundation as per engineering design with careful consideration to earthworks backfill to avoid future settlement.</p> <p>Reconstruct building using the same bricks. Replace damaged or broken bricks with similar.</p> <p>Reconstruct building using the same roof structure. Replace damaged or broken roof members with similar.</p>
6	Concrete roof	Deteriorated concrete waterproofing causing severe water leakages		X	<p>Prepare and remove paving blocks, paving block kerbs, vegetation and soil backfill by hand up to the surface of the concrete roof in 5 – 6m sections.</p> <p>Remove deteriorated waterproofing membrane, prepare area to receive new membrane by removing the existing screed and applying a new screed >50mm to cover entire exposed area.</p> <p>Apply a primary coat (acrylic based bituminous primer) to prime screed surface as per manufacturer's specification and allow to dry.</p> <p>Lay and align 4mm "Derbigum SP" fully bonded or similar approved and check alignment and adjust where necessary.</p> <p>Heat with a torch the burn-of film present on the underside of the membrane and bond with the underlying surface. Firmly press the membrane ensuring proper bonding with the concrete surface. Additional care to be taken for overlaps, edges and at angles.</p>

					<p>Backfill area with soilcrete up to 1m compacted using a rammer or plate compactor in 150mm layers.</p> <p>Backfill with suitable G5 material to suit previous shape and form up to 500mm below surface (not applicable to areas with pavement blocks and buildings) and compact using a rammer or plate compactor in 150mm layers.</p> <p>Backfill with top soil on areas with no pavement blocks and replant vegetation.</p> <p>Repeat steps for remainder of problematic areas.</p>
7	Steel work	Surface rust on steel works	X		<p>Clean surface by removing all loose material from the rust, treat the steel with an antirust coat and repaint steel with similar colour to match existing/previous by Architect's approval</p>
9	Retaining wall	Collapsing/Failing retaining wall; Cracks on retaining wall; Sagging retaining wall; Loose stones on retaining wall; No drainage on retaining wall		X	<p>Carefully remove retaining wall stones from top to bottom and store for later re-use. The soil retained to also be removed from top to bottom simultaneously with the stones.</p> <p>Construct a new retaining wall as per engineering design to suit complete with weep holes/drainage holes. Design to incorporate an inclusion of the old retaining wall as a façade.</p> <p>Re-use old retaining wall stones to create a façade on the face of the new retaining wall. Façade to incorporate drainage.</p>
10	Drainage pipes	Blocked drainage pipes; Leaking drainage pipes		X	<p>Trace all stormwater drainage pipes and unblock.</p> <p>Replace damaged drainage pipes with new to match existing.</p>
11	Vent shafts	Vent shafts causing leakages on basement; Vent shaft covers missing and or damaged		X	<p>Remove and replace existing vent shaft covers with new. Vent shaft cover to prohibit any water from seeping through; Vent shafts to be waterproofed by specialist in areas at risk of excess water to prohibit water seepage.</p>
12	Roof drainage	Roof drainage channel partially waterproofed and filled with vegetation		X	<p>Reconstruct new channel with slope as per engineering design. New channel to be fully water proof.</p>

*(M=Moderate; S=Severe)

Table 1- Recommendations

5. SCOPE OF WORK

The scope of works shall be implemented in conjunction with the method statements provided by the project Engineer and Heritage Architect. Limitations and procedures of implementation listed on the report due to the sensitivity of the site shall be strictly enforced.

Based on the recommendation of the above table, the scope of works can be summarised as follows:

1. Repairing of cosmetic fine to minor cracks (Category 1 to Category 2) as per recommendation only on external fabric of building (western building, south museum building, north-western guard tower);
2. Repairing of cracks by partial masonry replacement (Category 3) as per recommendation for guard towers identified (south-western guard tower) ;
3. Repairing of cracks by rebuilding (Category 4 to Category 5) as per recommendation for guard towers identified (north-eastern and south eastern guard towers, north-western guard house below rampart walk). See the attached proposed method statement **Appendix A**;
4. Remove existing backfill and expose the surface of roof slab in 5 – 6m sections, remove the existing waterproofing membrane and screed, apply new screed and apply new 4mm “Derbigum SP” fully bonded or similar approved torched on to the surface;
5. Backfill, replant vegetation and relay paving blocks and kerbs. Backfill in layers of G5 material and top soil as per recommendation. See the attached proposed method statement **Appendix C**;
6. Treatment of surface rust and reconditioning of structural steel;
7. Remove existing stones on retaining wall, prepare and construct a new retaining wall as per engineering design and construct a façade using existing stones. See the attached proposed method statement **Appendix B**;
8. Unblock stormwater drainage pipes;
9. Repair and/or replace damaged stormwater drainage pipes;
10. Repair and/or replace vent shafts causing leakages on basement;
11. Replace vent shaft cover allowing water to seep through building;
12. Re-construct roof channel drainage with full waterproofing;
13. Installation of sub-soil drainage in various areas of the rampart walk as per design.

6. CONCLUSION

We have evaluated and inspected the facility and identified major items which require repairs. The overall structure of the buildings are in a good state but some components require urgent maintenance and refurbishment in order for the building to be utilised effectively and to avoid further dilapidation.

The implementation of the repair works are of a high sensitivity due to the heritage status of the site. All works to be carried out must be in accordance to the approvals and method statements of the Project Engineer and Heritage Consultant.

The retaining walls are in a failing state and require some major urgent intervention which includes demolition and reconstruction.

We believe that the proposed recommendations for the identified items should be attended to as this will further preserve the property for some years to come.

APPROVALS

Client

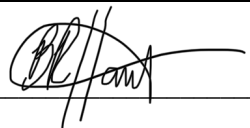
Name : _____

Signature : _____

Date : _____

Heritage Consultant

Name : 

Signature : 

Date : _____

Appendix A – Guard Towers Reconstruction (Method Statement)

Proposed Method Statement for demolition and reconstruction of guard towers

Please note that the proposed method statement should be taken as a guide. The appointed contractor shall be required to produce a detailed method statement for approval. Method may change given unknown circumstances during implementation.

Permission shall be required before any demolitions and reconstructions take place by relevant local authorities and bodies. The project Heritage Architect and Archaeologist shall be present to monitor any excavations exceeding 400mm

The following steps shall be followed:

1. An as-built drawing of the building shall be issued to the contractor by the project Architect detailing the building in all aspects;
2. A temporary fence shall be constructed around the structure to be demolished. Fence shall accommodate movement around the structure;
3. Precautionary safety signs shall be erected and maintained throughout the project. Access to area shall be controlled during the process;
4. Demolitions of the superstructure shall be carried out by hand tools and substructure (concrete foundation) may be demolished by mechanical tools;
5. All demolitions shall be done extremely careful with the aim of retaining 100% of the building components such as bricks, windows, roof etc. for later re-use;
6. Materials shall be stored away for safe keeping in a dedicated area within the site. All broken and loose material resulting from the demolitions shall be cleared and removed from site or stored safely for later cart away;
7. Excavations of not more than 1.5m below NGL shall be done with an allowance of 1m around the building shall be done and the soil shall be cart away from site;
8. Surface of excavated area shall be compacted to 90% MOD ASSHTO;
9. Borrowed material of classification minimum G5 and maximum G7 shall be used as backfill. Backfill material to be compacted to 93% MOD ASSHTO in 150mm layers up to foundation level;
10. Compaction shall be tested by a SANAS accredited Lab;
11. A new foundation shall be excavated as per engineering design;
12. Preparation work shall be carried out for foundation prior to concrete pour. Engineer to inspect and approve foundations prior to concrete pour;
13. The super structure shall be reconstructed using as-built drawings by project Architect to be identical to previous building in all aspects;
14. All landscaping and vegetation altered during implementation of the project shall be rehabilitated and restored to original condition;

Appendix B – Retaining Wall Reconstruction (Method Statement)

Proposed Method Statement for demolition and reconstruction of retaining walls.

Please note that the proposed method statement should be taken as a guide. The appointed contractor shall be required to produce a detailed method statement for approval. Method may change given unknown circumstances during implementation.

Permission shall be required before any demolitions and reconstructions take place by relevant local authorities and bodies. The project Heritage Architect and Archaeologist shall be present to monitor any excavations exceeding 400mm

The following steps shall be followed:

1. An as-built drawing of the wall shall be issued to the contractor by the project Architect detailing the wall in all aspects;
2. A temporary fence shall be constructed around the structure to be demolished. Fence shall accommodate movement around the structure;
3. Precautionary safety signs shall be erected and maintained throughout the project. Access to area shall be controlled during the process;
4. Demolitions shall be sequentially in a logical sense to prevent accidental collapse of the structure such that a top to bottom approach must be adopted;
5. From top to bottom, the stone retaining wall shall be demolished with the assistance of mechanical tools such as a backhoe loader that can be used to safely carry the stone from the top of the wall to the storage;
6. The soil being retained shall be removed simultaneously with the retaining wall stones;
7. The site shall be cleared and preparations of the new retaining structure shall commence as per the engineering drawings;
8. The new retaining wall shall be constructed using modern construction techniques with careful consideration to the sensitivity of the site;
9. The old retaining wall shall be incorporated in the new retaining wall making it one structure;
10. The soil that was retained shall be backfilled and compacted in layers to the original height and form;
11. All landscaping and vegetation altered during implementation of the project shall be rehabilitated and restored to original condition;

Appendix C – Waterproofing (Method Statement)

Proposed Method Statement for waterproofing of roof slab.

Please note that the proposed method statement should be taken as a guide. The appointed contractor shall be required to produce a detailed method statement for approval. Method may change given unknown circumstances during implementation.

Permission shall be required before any demolitions and reconstructions take place by relevant local authorities and bodies. The project Heritage Architect and Archaeologist shall be present to monitor any excavations exceeding 400mm.

The following steps shall be followed:

1. A temporary fence shall be constructed around the area of excavation. Fence shall accommodate movement around the excavation;
2. Precautionary safety signs shall be erected and maintained throughout the project. Access to area shall be controlled during the process;
3. The existing structure shall be propped on the underside of the structure and for at least 3m on each side of the excavation;
4. Excavations shall be done on an area of between 5m – 6m by hand. Excavations to be done at a slope of 1:1 if found to be collapsible;
5. The roof slab shall be exposed on the area excavated. The screed and waterproofing if any shall be scraped off and removed from the surface in its entirety;
6. A new screed shall be used to level out the surface of the concrete. A minimum period of 4 days shall be given for the screed to cure;
7. A primary coat to prime the surface as per manufacturer's specification shall be placed on the surface of the screed. Solvent-based or water-based primers are suitable for bitumen membranes.
8. The membrane shall be unrolled and checked for the correct alignment and adjusted wherever required.
9. The membrane shall be heated with a torch as per manufacturer's specifications and bonded with the underlying surface;
10. Additional care should be taken for overlaps, edges and at angles to ensure proper bonding.
11. A coat of Bitu-Primer (acrylic based bituminous primer) to be applied to the concrete slab. The solvent-based bitumen primer (Bitu-Primer) applied to the concrete slab to facilitate the correct adhesion between substrate and the Derbigum/Derbit waterproofing material.
12. All details shall be treated and only after torching of the membrane. Liquid membrane to be used for such details. Details such as interior and exterior corners, as well as wall to floor type corners, metal flashing terminations and penetrations such as pipes, vents, drains, etc. to typically be pre-treated with reinforcing fabric embedded into the liquid membrane and/or with a flashing grade sealant;
13. Backfill with classification G5 minimum and G7 maximum shall be used to backfill the area in which the paving blocks will be constructed. Backfill to be compacted in layers of not more than 150mm. The remaining areas to be backfilled with the excavated material and also compacted in layers of not more than 150mm. Backfill to be to the original height and form.
14. All landscaping and vegetation altered during implementation of the project shall be rehabilitated and restored to original condition;

Appendix D – Drawings (for information)

