Conditional Assessment
for Buildings on Robben Island
CDC-453-17

Prepared for: Coega Development Corporation (Pty) Ltd

Consultants: **CHARLES CONSULTING CONSORTIUM** a joint venture consisting of
Osmond Lange Architect and Planners
Charles Consulting
Bosch Projects

Date: October 2018

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CHARLES CONSULTING

BOSCH PROJECTS

OSMOND LANGE ARCHITECTS + PLANNERS

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List of abbreviations

CCC	Charles Consult Consortium
CDC	Coega Development Corporation
HA	Heritage Architect
MPLC	Multi-purpose Learning Centre
MSP	Maximum Security Prison
NMG	Nelson Mandela Gateway
OLA	Osmond Lange Architects
PWD	Public Works Department
RIM	Robben Island Museum
SACAP	South African Council for the Architectural Profession
SAHRA	South African Heritage Resources Agency

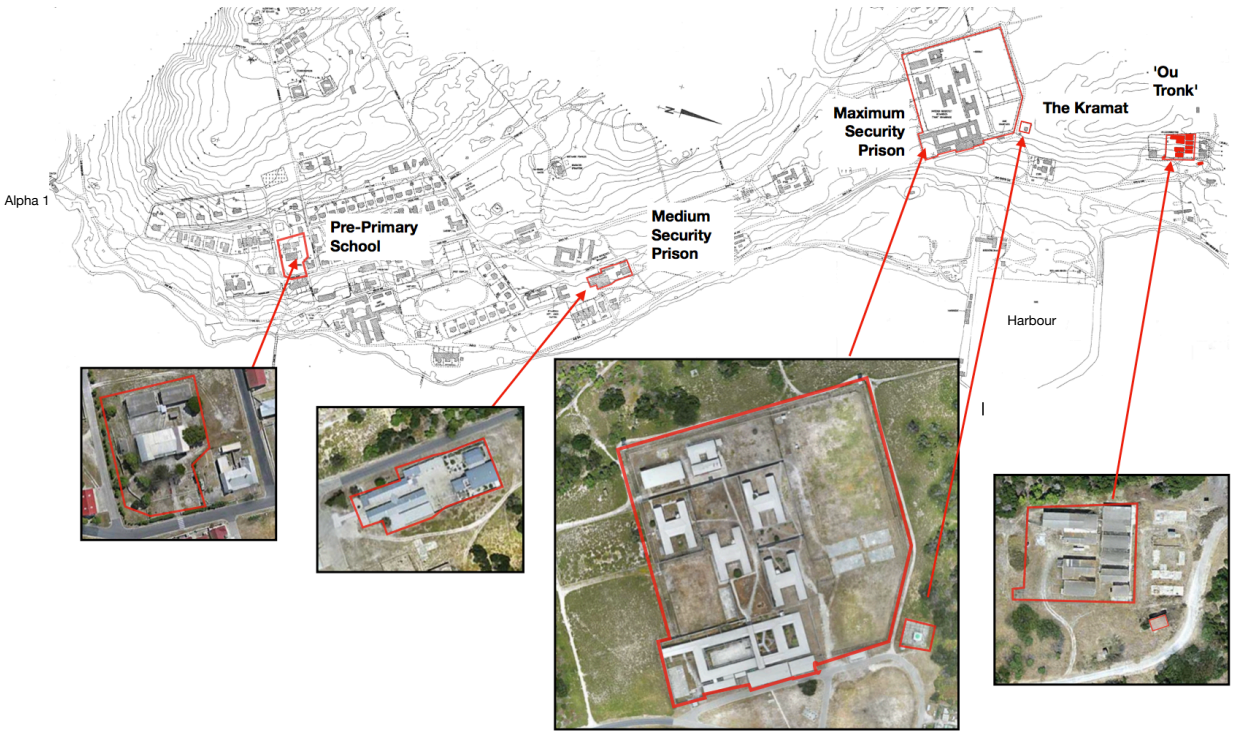
1. OVERVIEW

Introduction

The professional consultancy joint venture, Charles Consult Consortium consisting of Charles Consult, Osmond Lange Architects + Planners and Bosch Projects, was appointed by the Coega Development Corporation (CDC) in July 2018 following a formal procurement and adjudication process.

The scope of the conditional Assessment was defined by the CDC to include the following five building precincts :

- Old Maximum Security Prison
- The Kramat
- The Ou Tronk / Trade Training Unit
- Old Medium Security Prison (now the MPLC)
- Old School (Pre-Primary School)



Each of the building precincts has been the subject of detailed inspections. Where As-Built drawings were not available, the buildings have been measured and new As-Built drawings compiled. Not all drawings are included in this report, only buildings that are unique or are representative of similar buildings or similar fabric.

This report assesses the general conditions of the buildings within the identified precincts.

The inspections focussed on the build technique and materials used, and the way the building would have functioned and are being used now. We have noted the more recent interventions and the impact this has on most buildings. The survey and report outlines what work needs to be done to the buildings (with the approximate cost), and makes recommendations as to the type of particular skills required to carry out the repair and restoration works.

At this stage our focus is on the overall condition and offers initial basic construction recommendations. Later reports will include more detailed site survey and assessment, detailed condition report and recommendations, with associated costs.

We will list the problems found, and rank them in order of importance - which will help with budgeting current and future maintenance. The subsequent reports will include responses and comments from SAHRA.

Most buildings are in a reasonable state of repair. The MPLC, which, although in better condition, appears to have lost some of its historic features.

There is strong evidence that previous maintenance and repair works have not taken into account how buildings 'breathe' and how condensation and dampness is to be treated.

Brief

Prepare detailed conditional assessments of the five identified building precincts on Robben Island. Investigations of building elements for each specialist discipline as to assess functionality of these elements and identify any repairs and/or maintenance works required. The entire process must be in consultation with the South African Heritage Resources Agency (SAHRA) with all applications for approval to be compiled and submitted. The services to be provided will include the following:

- Conditional Assessment and compilation of an Assessment Report (all disciplines);
- Consultation Report with end user requirements and SAHRA;
- Development of a detailed Bill of Quantities for every identified building;
- Development of Detailed Specifications for every identified building for approval by SAHRA;
- Development of any required Working Drawings (where required) for identified repairs and/or maintenance works on every building.

The initial work at this stage essentially entails a survey of the current state of conservation of all the buildings and noting previous renovations and alterations. A photographic survey of buildings will augment the report to demonstrate relevant issues and for ease of reference. Any necessary research, documentary and oral fact finding will be conducted. An assessment of the fabric and of any artefacts will be made as per SAHRA requirements. Proposals for the repair to the fabric will be submitted to SAHRA for a permit to carry out the work. SAHRA will require an updated maintenance management plan with the permit application.

The scope of work should then have the following outcomes:

- Identification and assessment of existing materials used in the buildings.
- Assess the significance of the fabric in terms of the current finishes.
- Advise on best restoration solutions.
- Assist with drafting an application to SAHRA for permission to restore the walls where required.
- Assist with the specification for the restoration work if required.
- Advise on methods to overcome a moisture build up in some of the buildings.
- Supervise the restoration process.

Administration of Architectural Heritage Protection

Coega Development Corporation on behalf of the Public Works Department and by extension the Robben Island Museum has a policy that a structure and its fabric must reflect its state as at the takeover of the buildings by Robben Island Museum in 1997. Restoration and repairs are to be dated to the physical attributes of these buildings.

This conditional assessment report uses guidelines as set out by The International Council on Monuments and Sites (ICOMOS) and by extension the Australian Burra Charter, a professional association that works for the conservation and protection of cultural heritage places around the world. ICOMOS was founded in 1965 in Warsaw as a result of the Venice Charter of 1964, and offers advice to UNESCO on World Heritage Sites.

Robben Island was declared by UNESCO as a World Heritage Site in 1999 and declared by SAHRA as a National Monument in 1996.

Fig 1. View of Robben Island from the north

2. WORK STAGES

Specific Deliverables

Work stages 1 to 4 as prescribed by the South African Council for the Architectural Profession have been used as a guideline to inform the essential functions relevant to each of the four work stages. This report forms part of Stage 1. This report focuses on the description of the precincts, together with an outline description of a sampling of buildings from which the quantity surveyor will be able to establish a square meter rate. The rates will be applied to all other similar buildings in the preparation of a preliminary cost report.

General Assumptions

In broad terms, and subject to ongoing discussions with the client, we have assumed that some of the buildings will be used as museums whilst others we have assumed possible future functions. We understand from the Robben Island Museum that in broad terms, a better visitor experience needs to be created. These functions are described in detail under each precinct's chapter.

Information Received

We received As-Built drawings from CDC prepared by Built Care in 2010 of the Ou Tronk, most of the Maximum Security Prison buildings, copies of original hand drawn drawings of the Maximum security prison, un-dimensioned drawings of parts of the Maximum Security Prison and as-built drawings from GAPP Architects of the MPLC. We measured and generated as-built drawings of the school and auxiliary buildings, the armoury at the Ou Tronk and the Kramat. We are in the process of preparing dimensioned drawings for Section A, B and C as well as the hospital wing of building number B088.

We also downloaded restoration reports for Section A of the Maximum Security Prison and other similar heritage reports from SAHRA's website.

A full list of current information is listed under addendum A.

Work Progress

Understanding the various composition of buildings, drawings received, other information gathered (SAHRA via internet), own measurement and producing new drawings.

Planning Authorities

No notification required at this stage to the City of Cape Town.

South African Heritage Resources Agency

A formal letter will be addressed to SAHRA notifying them of the commencement of the planning stages of this project and advising them of the extent of the affected buildings. Ongoing liaison with SAHRA will take place as the scope and extent of the proposed work is finalised.

It is currently assumed that SAHRA will in turn liaise with UNESCO in respect of the Island's status as a World Heritage Site and apprise them of the proposals emanating from this assessment.

3. SPECIFIC CONSERVATION POLICY AND PRINCIPLES

During the restoration process, certain elements will need to be reinstated, certain elements will need to be retained, certain elements will need to be replaced, certain elements will need to be modified or moved while some will be removed completely to accommodate a new use.

Retention, re-introduction, removal, replacement or modification of fabric is a contested area and should not be done by any one individual. The consultancy team will make recommendations and obtain approvals from the South African Heritage Resources Agency.

The aim is to achieve a reasonable balance between the needs to conserve with that of adaptive re-use.

Decisions to re-introduce, retain, remove, replace or modify must be justifiable.

The process must be re-iterative. Recommendations in this document may need to change with implementation and construction.

Good methods of interpretation of re-introduction, retention, removal or modification should be implemented.

Records by means of both photographs and documents must be made during construction of the re-introduction, retention, modification or removal of fabric.

Any fabric removed or modified must be handed over to RIM. RIM must in terms of the National Heritage Resources Act, 25 of 1999, and in conjunction with SAHRA decide on the significance of items removed and whether to incorporate these into the collection, place into storage or scrap. Any fabric to be scrapped must be thoroughly recorded and photographed prior to removal from the island.

The principle of ‘do as much as is necessary and as little as possible’ must be used as far as possible. In situ materials should be made good and left as is.

The ‘feel’ or ‘sense of place’ [genus loci] of the buildings and their environment must be respected and interpreted appropriately.

4. COMMON ISSUES

During the course of collecting information and visually assessing the buildings, we have come to realise that many of the prior restoration and repair projects of these and other buildings have not been completely successful.

Recent restoration projects have taken place on the island since 1999.

The bulk of the buildings we are tackling in this project are built using blue slate facing, lime blocks and a concrete infill. Lime based construction is not really compatible with modern cement.

It is clear that most of the damp issues in the buildings have to do with the walls not being able 'breathe'. Some of the external wall surfaces have unfortunately also been sealed with a clear 'sealer' and silicon beads applied around the tuck pointing, only making the problem worse.

We will have a close look at the actual construction of the Maximum Security Prison - looking in detail at the opening made in the wall in Section B is a good starting point. We would propose to engage with a geotechnical specialist to ascertain the exact nature of the component parts. It is assumed that most, if not all the material used in these buildings was sourced on the island, with varied manufactured qualities.

A double skin lime brick wall with a thick blue slate slabs formed permanent shutters for concrete infill poured insitu as walls were built. The substantially sized blue slate slabs were carefully dressed to match the outlines of adjacent slabs.

The Victorian era school building was constructed with hammer dressed tuck-pointed stone blocks. The interior face of the wall was probably lined with a plastered brick skin and the gap between filled with mortar and rubble as the work proceeded.

Moisture Penetration through Walls

A common condition on many of the buildings has often been referred to 'rising damp'. This, in our opinion, is not the overriding issue, rather the affects of condensation and poor ventilation, together with incorrect rendering specifications are the causes for many of the deteriorating wall conditions.

Rising damp describes the movement of moisture upward through permeable building materials by capillary action. It becomes a problem if any moisture penetrates vulnerable materials or finishes, particularly in the occupied parts of a building.

The moisture will dissolve soluble salts from the building materials such as calcium sulphate, and may also carry soluble salts from its source. If the moisture evaporates through a permeable surface, these salts will be left behind and form deposits on or within the evaporative surface. Where there is a large evaporative surface, salt crystals are deposited as a harmless flour-like dusting on the surface. If evaporation is restricted to localised areas such as defects in an impermeable paint finish, then salt deposition is concentrated, forming thick crystalline deposits with the appearance of small flowers; hence the term 'efflorescence'.

When evaporation occurs within the material, salts can be deposited within the pores. The expanding salt crystals in these locations may result in fractures forming in the material and spalling of the surface. This type of decay may be seen in porous brickwork or paint flaking off walls.

When there has been a long-term problem with moisture penetration, evaporation at the edge of the damp area leads to a distinctive 'tide mark' as a result of salt deposition. Where this occurs at the base of a wall, the tide mark is often taken as a typical diagnostic feature of 'rising damp'. However, these salt accumulations may remain even when the water penetration that originally caused them has long gone. Similarly, water penetration may have occurred from causes other than 'rising damp'.

The most common source of moisture in the base of the walls of buildings is from defective ground and surface drainage around the building. This is present to some degree in almost every building on Robben Island, due to a combination of such factors as rising ground levels, the failure of ground

drainage systems, and the use of concrete or finishes around buildings without consideration of drainage slopes.

Concentrations of hygroscopic salts, which are often found in masonry, can also absorb moisture from the air, especially at relative humilities above 75 per cent. In unoccupied rooms, with fluctuating relative humidity levels, this can result in the appearance of salt blooms on the surface, resulting in damage to vulnerable materials, and giving the appearance of rising damp.

Damp masonry at the base of walls may lead to a number of problems:

- The moisture content of the structure may rise to a level at which decay organisms may grow, or the materials themselves may be adversely affected. For example, timber skirting boards or built-in structural timbers along the base of walls may become infected and decayed by dry or wet rot or woodborers.
- Damp conditions on the surface of walls, particularly in conjunction with condensation, allow the growth of moulds both on the surface and within porous or fibrous materials fitted against the base of the wall. Not only is this aesthetically unacceptable and damaging to finishes, but it can be a significant health hazard to occupants.
- Where evaporation takes place, the deposition of soluble salts on the surface or within the pores of materials can cause aesthetic and structural damage.

Building Lime in Construction

Lime is the oldest building technology still commonly used. It is found in all buildings built before the early 1920's. It is essential to use lime if one restoring old buildings that were originally constructed with lime, and it is recommended to use it in any older buildings, such as those on Robben Island.

Most modern buildings are made using Portland cement, which is hard, rigid and impervious. Lime allows a structure to breathe - it is porous, and flexible. It allows water to escape the building. Any fine cracks which develop will self heal, as opposed to cement, which just cracks and lets water in.

Building with lime is a process that is simple, is very forgiving, inexpensive, yet needs understanding. Once one understands the material, and how it works, and use it within a restoration project, many condensation and damp issues will have been resolved.

Many, if not all of the older buildings, especially those in this contract have been built using lime mortar sourced on the island. This was in the form of limestone quarried from the lime quarry, and also the burning of the many shells found on the shores of the island. We also suspect that some of the bricks in the MSP are calcium silicate bricks, commonly known as sand lime bricks. Where they were made though is unknown.

Treatment Options for High Moisture Levels

The management of problems due to high moisture levels requires the proper identification of the moisture source and the defect responsible. Only then can the most cost-effective solution to the problem can be defined.

Damp and its effects may be controlled by adopting one or more of the following measures:

- Dissipating the moisture at its source without causing problems to the structure or occupants, and the repair of any contributing defects acting as moisture sources, such as broken pipes.
- Ensuring that vents below wooden floors and higher up on walls are open for the free flow of air;
- Removing cementitious mortar and plaster from walls, to allow the walls to 'breathe';
- The isolation of vulnerable materials such as timber and interior finishes from damp fabric.

Moisture Barriers

The control of moisture movement using either damp-proof or hydrophobic materials to create a relatively less permeable 'moisture barrier' is not a cost-effective option in controlling damp problems and may even be counter-productive. This is because use of relatively impermeable materials will restrict moisture movement and hence drying. As a result, moisture may be 'locked' into damp materials for many years causing chronic problems. Moisture may also be prevented from dissipating from permeable materials, resulting in the build-up of moisture or even damper conditions in localised areas. This may result in moisture moving into previously dry structures or evaporating from previously unaffected surfaces, causing further salt efflorescence.

Injected 'chemical damp-proof courses' generally require re-plastering treated masonry with a salt-proof and waterproof mixture, to cover up these potential problems.

A relatively common example of the effect of inserting a damp-proof material into a structure is the appearance of fresh 'rising damp' in walls following the laying of a new concrete floor with a damp-proof membrane. This is most often done when a suspended floor structure is replaced by a solid floor, or when a breathable stone slab floor is lifted and re-laid. Before the alteration of the original floor, moisture would have been able to evaporate off a large surface, without affecting internal finishes. However, a new impermeable membrane allows the water to accumulate beneath, forcing it to the sides of the room and into the base of the walls. This causes damp and decay problems unless appropriate ventilation has been provided at the floor/ wall junction. These damp problems are then often used as justification for the injection of a moisture-barrier and the removal and replacement of plaster with remedial mixes. The more cost effective solution would have been to allow the floor structure to continue to breathe. This can be done with a suspended floor or by re-detailing the floor/ wall junction in such a way as to allow moisture to dissipate, for example, with a vented skirting detail.

A damp-proof barrier is always vulnerable to local failure and will tend to concentrate moisture and damp problems at these points. This is a general characteristic of all impermeable materials. This results in more 'concentrated' moisture at the points of failure, and hence more severe damp problems locally when they fail. Because of this, the more robust traditional building techniques rely on the use of permeable materials and ventilation details in order to dissipate moisture and prevent it coming into contact with vulnerable materials or interiors.

Generally, failures in existing damp-proof courses are the result of bridging by inappropriate repairs and alterations, by raised ground levels or by localised damage due to structural movement or poor building work. If a damp-proof course is an original design detail to control moisture movement in the structure, it may be necessary to carry out local repairs. This is best done by 'cutting in' a new layer of damp-proof material locally rather than by the general injection of hydrophobic solutions into the masonry to create a 'moisture movement restricting barrier'.

Even with the loss of traditional skills and the complexities introduced into building by new materials and change in use, the conditions resulting in damp to the base of walls can easily be avoided with a some thought and understanding.

New materials and techniques can often be used to advantage. In contrast, the misdiagnosis of rising damp and the general application of particular products and techniques without considering the consequences lead to the unnecessary waste of limited budgets available for maintenance and refurbishment.

Surface Water Drainage

The most cost-effective way of preventing damp problems in buildings should start with the provision of properly detailed aprons and ground drainage around the building to minimise water penetration to the foundations, and ensure surface water is drained clear of the foot of the walls.

Wall Construction : Slate Facings

The majority of the important heritage building on Robben Island which form a significant component of the buildings in this Assessment, were built using blue slate facing slabs.

The slate faced walls were built as a double skin brick wall internally and a slate wall facing externally forming a permanent shutter with the resultant cavity filled incrementally with concrete infill.

The bedding planes of the slate slabs were laid in the vertical plane. One of the consequences of the quarrying of these slate slabs by hand was the resultant irregular outlines of the slate slabs. A prison official involved with the construction of such walls described the use of a piece of paper to trace the irregular outline of the block that had already been placed, which outline would be used to modify the shape of the next slab to create a close fit.

The consequence of this method of construction was an almost random joint pattern. This random pattern is a significant feature of the building stock. The exception to this was the horizontal joint forming the plinth of the building and marking the position and line of the damp proof course.

The prison official further confirmed that the inner brick wall was built first, the slate slabs were placed second - using a block and tackle due to their weight - and the space would then be filled with concrete.

This type of wall construction was clearly considered by the Correctional Services as ideal for the Robben Island Prison. It required hard manual labour and the prisoners could be used for this.

It also provided a robust, structurally sound wall solution and relatively maintenance free external finish. Provided the method of construction was closely monitored, it could be followed by teams of prisoners not necessarily skilled in building trades.

Originally, pointing was done with lime mortar, and replaced in later years with cement/sand pointing, which made the walls less permeable and preventing the walls from breathing. The western wall of The Kramat even has clear silicon applied over the tuck pointing and slate slabs, compounding the problem of trapped moisture.

Wall construction : Plastered Walls

The use of impermeable finishes, such as cement renders on external plastered walls is a common cause of damp problems. These prevent moisture evaporating, forcing water to remain within walls, and in many cases into the interior. As with all impermeable materials, they eventually fail, generally due to cracking. This allows water to penetrate into the foot of the wall, and then prevents drying.

The use of more traditional breathable lime mortar renders, and the correct detailing to shed water clear of the base of the wall and to prevent 'bridging' of any existing damp-proof course, would be the preferred solutions.

Wall construction : Cavity Wall Construction

Cavity wall construction may provide a way of dissipating moisture and preventing it penetrating into the building, provided the cavity is through ventilated. There is however no evidence that there are any cavity walls. The as-built drawings received, do not indicate this.

Painting

Many of the buildings on the island have been rendered using 'plastic' paints, in the form of acrylic PVA and enamel paints. Usually, and without the presence of any moisture in the walls, these types of paints will adhere to the surface and generally will not peel off. However, as soon as any moisture is prevalent, such as most external walls, especially those facing the north to north west, the internal render will be affected. Also, damaged plumbing will cause these paints to blister and flake.

It would be difficult to prevent any moisture ingress, and walls should be allowed to 'breathe' freely by rendering moisture prevalent walls to be painted rather with a lime wash and distemper.

Ventilation

Traditional buildings built in damp or potentially damp sites commonly included through-ventilated sub-floor cavities, as utilised in the school building. These act as sumps to allow the evaporation and dissipation of moisture from the structure before it reaches occupied areas or vulnerable finishes.

The retension or reinstatement of a through-ventilated suspended timber floor is generally preferable to its replacement with a concrete slab.

Air Conditioning

A large quantity of people presumably move through The Kramat during religious events, which has probably led to the installation of two air conditioning units on the roof. The Kramat already has damp issues, the air treatment facility adds to the problems. We will further investigate the air quality, at this stage suffice to state that alternative methods of air exchange has to be allowed for.

Asbestos Cement Roof Sheets

Many roofs were completed using Asbestos cement roof sheeting in the form of Everite's 'Big 6' profile. Some of them are in a very poor state and need to be replaced using acceptable industry standards in their removal.

The use of asbestos cement products is no longer permissible due to health and safety issues.

Directives must be provided by Coega Development Corporation and Robben Island Museum regarding the policy to be followed with regard to asbestos cement products. Two possible options are suggested below :

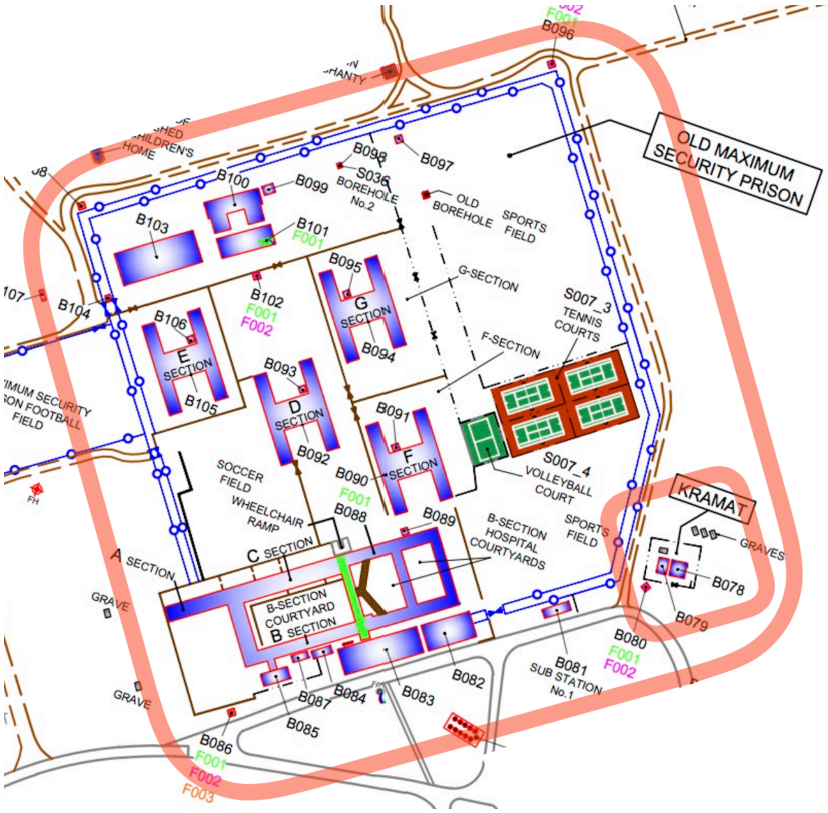
1. Removal to registered landfill site and replacement with matching fibre cement profiles; or
2. Cleaning, repair and coating of existing surfaces of roof sheeting to stabilise and prevent asbestos fibres from detaching and becoming liberated into the environment.

The first option clearly has a significant cost. There are identical profiles available in safe fibre cement material that could be used as replacement.

All water tanks are made of asbestos cement, and should ideally be replaced with similar tanks made of fibre cement. Should these not be available, the existing tanks should be coated with an impervious layer to render them safe.

5. THE PRECINCTS

1. Maximum Security Prison



Ref	Building Description
080	Watch Tower Alpha 7
081	Sub Station
082	Admin Building (Prefab)
083	Entrance Building
084	Public Toilets
085	Ablution Block
086	Watch Tower Alpha 4
087	Public Toilets
088	Sections A, B and C
089	Auxiliary Building (?)
090	Section F Prison Cells
091	Auxiliary Building
092	Section D Prison Cells
093	Auxiliary Building
094	Section G Prison Cells
095	Auxiliary Building
096	Watch Tower Alpha 6
097	Sports field toilets
098	non - existant ? (demolished?)
099	Sleeping Quarters for Kitchen Staff
100	Kitchen
101	Boiler Room
102	Watch Tower Alpha 7
103	Dining Room - Recreation
104	Guard Hut
105	Section E Prison Cells
106	Auxiliary Building
107	Outside perimeter fence (not clear)
108	Watch Tower Alpha 5

Brief Description

The Maximum Security Prison is perhaps the most significant precinct on Robben Island due to its association with Nelson Mandela (in particular) and with the numerous other political prisoners detained here during Apartheid.

In planning terms, the prison precinct was accessed through ehe Entrance and Administration block on the east side which was directly connected to Sections A, B and C. Each Section comprised perimeter blocks with courtyards.

Another four freestanding cell buildings accommodated Sections D, E, F and G, each of which was an H-shaped building within its own walled exercise yard. The 'bar' of the H-plan contained a central passage and four separate ablution blocks. Entry into four separate communal cells, one in each wing of the H-plan was accessed form the central passage.

The kitchen, a large dining room and a boiler room were located on the west side of the site.

A substantial recreation area with playing fields and four tennis courts was located on the north side of the precinct - within the secure perimeter fence.

Of symbolic significance is the fact that the buildings were built by prisoners themselves, both political and criminal (Baumann and Le Grange, 2001.)

Most buildings, excepts for the few auxiliary buildings and the prefabricated fibre cement walled administration buildings, are built with limestone bricks in possibly a cement/lime mortar mix, and clad with blue stone facing quarried on the island. The blue stone forms a permanent shutter for an approximate 100mm thick mass concrete layer sandwiched between the blue stone and the brick wall. Walls are rendered internally either with a high gloss enamel or with acrylic PVA. The blue stone was originally possibly pointed using locally sourced lime mortar, with cement repairs in later years.

Floors are highly polished granolithic concrete screeds. Asbestos cement 'Big Six' corrugated roof sheeting on wooden trusses. All rainwater goods are predominantly asbestos cement.

The entrance buildings facing east have timber framed casement windows. A noteworthy feature of the Entrance building is the use of purpose made square precast concrete facing blocks. The external face of the blocks comprised of grey oval pebbles set closely together with the narrow ends of each pebble projecting outwards. The mortar joint between the separate blocks was painted white creating a distinctive architectural feature.

This detail was used both on the main facade and within the entrance lobby. Remainder of the windows in the precinct are steel casement windows with round vertical security bars.

All roof have corrugated asbestos roof sheeting in various stages of dilapidation. All rainwater goods are of asbestos cement, in many instances have disappeared, been recently removed or in a poor state of repair.

Restoration

Assess existing fabric and determine state of repair, make recommendations for the repair and continued maintenance.

Where necessary, replace all cementitious material with lime mortar.

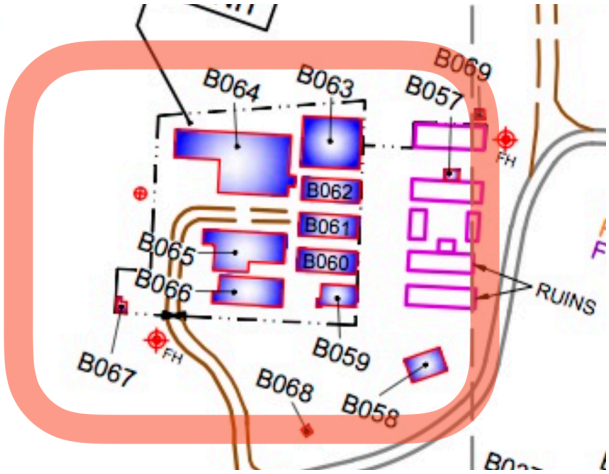
Revamp of watch towers as tourist attraction. Restore all unused buildings not currently open to the public. Notably the kitchen, boiler room and recreation hall.

Investigate current use of buildings to ascertain if they comply with national building regulations

Repair pathways and courtyards.

Attend to structural issues related to the Prison Yard walls and make any necessary interventions in a subtle and non-intrusive manner.

2. Ou Tronk



Ref	Ou Tronk
057	Ruins
058	World War 2 Armoury
059	Office
060	Cell Block
061	Cell Block
062	Cell Block
063	Cell Block
064	Workshop
065	Store
066	Cell Block
067	Toilets

Brief Description

The Ou Tronk comprises of two sets of buildings and ruins of buildings from two separate periods of construction.

The first set of buildings was constructed during World War 2. These are located on the north side of the precinct.

Apart from the Armoury (B058) which has survived intact due to its all-concrete construction, the balance of these buildings were timber framed prefabricated buildings on brick plinths (probably based on British Army prototypes).

It is likely that these buildings housed support staff for the nearby Battery. Only the plinths remain of these buildings. These plinths have some significance as the timber framed buildings were converted in the 1960's for use by the Prison Service as confirmed by oral histories of prisoners.

The second set of buildings were constructed later by the Correctional Services and accommodated a Trade Training Unit.

The buildings were constructed of traditional building material, lime plastered fired red brick in lime mortar walls, timber roof construction and asbestos cement roof sheets.

This second group of buildings would lend itself to an adaptive re-use.

Restoration

Restoration of all buildings, design of landscaped/external area with minimal interference, replace part of the fence to museum quality and making the precinct accessible to tourists similar to the current use of the Maximum Security Prison.

Provide new public toilets.

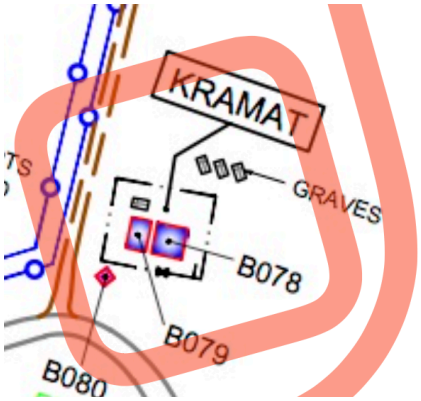
As an alternative, if funding is not immediately available for a full restoration project, the precinct buildings should be 'mothballed' ie. preserved in such a state that the building do not deteriorate any

further, and keeping the present condition with minimal maintenance. Restore only one building, say B065, to a last use and utilise it to house exhibits of this and possibly the Zink Tronk as well.

The Zink Tronk site can easily be cleared of vegetation to create an outdoor space to the Ou Tronk precinct for an increased visitor experience.

Fig 2. View of the Ou Tronk from the east. The Zink Tronk site is to the right of the cell blocks behind the armoury.

3. The Kramat



Ref	Building Description
078	The Kramat
079	Courtyard & Tented structure

Brief Description

This Kramat was built in 1967 over the grave of Hadjie Matarim, a muslim priest originally from Arabia, who was in the service of an Indonesian sultan when he was exiled to Robben Island in 1744. He died on the island in 1755. A granite plaque mounted within the Kramat commemorates these details and the year 1969 when it was formally opened. The grave is marked with a raised rectangular podium clad with polished grey granite tiles. There is also a plaque to Sayed Abduramen Moluca.

The Kramat is has a similar design to the Ghaibi Shah Kramat on Signal Hill.

The Kramat is a simple square building from local "leiklip" with ribbon pointing, internal brick lining and concrete infill. The concrete roof is a green cupola and four miniature cupolas at the corners. The Kramat has a fine plaster cornice and plaster surrounds to the doors and windows.

The entrance is covered by a cantilevered concrete canopy and is approached via a short flight of steps flanked by two flower boxes. Windows and doors have Moorish arches.

The entrance door is half-glazed and the windows are wooden four-paned casements with fanlights. The inside walls are plastered with minor damage from water leakage. Ongoing maintenance is required to prevent further deterioration.

When the Kramat was constructed, a small walled area existed behind the building which contained two headstones. These were probably the graves of other Muslims exiled from the East. The body

Fig 3. Entrance to the Kramat

Fig 4. Tent structure next to the Kramat

of Pangerau Chakra Deningrat, the Prince of Madura, who died on the island in 1754, was later returned to Indonesia. (Bassett, B.W. & Rudner, J., Robben Island: An annotated survey of buildings and sites of architectural, historical and contextual importance, and recommendations concerning a conservation policy for the island. January 1986. NMC).

In recent years a formalised square precinct has been created around the Kramat utilising a standard galvanised palisade fence and a concrete surface bed. The entrance gate is sited on axis with the entrance door in the Kramat. An ablution facility - a freestanding wall with a few water points - was built in the north eastern corner of the Kramat precinct.

A single grave is located within the south west quadrant of the Kramat precinct.

An informal metal structure has been incrementally erected within the precinct over which tarpaulins are presumably draped to form temporary covered areas during religious ceremonies.

Restoration

Generally the building is in good condition, only the external west and north facing facades need specific attention. Remove all silicone and cement pointing and replace with lime mortar.

Service and maintain timber doors and windows where necessary.

Reinstate 'star and crescent moon' device onto main cupola.

Repair to external stone wall and ‘courtyard’, complete perimeter fence and provide a proper gate to match the palisade fence, design an external counter next to existing foot bath to house HVAC condensers and possible temporary tent structures.

Remove all existing poles for the temporary tent structure and provide new free standing external covered area.

Remove all surface mounted services, including anchor positions of tent structure.

4. Medium B Security Prison - MPLC

Brief Description

Ref	Building Description
163	Library and Solitary Confinement
164	Admin
165	Pergola
166	Art Centre
167	Prison, Admin, Kitchen, Dining

This set of free standing buildings is assumed to have been built during World War 2 and subsequently converted in a prison in the 1960's

The Medium B Security Prison comprised of a series of separate buildings arranged in a roughly rectangular precinct. The external walls of the buildings partly formed the perimeter and connecting walls complete the limits of the secure precinct.

It is 8m x 34m in extent and housed the Kitchen, Food Stores, Cells for the Prison Cooks and Sick-bays.The walls are of plastered brickwork and the western wall is integrated into the perimeter prison wall. The roof is a double-pitched fibre-cement sheet roof and has two large sheet-metal ventilation cowls projecting from it. The windows are double casement windows with top-hung fanlights and are made of timber. External doors are, double leafed framed ledged and braced ('FLB') doors with fixed fanlights above. (Baumann and Le Grange, 2001).

Associated with this enclosed area, is a partially closed 'afdak' or lean-to section, 13m x 6m in area, which was used as a laundry and ablution area. It is a building that was likely constructed after 1960. (Baumann and Le Grange, 2001)

The 18m x 5.5m structure has a mono-pitched fibre cement roof and its western wall is incorporated into the Medium Security Prison perimeter wall. (Baumann and Le Grange, 2001)

The main structure of building B166 incorporates three large cells and a small ablution area. The walls are of plastered brickwork incorporating barred steel windows and the floor is of cast concrete. (Baumann and Le Grange,

The 22m x 14m main structure, used as prison cells has a barrel vaulted fibre cement ('Big Six) sheet roof. It is a building that was most likely built before 1960, [check on 1948 map - old navy mess in this area] either during WW2 or during the subsequent period when the Island was administered by the S.A. Navy. (Baumann and Le Grange, 2001)

It is assumed that walls consist of lime bricks (calcium silica) with lime mortar and plaster, and originally rendered using lime washes. Modern paints were likely introduced in the refurbishment in 2003/2004. Many of the original WW2 features were removed during the alterations carried out to convert the facility for use from a prison for common criminals in the 1960's, to a Multi-Purpose Learning Centre (MPLC).

The buildings are currently used by school groups, either on day visits, or for longer week visits during school holidays. There are well kitted out dormitories using a double bunk system and cupboards in the dormitories. There seem sufficient ablution facilities. A large, well lit dining hall and newly restored kitchen with all required equipment ensures proper meal preparation and consumption.

Restoration

This precinct will be relatively easy to repair, with minimal intervention required to provide proper finishes, especially on internal faces of perimeter walls.

As stated elsewhere, modern paints such as PVA acrylics and enamel paints are not compatible with lime mortars and plasters where wet conditions occur. Moisture can be from wind driven rain, leaking gutters and from leaking water pipes.

The flaking paint in some of the dormitories is evidence of this, and where this occurs, all paint has to be removed, surfaces checked for any cement repairs, which will also need to be removed. Restore plastered walls using lime plasters to match original lime composition, then render using lime washes and distempers.

Any walls not affected can remain, but the two different building systems are to be clearly defined so that future maintenance work treats each type correctly.

The cause of the black mould, which is quite prevalent in the dining area, needs to be investigated. It is likely that there is inadequate natural ventilation in this space. Surrounding remedial work will be required to prevent this from re-occurring.

Fig 5. Black mould on walls in dining area. Causes need to be established

Fig 6. Note the flaking paint on the walls close to the concrete ceiling. Most likely caused by excessive moisture generated by children with walls not being able to 'breathe'.

5. Pre Primary School

Ref	Building Description
319	School
320	Link between School & classrooms
321	Children's Toilets
322	Classroom & Toilets
323	Teachers' Toilets
324	Classrooms

Brief Description

The Pre-primary School precinct is situated in an area of Robben Island predominantly utilised for staff housing. The precinct comprises five separate buildings, the largest of the five having the most heritage significance as a Victorian era stone built structure with extant verandah.

The other two larger buildings, linked later via a crudely built flat roofed asbestos cement undercover walkway, are of lessor significance and are almost certainly more modern or have been adapted over time. These double pitched asbestos cement roofed buildings were used as classrooms. B324 consisting of two separate classrooms, B322 had one large classroom partially divided in half. The southern side of this building has male and female toilets under the same roof. There are also two toilet buildings, perhaps built at different times. B321, a mono-pitched flat roofed building, has a male and female component, and B323 is a single roomed mono-pitched flat roofed structure with two toilet cubicles and a wash basin.

The school building is one of the oldest buildings on the Island because it was first used as a lime house before 1846. There has been a flagstaff in front of the building at least since 1846. (Deacon, H., RIM 2000).

Converted to a chronic sick ward with two rooms in 1846, it was extended by 1890 and altered again to act as a staff recreation facility by 1893. (Deacon, H., RIM 2000).

In 1941-59 it was used as a training school for the army and then for the navy. (Deacon, H., RIM 2000).

After 1960 it was used as a primary school for children of the prison warders. In 2000 the building was still being used as a primary school. (Deacon, H., RIM 2000), and ceased to be used as such in 2011.

On Mondays the children went to school until 2 'o clock, on Tuesday until 1 'o clock, on Wednesday until 11:20, on Thursday until 2 o' clock and on Friday until 1 o' clock. The reason for the early closure on Wednesday was for the children to be able to take a special noon boat to the Cape, to do anything that had to be done on the mainland (1973-1994). (Van Zyl, D., Interview by Victor, M. & Stephney, I. Robben Island.

The buildings are currently vacant and a suitable use needs to be found for it.

This stone school building is situated on top of a terraced (formerly formal) garden with two tall flanking Norfolk Island pine trees. This is a rectangular symmetrical stone building with two short wings terminated by facetted end bays covered by gable roofs. Between the wings is a verandah with wooden pillars and ornamental balustrade and in the middle, a small gable with woodwork and finial to mark the main entrance. The walls are of primarily dressed Robben Island stone with raised jointing. The corners are articulated with plaster quoins; the windows and doors have plain plaster surrounds. The windows are Victorian sashes with the upper sash subdivided into small panes. The entrance door has been replaced with a modern fielded door, but has the original glazed double doors to the wings. The back of the buildings has modern steel windows. (Bassett, B.W. & Rudner, J., Robben Island: An annotated survey of buildings and sites of architectural, historical and contextual importance, and recommendations concerning a conservation policy for the island. January 1986. NMC).

Fig 7. East Elevation of the Pre-Primary School.

Restoration

Attempts have been made to repair and restore parts of the stone building. We suspect that many parts of the stone walls have been repaired using cement, which is detrimental to the overall fabric.

Full restoration of main school building, possibly to be used as a conference or meeting place or formal teaching facility.

Toilet buildings to be repaired to functional public toilets, classrooms to repaired to functional usable spaces, external areas between buildings to be repaired/restored, terraces and gardens to be restored.

General Outline Specification

Walls, external - remove all external paint to expose mortars. Remove all cement plaster work, including all cement pointing. Apply 3 coat lime mortar plaster to previously plastered walls, using a lime sand mix similar to predominant existing lime mix. Render in lime wash

Walls, internal - remove all paint to expose plaster work. Remove all cement repairs and repair with lime mortar similar to external method. Render in lime wash

Suspended timber flooring - ensure all ventilation opening are clear of vegetation and debris to allow for full air movement, especially under the floor. Sand down by hand any water or other marks and reseal using raw linseed oils. Where suspended timber floors have been replaced with concrete floors, consideration should be given to the removal of the concrete, excavation of fill and reinstatement of timber floor.

Windows, wood - Repair window frames and glass using similar timber. Remove all plastic paint and repaint using a suitable enamel paint. Where timber windows are significantly compromised due to exposure to long term weather, these should be replaced with purpose made timber sash windows made using wedged mortice and tenon joints and waterproof glue. All mouldings to glazing beads and edges to be machined PRIOR to assembly and glueing of frames.

Windows, steel - remove all glass and strip frames of all paint. Paint one undercoat and two coats matt enamel

Doors and door Frames - similar to wooden windows. Front door : research most likely design of original door and replace existing front door.

Roof - check for leaks and holes in metal 's' rib sheeting and repair

Rainwater goods - replace all asbestos cement goods and replace with like in fibre cement. Ensure all box gutters and hoppers are leak free.

Lead flashing - ensure existing flashing is seated and sealed properly against wall and make good with same where sheets have slipped.

6. COST ESTIMATES

The sheer magnitude of specific remedial work, the details of which are in the process of being determined at this stage, prevents us from preparing any meaningful cost estimates.

As stated, some buildings can be restored quite quickly with limited intervention, such as the dormitories in the MPLC. Other buildings require more substantial restoration processes, but this could be phased such that only portions of each precinct were affected at any one time.

Consideration could also be given to partly restore the Ou Tronk, and 'moth balling' most to ensure no further deterioration of structures in the short term. When funds become available, further restoration can take place from building to building.

7. GENERAL SPECIFICATIONS FOR HISTORIC BUILDINGS

The buildings on Robben Island form part of the World Heritage Site.

All work to such buildings shall be completed in such a way as to protect existing architectural features from damage and to retain as much historic fabric as possible, with a minimum of loss.

These specifications describe all aspects within the buildings, with a special initial sections describing masonry repair work, as this aspect is common to all the buildings in this project.

Introduction

Some basic principles should be adopted to guide the repair and interventions in the conservation of the buildings. This begins with an understanding of the building history and significance, the behaviour of materials and their construction, their function and how the building currently functions and the implications of change. The cultural significance of the building should not be compromised and the work should retain as much historic and original fabric as possible by minimising interventions.

Repairs to the existing fabric should respect and adopt the original materials, craft skills and construction techniques found in the original building. Where circumstances allow local materials should be used. In repair work an important consideration is matching the new material with the existing; incorrect selection of material, often for perceived reasons of improved durability and lower cost, will result in shorter life repairs and accelerated damage to existing fabric. The procurement of traditional materials such as stone, lime, slate, suitably dimensioned timber and iron work should be considered at an early stage.

Where possible implementation of energy efficiency in buildings could be considered where this would not harm the significance of the building and is appropriate to condition of the building fabric.

Consideration is to be given to enhancement of detailing to allow the building to better contend with extremes of weather and changing weather patterns. With a proper understanding of the principles for building ventilation and the use of appropriate materials the weather performance of a historicl structure can be improved considerably.

Quality assurance

Materials to be used

All materials to be used are to be approved by the heritage architect (HA) before implementation. This specifically refers to lime mortars, lime putty and washes.

Extent of Repair

For repair determinations, the heritage architects will determine the extent of repair. A significant portion will be shown on drawings, finer detailed areas will need to be identified on site.

Qualifications of Historic Plaster Repair Contractor

Must be experienced in all phases of historic plaster repair, specifically lime based plasters, the preservation and reproduction thereof. The contractor must have six years and/or four projects of similar historical significance. They should have had experience in historic plaster repair that stresses the stabilisation of historic plaster.

Samples and Method Statements

Contractors are to submit written repair procedures to the heritage architect. This should include :

- Two sample panels of replacement plasters to be used as standards for the patching material.
- A sample of the painting to be applied to each type of application.
- Method statements for each application to be checked by the HA and confirmed in writing before work is put in hand.

This section may be waived in any or all of its parts by the HA as warranted.

Job conditions

Protect and cover all adjacent architectural features and work completed by other trades.

Determine what substrates to which plaster materials are to be applied are sound and free from defects affecting proper application of the lime plaster. Report defective surfaces to the HA.

Insure that a minimum temperature of 18ºC is maintained for an adequate period prior to, during and after application of plaster and that heating and/or ventilation is properly regulated to insure correct curing of the lime plaster.

Product Handling

Follow manufacturers directions, and store materials where directed on site to prevent damage.

Mothballing

It is accepted that buildings could be conserved by mothballing, then there are sime very simple and cost effective measures that can be taken in unoccupied buildings. They can be summarised as follows:-

1. Inspect and clear roof drainage systems at least twice a year;
2. Ensure adequate ventilation throughout the building;
3. Remove all accumulated rubbish within the building;
4. Turn off and drain all unnecessary plumbing;
5. Ensure 'mothballed' buildings are inspected and cleaned every four months.

The application of these measures, in the absence of advice from expert consultants, will significantly reduce potential damage.

Scaffolding

Scaffold Design

Design Proposals for scaffold should aim to minimise any added load onto a historic structure or fixings into historic fabric

When bracing scaffolding, masonry anchors may not be used. The use of 'free-standing scaffold or self supporting scaffold will be acceptable together with use of window openings, window jamb cramps and raking support.

Roof and Rainwater Disposal

Roof Structure

All asbestos cement sheeting to be replaced with new fibre cement 'Big 6' profiled sheeting.

Inspect timbers for rot, insect attack and structural weakness. Repair damaged timbers using new preservative treated timbers run to the original profile and treat rot or insect attack locally as required. Timbers should be spliced in-line rather than cheek bolted where appropriate to the structural design and the historic significance of the roof.

Where possible, separate timber repairs from damp stonework with a DPC and allow for free ventilation where practicable.

Check the provision of ventilation to roof voids. If additional ventilation is required, locate discreetly and create using traditional materials e.g. lead. Bespoke solutions may be required.

Leadwork

Lead to be laid to follow the recommendations of the Lead Sheet Association but also

with respect of the original lead work. Any complex details should be drawn at a large scale sufficient to illustrate how these areas are to be constructed.

Other Metal Roofs

Repairs to corrugated iron roofing or wall cladding materials should be with galvanised corrugated iron to the original profile and thickness and using fixings to match the original.

Ventilation as for other roof types should be considered respecting historic appearance and detail.

Flashings

Flashings are to be inserted into raggles sufficiently deep to allow the raggle to be pointed with lime mortar; typically this would be to a depth twice the width of the raggle, and square cut. Existing raggles should be used wherever possible. Lead should be isolated from lime mortar by a protective coating such as masking tape or bituminous paint.

The use of sacrificial flashings where slating discharges into valleys and parapet gutters is encouraged.

Rainwater Disposal

Check that the existing rainwater goods are adequate to control and discharge water safely away from the building. If not, the HA should submit proposals for reconfiguration of installations.

Where sound, ensure they are clear and flowing freely, and that there is maintenance access at ground level and at key junction points above. The as built information should include plan and method of access to all areas that require maintenance.

Where sections are broken, damaged or missing, or in non-original materials such as uPVC, replace to match original profile, detail and original material.

Ground drainage to be checked, recorded and made fully operational to ensure water is being conducted properly away from the building.

All cast-iron pipework to be prepared, primed and painted in accordance with manufacturer's written instructions using a high performance paint specification. Paint new cast iron goods before site assembly and make good joints, chips and fixings immediately after fixing. Particular attention should be given to preparation and paintwork at sharp arrises to fresh castings. The final colour may be selected using evidence gained in the cleaning process or to match other existing pipework.

Safe Access

The opportunity should be taken to ensure there is adequate safe access for maintenance and repair with a strategy for maintenance beyond the completion of the works.

Locate and detail interventions such as access ladders and roof hatches discreetly.

Lightning Conductors

Lightning conductor systems can result in a considerable visual intrusion on historic structure and should be carefully and discreetly located and installed.

Fixings should be secured in joints rather than stones and conductor lines are to be discreetly located behind or beside other building elements such as downpipes or buttresses.

Existing lightning conductors may be retained and integrated into the new system.

Masonry

Structural Condition of Masonry

Where significant structural movement, settlement cracking or other evidence of a compromised structure is identified, advice from an engineer experienced in the repair of historic structures may be required. Discuss the proposed remedial works with HA

Removal of Moss and Algae from Masonry

Where damp conditions have caused moss and algal growth on masonry, the area is to be scraped clean with wooden spatulas and cleaned down to remove all organic debris and soil prior to re-point-

ing. The source of moisture encouraging such growth must be addressed in order to prevent re-growth.

Seek specialist advice on biological growths such as algae, fungi, and lichens where the effect to the masonry may not be benign but removal could cause masonry damage.

It should be recognised, that biocide is unlikely to have a long-lasting effect and may damage the masonry. Consequently, the use of biocide should not form part of a regular maintenance regime.

Removal of Vegetation from Masonry and Immediate Vicinity

Consider the proximity of large and mature trees and the risk and likelihood of damage to historic fabric from root heave or fall, including affected foundations and drainage.

Carefully remove any invasive vegetation while avoiding damage to the masonry

Main vegetation trunks are to be cut and roots treated with suitable systemic weed killer. Larger growths of surface vegetation may be cut into smaller areas (creating a grid) prior to treatment. This will identify areas where growth persists and allow

Vegetation adhering to the masonry is to be left until dead, and then carefully removed by gently teasing the mat away from the building taking care to sever roots that penetrate the masonry.

Larger vegetation should be removed by hand weeding ensuring that all roots are removed to avoid leaving potential open paths for water ingress as they decay

Stones that are found to be loose are to be held in place by wooden wedges and suitably propped as required until repair work is undertaken.

Masonry Repair

From the scaffolding, brush down loose stone (with bristle brushes, not wire) and tap the existing surface to ensure the face of the stone is sound. Where the stone face is eroded or crumbly but this does not pose a threat to the weathering function (eg cills), the structural integrity or the architectural interpretation of the building, it is advisable to leave for attention at some time in the future.

Where soft, cracked or friable stones are identified as a threat to the structure or weathering, or significantly detracting from the architectural composition and integrity of the building, they may be carefully cut out and indented with a matching stone that respects the existing stone joint pattern. Where it is necessary to replace missing, broken, cracked or eroded stones with new stone, ensure that the new stone is a suitable replacement for the original in terms of colour, texture, porosity, crushing strength and weathering properties.

Remove any redundant fixings, surface-mounted cables, extraneous items - including redundant drainage pipework. Where services cables are required, site and route these discreetly.

Exposed surfaces of new stone should be hand dressed to match the original face or tooling. Avoid the use of power tools on any exposed surface of stone. Cut replacement stone on the correct geological bed for the circumstances of its use in different elements of the building. Lay on to a full mortar bed, grout behind and point fully to ensure loads are taken by the new stone. Indented face stone

should have a minimum bed depth of 150 mm. New stone should not be distressed or toned down to match original.

Avoid the use of pre-mixed restoration mortars. Mortar made from lime, sand and graded matching stone, are to be used for fine cracks or small "pocket" repairs in otherwise sound stone and where lying water and subsequent frost damage may be considered a risk.

Fig 8. A sample of limestone brick found on Robben Island. A typical example of the quality of brick produced. It appears if the mortar contains cement, which should be analysed to determine the mortar mix for the restoration work.

Removal of Cementitious Pointing

As it can be damaging to the adjacent stone arrises to remove well-adhered cement mortar, it is often better to avoid removing sound cementitious pointing. With this in mind, the HA will determine which portions if any will remain.

Where pointing is cracked and open, separating from the stone or causing evident distress and erosion to adjacent masonry, carefully remove cementitious mortar by the use of fine masonry chisels. The expert use of appropriate power tools to assist may only be considered in strictly controlled situations.

When free space has been created, mortar may be freed from the stone by working back into this space. Pointing should be raked out to a minimum depth of 35 mm and the joint flushed clean.

Joints in Rubble Masonry

Where mortar joints in rubble masonry are loose or crumbly, carefully rake out to a minimum of 35 mm using tools narrower than the joint to avoid damaging the stone. Thoroughly flush clean the joint and re-point with the mortar mix informed by analysis. Pointing to be well packed into the joint and finished to match the original and suit the style of masonry construction. Where appropriate, the correct number, size, shape, orientation and type of pinning stones to maintain the mortar/stone ratio and original character of the wall evident in the original build. Stones used for pinning repair in rubble masonry should typically have the same colour, surface treatment and edge dressing as the surrounding masonry.

Brick Walls

Note the character of the original brickwork including bond, brick type, sizes, and mortar type. Survey and record location of types of decay to inform repairs required.

All brickwork repairs to accurately follow the original build, using brick of matching colour, size, hardness and porosity.

Following brickwork repair, re-point to match original using a pointing tool and application technique similar to that used originally with a mortar specification to suit the age of the building and the strength of the brick.

Flue Terminals

Missing or defective chimney pots to be replaced to match the original form indicated by documentary or site evidence. Where there is no evidence of the original, use pots to pattern in use on buildings of similar period in the vicinity.

Ensure that the number of pots accurately reflects the number of flues and where appropriate reflects historical variation in types used on the respective flues. Chimneys not in use should be cleared of debris and then terminated with a vented weathered top and a vent at the bottom of the flue to allow free air circulation.

Concrete

Commission an independent investigative specialist report on the condition of the concrete and repair the structure accordingly. The report should include such techniques as use of a cover-meter to establish the depth of reinforcement cover and include core samples at strategic locations to enable analysis of the depth of carbonation, chloride content and quality of concrete.

Remedial works may include specialist treatment to enable retention of as much original fabric as possible.

Rough Cast Plaster

Rough cast plaster should be applied in accordance with traditional throwing techniques. Samples of the original surface should be analysed to clearly identify the various constituents e.g. shell, aggregate, lime proportions etc. The new rough cast plaster should have a wide range of aggregate grading and replicate any local mix or application traditions.

Quality and appearance of work to be determined by sample panels.

Rough cast plaster to be applied using a lime mortar mix in 2 or 3 coats respecting the original practice. Finished plaster should be screened from rapid drying in accordance with best practice. Where the plaster is exposed to drying winds or high temperature, repeated wetting of the screens will be necessary.

Site operations should ensure that flashings, rainwater goods and external joinery are fitted at the appropriate time in order to ensure a good finish to the harl / render.

Limewash

Historic limewash can have several constituents ranging from natural pigments, tallow and other organic additives. As with mortars, analysis and sample panels should be carried out before the specification is finalised.

Limewash should be applied to a pre-wetted surface. Multiple coats, usually a minimum of eight, will be required as it should be applied in sufficiently thin coats (usually the consistency of skimmed milk)

to allow carbonation at each coat. Layers of limewash should not be applied if the appropriate attendance to control rapid drying is not possible.

Limewash should be screened from rapid drying in accordance with best practice. Where the limewash is exposed to drying winds or temperature, repeated wetting of the screens will be necessary.

Regular maintenance coats will be required over subsequent years.

Mortars for Building, Pointing and Rough Cast Plaster.

Lime mortars have significantly different working properties to cement mortars. Advice on procedures and suitable mixes may be required and can be obtained from various specialist advisors.

Care is required to fully understand the nature of the original mortar and the function of a mortar used in the repair scheme, the location, detail and visual appearance, as they may not fulfil the same requirements.

Mortar specification for repairs should not adversely affect the weathering of adjacent masonry.

All works to be undertaken by fully trained masons with experience of historic building work.

Lime mortar mix for indenting or pointing should usually match the original mortar and be informed by careful analysis of original build mortar samples. It should be prepared in advance to achieve maturity and may require a hydraulic content to achieve a predicable set and avoid lime leaching. Pozzolanic materials may be added to putty lime mortars to aid setting. Lime and sand for the mix is to be carefully selected to ensure the mix has a suitable self colour, even if it is to be limewashed.

Hot lime work can be appropriate when rebuilding and consolidating wall core taking care to include pozzolan to control free lime carbonisation and risk of leaching.

Ensure lime mortar work is undertaken in appropriate weather conditions and protect lime mortar from sun, rain and frost until cured in accordance with best practice.

Removal and Render and Application of Lime Plaster

This method statement describes the work process for the removal of the existing cement render from brick or stone walls.

Removal of Render

Start of Works: all areas around the site will be cleared of debris and rubble to ensure site is safe to commence works.

Independent scaffolding to be erected to provide a safe working platform from which to remove the render.

All windows and doors within the vicinity of the works to be temporally boarded to prevent dust from entering the building and to prevent accidental damage.

Removal of the render will commence in the areas that are currently cracked and work outwards.

Hand tools such as a masonry chisel and hammer will be used. Note that cold chisels are to have an equally wide shaft and blade, as opposed a fluted head which will cause stones and bricks to be prised apart during joint cleaning.

The use of hand tools will be used for the entire work.

At all stages great care will be taken to ensure that the substrate of the wall is not damaged by the removal of the render. If there is concern at any stage that this may be occurring, work will immediately stop, professional advice sought and the planning authority advised.

Due to the risk of large areas of render coming away from the wall, care will be taken to minimise the size of the sections of render removed and all work will be undertaken from one level at each stage.

Following removal of the render, exposed surfaces to be brushed of loose materials and dust.

Materials

Lime

Lime putty that has emley plasticity greater than 400, 98% or better calcium, and a high surface area of 30m²/g or better.

Sand

Sand shall be well graded, and shall be clean and free of dirt, and organic substances. It appears if shell fragments may have been used originally. Match the existing historic sand as determined by the HA and/or the mortar analysis.

Fibre for Scratch and Float coats

Investigation into the existing lime mortars used must be undertaken before work commences. If fibres have been previously used, then the allowable fibres are as determined by mortar analysis or as follows in order of priority, hemp, goat hair, cattle hair, hog hair, jute, sisal, or manila. The fibre should be 25 - 35mm, in length. It shall be added in the proportion of 4kg of fibre in one cubic meter of course stuff.

Water

Water shall be clean, fresh, potable, and free from organic substances.

Application of Lime Render

The Background Preparation

Follow good working practices; ensure that the background is thoroughly clean. If the background is saturated check externally for cracks or other causes of water penetration. Causes of damp should be remedied and cracks should be cleaned out. (pack with low fire clay tiles or slate if necessary) and sealed with an NHL pointing mortar.

Keying

Joints should be raked back (normally 10mm) to provide a key for the under coat.

Suction Control

Apply sufficient water to reduce excessive suction, especially on bricks and porous stone. On many occasions this is done the day before, if necessary several times with the last damping just before application starts. Apply water starting at the top of the structure. Old bricks require more water than new ones. The top of the structure will dry out before the bottom. In base coats this means that scouring back and keying of the lower section might have to be done later than the upper section. Always dampen down before applying subsequent coats.

Dubbing Out or Filling-in Irregular Surfaces

On defaced surfaces or in areas with a large amount of damaged joints it might be necessary to apply a dubbing out coat (using 3- 4mm down well graded aggregate) to provide a relatively level surface. In most cases this will be sufficient and joints or holes will not have to be filled with rubble unless quite deep. When a dubbing out coat is used let it set sufficiently before keying it. The most efficient way to apply a dubbing coat by throwing. The strength should, as always, be compatible with the type of background but a moderately hydraulic lime mix, of one part NHL 3.5 to two parts grit sand is recommended in this case. Apply base coat or scratch coat after 3-4 days (more if very deep recesses have been filled)

Undercoat/Scratch Coat

To be applied 3-4 days (or more, depending on atmospheric conditions) after completion of dubbing out. The undercoat is to consist of one part fat lime to two and a half parts grit sand, (this mix should have stood for at least two weeks and the putty must be at least 3 months old). Just before the mortar is ready for application horse, goat, or cow hair should be added to the mix approx. 0.5 kg per 100 litres. Thickness can vary according to the overall thickness required but it is normally between 10 and 12mm. It must not be applied over 15mm thick. If this is required it should be done as an extra coat (two intermediate coats) each not above 12mm. The thicker the intermediate coats the longer the waiting time before each application. Provide a criss cross key, creating 25-35mm diamonds, with a pointed but blunt wooden lath.

Float Coat

To be applied 4-5 days (or more, depending on atmospheric conditions) after completion of the scratch coat. It's strength should be less than the previous coat. This second undercoat should consist of one part fat lime to 2 and half parts of well-graded sand, (this mix should have stood for at least two weeks and the putty used must be at least 3 months old.) Just before the mortar is ready for application goat hair should be added to the mix approx 0.5kg per 100 litres. The thickness should be kept between 9 and 11mm. Scour back and key with a devil float after initial setting. Check for shrinkage during the first 2 days and if necessary, lightly dampen the relevant area , scout back and re-key. Do not apply a finishing coat for 4-5 days until undercoat is adequately firm and any small amounts of shrinkage are complete.

Finishing Coat

Use a well matured, mix of one part lime putty to two parts of a good quality building sand and provide a sponge finish. This topcoat can be applied in two this coats immediately after each other.

Damp Proof Courses

Installation of new chemical DPC is not considered acceptable as the long-term chemical effect on the masonry has been shown to be detrimental.

Appropriate DPCs may be considered for situations such as under coping stones, with consideration of how to avoid slip planes.

External Carpentry and Joinery

Repairs to Architectural Joinery

Retain as much original material as possible.

Replace rotted sections, with timber to match species, visible grain characteristics, quality and colour, suitably treated for the location.

New sections are to match the profile of the original with fixings to match existing.

Reinstatement of missing sections and elements may be acceptable where supporting historical documentary evidence is available.

General Repairs to Doors and Windows

Carry out repairs to windows, and doors sensitively retaining the original fabric in preference to replacement where possible. Reinstatement of former details may be considered where later unsympathetic and inappropriate alterations exist.

Secondary Glazing

Historic secondary glazing is to be repaired as window joinery.Original Glass

Original glass should be retained in-situ, and where this is not possible should be put aside for later reinstatement. The use of a proprietary putty lamp can be valuable in removing old putty without damaging the glass.

Modern float glass may be used for replacements depending on the original glass type to be found on the building. These may vary on a single building or elevation.

Match glass type to original examples on site or to date of building construction. Any patterns established as a result of evolution of the building should be respected. Repair of glass in-situ should be considered for small cracks, modern techniques may be considered.

Where interiors are of recognised historic significance and are sensitive to UV light, UV blinds may be considered; avoid using UV film on historic window glass as this cannot be removed easily without risk of damage to the glass.

Timber Cladding

Timber cladding and weatherboarding may be left to weather where this is the original finish.

Treatment and finish to external carpentry and joinery such as verandahs, barge and eaves boards, should match that evident on the original fabric or, if not feasible, should be based on research study and historical documentary evidence available.

Products and systems selected for treatment and finish should be appropriate for the location; at exposed and inaccessible areas high performance oil treatment and non traditional paint systems may be applicable. Modern protective wood stains are unacceptable.

Windows and Doors

Window and Door Joinery

Windows and doors should be overhauled and repaired wherever possible by carefully splicing in new matching timber to follow accurately the original profile using traditional techniques and glue.

Where new replacement windows or doors are required they should be glazed as the original and manufactured from matching timber sections accurately following the original design and profiles.

Reuse original ironmongery where possible. Where necessary select historically appropriate new ironmongery that meets the modern requirements of security and exit, yet is of an appropriate style and quality. Use only slot headed screws of the correct type to match original installation.

Metal Windows and Doors

Retain and repair as much original frame, operating gear and ironmongery for re-use as possible.

Replace damaged sections, to match section and profile.

Where repair is not possible, replace to replicate size, profile and finish.Abutment Pointing

The joint between joinery and masonry is to be pointed with either of the following:

A traditional site mixed mastic comprising burnt mastic sand and boiled linseed oil placed against a suitable backing stop.

or

Lime mortar pointing placed against a suitable backing stop. Where a building is harled/rendered the use of lime mortar to fill this joint will allow the harl/render to be brought up to the joinery. This should be placed after joinery fascias have been decorated to ensure good protection of the fascia.

For metal windows that are a feature of the original design, alternative mastics may be considered for agreement with HA.

The use of silicon sealer is to be avoided, worst case advice should be sought from a worthy manufacturer like Sika or ABE.

External Painting of Window and Door Joinery

Paint using traditional methods prior to assembly of sections where possible. Use good quality oil-based paint preparation as recommended in the paint manufacturer's written instructions including knotting preparation treatment. Particular attention should be given to rounding sharp arises to avoid thinning of paint

Ensure paint is not spread onto adjacent masonry.

Appropriate window colour is to be agreed; choice can be informed by paint analysis from scrapes. Off white or other colours such as black or green following historic local practice may be appropriate. Avoid brilliant white on pre 1920's buildings.

or

Treat all new and old timber with boiled linseed oil prior to painting.

External Painting of Metal Windows and Doors

Remove all damaged paint and sand down all rusted surfaces to bare metal. Paint with acid etch red oxide primer, universal undercoat and a good quality enamel paint.

Internal

Plaster Repairs

Plaster should be in lime plaster to match the original as determined by analysis of the existing.

Joinery Work Repairs

Carefully record, using profile gauges, the original size and form of original internal joinery.

Where it is necessary to repair or replace internal joinery sections such as skirtings and cornices, profile new timber of suitable species and quality to the original profile, cut and fix in accordance with best practice.

Rot and Insect Attack Works

Locate the reason for moisture penetrating the fabric and successfully prevent this happening. Where prevention is not possible take suitable measures to control the source, and monitor the situation. Remove the source of rot and, where time permits, allow fabric to dry out.

Seek independent expert advice on methods of treatment, adopting a conservative approach including environmental controls and with green principles wherever possible.

Seek the advice of a suitably experienced engineer for advice on decayed original structural timber sections and repair needs.

Carefully patch in new pre-treated structural timbers to match original. Make good internal finishes to match original.

Decoration

Internal decoration with paint scheme should be based on research study of the interior, where it forms part of a historically significant decorative scheme.

Services Installations

Service installations within the envelope of the building should be discretely located and sympathetic to the historic fabric.

The scheme of services works should include testing of the electrical installation and any upgrading found to be necessary as a result of the testing.

Refurbishment of significant historic electrical and mechanical fittings should be considered.

Metalwork

The identification of the form of ironwork to be repaired i.e. mild steel, cast iron or wrought iron should be made at an early stage to guide subsequent works.

Cast Iron

Each project should be assessed and the most appropriate repair technique(s) employed given the application, materials and historic importance.

In certain circumstances cast iron may be welded by specialists using high nickel electrodes, or brazed using aluminium bronze. Plate repairs or pinning by drilling and tapping adjoining components may also be appropriate. Cold metal stitching may also be feasible.

Re-casting missing components using traditional techniques might also be considered. Design and quality should match existing.Wrought Iron

Wrought iron should be removed for repair by proven experts in this field.

To correctly repair wrought iron, use only suitable quality recycled wrought iron or pure iron if this is unavailable.

Steel

Retain as much historic steelwork as possible, using appropriate cleaning systems and anti corrosion treatment.

Where repairs are necessary use appropriate grade of steel, matching sections and original fixing details.

Decorative and other Metal Work Repair

Security gates, bars to windows, railings, or other historic architectural items should be repaired with matching materials and methods.

Flame cleaning; needle gunning, blast cleaning and chemical cleaning may be appropriate. Particular care is required for cast iron due to the porosity of the material.

Metalwork Protection

Generally new steel (not cast or wrought iron) should be hot dip galvanised following manufacture.

Suitable long life paint treatments for ironwork, such as zinc rich primers, and micaceous iron oxide build coats should be considered for use and applied in accordance with manufacturers' written instructions. Hard shell epoxy paints should not be used on cast iron; dry film thicknesses should strike a balance between protection and loss of detail.

Protection with rust inhibiting greases and waxes treatments may be appropriate treatments.

Resilience to Weather

The resilience and the sustainability of building elements and materials for use on Robben Island must deal with rapid and significant temperature changes, storm conditions with severe wind forces and intense and prolonged rainfall.

Rainwater

Review the overall size and cross section of gutters and hoppers, and the location, number and size of overflows and downpipes. Consider the effect to the building appearance along with any proposed functional improvements to rainwater fittings and any consequent changes to existing below ground drainage systems including soak-aways to the surrounding landscape drainage.

Building Energy Services

A review of the current energy supply and use required for the building maintenance and the consumption by building users is beneficial to make best use of available resources.

Building Energy Provision

Care is required when considering the installation of power to help maintain historic buildings, to retain significant features and avoid loss of setting from inappropriate infrastructure such as substations. Alternative energy sources to carbon fuels may be appropriate for historic buildings as for new development when considered sensitively.

Building Services Provision

A review of existing building services is advisable for safety measures and to consider improvements for sustainable energy efficiency.

Renewal or Replacement of Building Services

Re-wiring may be required for safety reasons. Similarly renewal of other building services may be required such as the upgrading of existing heating systems. This should be approached sympathetically to minimise any impact on historic fabric and retain historic fittings where appropriate.

Building Services Controls

Thermostatic and humidistatic controls for heating and ventilation systems should be fitted where applicable, set to appropriate level for historic fabric. Dry and hot environmental conditions can be as damaging to some materials as damp.

Energy Use and Building Fabric

Insulation and Ventilation

Much can be done to improve the resilience of existing buildings by properly considering insulation. This requires an understanding of the existing building fabric ventilation and an evaluation of insulation proposals particularly risk of condensation leading to damage from damp conditions. Specialist advice may be helpful to develop proposals which respond to current standards and are appropriate and sympathetic to historic buildings.

Damp Conditions

Damp environmental conditions can cause significant damage to building materials and structure and it is important to understand the source of the water or condensation when considering appropriate actions and treatment. Where it is not feasible to eliminate the risk of water ingress or accumulating condensation consider monitored control measures with options for extraction, dehumidification and natural charge installation. Equipment will not avoid the risk of damage and monitoring is required for regular function check and maintenance.

Roof Insulation and Ventilation

Consider the risks of condensation, damp and rot from both warm and cold roof constructions. Avoid loss of natural ventilation and maintain traditional details; different measures may be necessary for roof features such as dormers.

Fireplaces and chimneys

Chimney flue ventilation should be maintained. Retaining open fireplaces can be beneficial as part of the ventilation strategy. Vented caps can be fitted to chimney tops and modern linings and variable dampers can be fitted within flues.

Damaged Masonry

The use of alternative or modern materials and techniques can be appropriate in certain circumstances.

Acrylic Resins

Specialist stone conservator techniques and materials can be considered for delaminating, fissured and cracked masonry and sculpture work. This type of work with acrylic resin will have a limited life and implies on-going condition monitoring.

Proprietary Restoration Mortars

Limited and localised use of proprietary restoration mortars may be appropriate for small key areas to retain building significance, extensive use is not appropriate. Consider the composition of the restoration mortar and the compatibility with the masonry, as a difference in breathability will exacerbate erosion and loss of the masonry.

Removal of Paint and other Coatings and Facings from Masonry

Removal of coatings and facings may be acceptable where there is evidence of distress to the underlying masonry or where the finish may be considered incongruous and detrimental to the building significance. Analyse the paint or other coating or facing to establish the least damaging removal method, tested and approved for use on the particular masonry type. Gels, chemical poultice systems or air/water abrasion may be appropriate. Test the proposed system as a control sample for approval to proceed, particularly where chemical poultice or low level air/water abrasion is proposed. Chemicals used on stone are to be neutralised immediately after use as recommended in the manufacturer's written instructions.

Copings

Provide protection to the core construction from rainwater. Where it is not feasible or appropriate to fit copings to shed rainwater alternatives may be considered. Specification must take account of the local climate, natural diversity and risk of invasive vegetation colonisation. Proprietary membrane system may be considered as an alternative option for the repair or renewal of existing impermeable cover where appearance and effectiveness to shed water is not further compromised.

Fire Safety

Fire Strategy

Adopt a fire safety strategy to protect and retain historic fabric which minimises impact to significant interiors features and fittings.

Compartmentation and Services

Fire-resistant breaks across large voids within existing buildings to form smaller compartments reducing the risk of fire spread, as will dampers and fire breaks to pipe and duct services.

Fabric Interventions for Fire Resistance

Fire rated linings, fillers and seals can be considered to enhance the fire resistance of existing building fabric rather than replacement with modern proprietary materials and fixtures.

Fire Detection and Suppression

The positioning of fitments for fire detection and suppression installations should be carefully considered to minimise any detraction from the aesthetic value of significant interiors.

Improved Disabled Access For All

Changes to external building doorways and to the interior to improve access for all should be sympathetic to the building appearance and form. Access equipment and fittings should be carefully selected to enable retention of existing building features.

7. EXPECTATIONS

Confirmation of proposals required

Following this Stage 1 report, the following specific items need to be agreed upon by the client :

Maximum Security Prison

- confirmation that our outline remedial and restoration methods are broadly accepted and can be pursued by providing more detail;
- options for demolishing existing public toilets (B084 and B087) and providing new facilities for public use. Discuss with client and SAHRA possible new toilet block on the precinct or converting portions of Section C for this purpose.

The Kramat

- design of new gate to match existing fence;
- New shade structure over the courtyard at The Kramat;
- moving condensers from The Kramat roof to new facility adjacent to the existing foot bath.

Ou Tronk

- the provision of public toilet facilities within one of the existing buildings at the Ou Tronk;
- moth balling most buildings at the Ou Tronk and to restore and adaptively re-use one of the buildings as a permanent exhibition space (possibly building B065);
- retention and stabilisation of WW2 platforms as part of the overall visitor experience (only landscaping and minor repairs required).

School

- restore main building (B319) to fully functional training facility;
- conversion of existing toilet buildings into public facility (B321 and B323);
- addaptive re-use of two external classrooms as a support function for a new facility to be accommodated in the main building;

MPLC

- Part renovation of buildings. Only internal walls affected by moisture. Minor repairs in bathrooms and ablutions.

General

- acceptance that local materials may be used (in part?) for the restoration process (blue stone, lime and sand). We would like to propose a new lime quarry that can be rehabilitated to restore previous natural look.
- permission to collect excessive shells on the island with the purposes of burning lime for construction.

8. BIBLIOGRAPHY

Acknowledgements

Staff at CDC, especially Chris Adams who is assisting the teams on the island.

Bibliography

Heritage Guidelines

ICOMOS, Charter for the Conservation of Places of Cultural Significance. The 'Burra Charter, adopted at Burra, Australia: 1979, revised 1999).

Robben Island Sites Information

Robben Island Sites Information - 2005 A Word document consisting of 800+ pages describing most buildings on the island under various headings and including much oral history of the significant heritage buildings.

Robben Island Museum website : www.robben-island.org.za

Report on the State of Conservation of the Fabric of 'A' Section of the Maximum Security Prison Robben Island. Rob Viney 11 May 2013

Robben Island MSP 'A' Section Photographic Survey Interior of Cells, Ablutions and Recreation Areas. Ron Viney 20 August 2013

Heritage Statement Garrison Church Robben Island. Ron Viney 23 January 2011

Rising Damp

Tim Hutton, MA MSc MRVS is a building pathologist and environmental scientist. This article is reproduced from *The Building Conservation Directory* 1998 and revised February 2012.

Lime Mortars

Heritage House - building and restoration offers insights to many restoration failures, especially dealing with misdiagnosis of damp conditions in old buildings.

various articles within www.buildingconservation.com and Hutton + Rostron's websites.

Limewash and Distempers. Elizabeth Hurst

Grouting Solid Masonry Walls. Chris Wood and Colin Burns

Hot-mixed Mortars. Advantages and Limitations by Adam Brown (BSc Hons)

Lime Harling. Craig Frew MSc IHBC

Matching Mortars for Pointing. Claire Davies BA BSc Cons

Pointing with Lime. Craig Frew MSc IHBC

Photographic Credits

All graphics and photographs by the project team unless otherwise stated

9. ADDENDUM

A. Structural Engineer's Report

COEGA DEVELOPMENT CORPORATION

CDC 453/ 2017: ROBBEN ISLAND SITE INSPECTION

STRUCTURAL ASSESSMENT

TITLE: CDC 453/ 2017: ROBBEN ISLAND BUILDINGS CONDITION ASSESSMENT

STRUCTURAL ASSESSMENT

DOCUMENT NUMBER: 10741-1-4033-003

REVISION: 0

Document Preparation:

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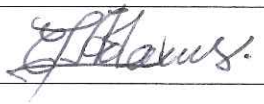
C Adams	Bosch Projects, Structural Engineer		2018/08/28
F Bothma	Bosch Projects, Regional Director: Western Cape		

Document History:

REV.	DESCRIPTION	DATE	PAGES
0	Issued for Comment	2018/08/28	52

Structure Classification:	**World War 2 Armoury**	Structure Location:	**Murray's Bay Rd**
Structure Number:	**B058**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Reinforced concrete walls, off shutter finish to exterior and interior surfaces.
- Roof: Reinforced concrete roof slab with reinforced concrete beams.

General Condition:

- Minor cracks on external walls.
- Dampness to the soffit of the roof slab is visible inside the building.
- Exterior corners of concrete walls in poor condition on north west & south west corners, concrete is spalling, and reinforcement is exposed and badly rusted.

Overall Condition Rating:

- Fair.
- Minor structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to RC walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification SCD-0004
- Clean off existing roof slab and remove all loose debris.
- Restore existing roof slab screed where required, apply new torch-on 'derbigum' type waterproofing to roof slab.
- Repair exterior corners of concrete walls with superficial methods.
    - Repair concrete wall corners to Engineer's specification SCD-0003

Structure Classification:	**Ou Tronk**	Structure Location:	**NE Boundary**
Structure Number:	**B059**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Minor cracks on external and internal walls.
- Medium crack on external wall above window on east side.
- Medium crack on external wall at door on east side.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair medium cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Ou Tronk**	Structure Location:	**N Boundary**
Structure Number:	**B060**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks on external and internal walls.
- Medium cracks on walls.
- Timber fascias rotten on north side.
- Low rise small chamber precast concrete roof slab damaged on south side.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Replace damaged low rise small chamber precast concrete roof slab with new precast concrete slab to match existing.
- Repair medium cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Ou Tronk**	Structure Location:	**N Boundary**
Structure Number:	**B061**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks on external and internal walls.
- Minor dampness on north and south walls.
- Medium cracks on walls.
- Timber fascias rotten on north side.
- Concrete ramp badly damaged between B061 & B062 on south side.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Concrete ramp to be cleaned and remove all loose debris as well as spalling concrete under ramp where required. Fill in void below ramp with approximately 1m³ of 20 MPa mass concrete. Surface of ramp to be re-screeded.
- Repair medium cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Ou Tronk**	Structure Location:	**NE Boundary**
Structure Number:	**B062**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks on external and internal walls.
- Minor dampness on west wall.
- Medium cracks on walls
- Timber fascias rotten on north side.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Repair medium cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Ou Tronk**	Structure Location:	**NW Boundary**
Structure Number:	**B063**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks on external and internal walls.
- Medium vertical cracks on internal walls below timber support beam on north & south side.
- Timber fascias rotten on north side.
- Roof sheeting damaged.
- Mass concrete steps damaged on east side.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair medium cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Replace damaged & missing roof sheeting with new Nutec roof sheeting to match existing where required.
- Mass concrete steps to be cleaned and remove all loose debris as well as spalling concrete. Cut away 100mm thick layer of existing concrete steps and cast new 20 MPa concrete with mesh ref 245 (approximately 1.5m^3 of concrete), profile to match existing.

Structure Classification:	**Ou Tronk**	Structure Location:	**SW Boundary**
Structure Number:	**B064**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roofs: timber trusses with asbestos roof sheeting and timber rafter with corrugated metal sheeting.
- Concrete slab under timber roof trusses.

General Condition:

- Minor cracks on external and internal walls.
- Medium vertical crack on external wall with minor dampness where flat roof and main roof joins on south side.
- Medium cracks on stoep foundation wall on east side.
- Medium horizontal cracks between windows on west side.
- Timber fascias rotten on north side.
- Roof sheeting missing on main roof.
- Flat roof in very poor condition, roof sheeting & box gutter badly rusted and timber is rotten & damaged.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Repair cracks to walls with superficial methods.
    - Repair minor 1mm – 2mm wide cracks to Engineer's specification.
    - Repair medium 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Replace damaged & missing roof sheeting with new Nutec roof sheeting to match existing where required.
- Replace entire flat roof with new structural timber, galvanised corrugated metal roof sheeting and galvanised steel box gutter.

Structure Classification:	**Kramat**	Structure Location:	**N Boundary**
Structure Number:	**B078**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces. The roof and dome are constructed from concrete.

General Condition:

- Dampness to the soffit of the roof and dome is visible inside the building.
- Previous attempts were made to restore the jointing in the stone cladding on the outside of the building.

Overall Condition Rating:

- The building is structurally in a very sound condition.
- No major structural repair work required

Recommendation:

- Waterproofing of concrete roof and dome to be restored/replaced with new.
- Jointing of stone cladding on the outside to be restored.

Structure Classification:	**Maximum Security Prison- Office**	Structure Location:	**E Boundary**
Structure Number:	**B082**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Structure consists of prefabricated panels.
- Timber Roof

General Condition:

Structure is in good condition**.**

Overall Condition Rating:

- Good.

Recommendation:

- No structural repair work required.

Structure Classification:	**Maximum Security**	Structure Location:	**E Boundary**
	Prison- Entrance (Administration Building)		
Structure Number:	**B083**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.

General Condition:

- 4xConcrete window sills badly cracked; reinforcement badly rusted on west side.
- The building is structurally in a very sound condition.

Overall Condition Rating:

- Good.
- No major structural repair work required.

Recommendation:

- Concrete window sills to be replaced with new.

Structure Classification: **Maximum Security** Structure Location: **E Boundary**

Prison- Entrance (Toilet facility)

Structure Number: **B084** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Make-shift, non-permanent drywall structure used for toilet facilities.
- Flat roof with rafters supported by timber poles

General Condition:

- Dry wall *Gypsum Board* not suited for external use.
- Rafters in roof badly bowed due to downward deflection. It appears to be undersized.

Overall Condition Rating:

- External walls and roof structure in poor condition.

Recommendation:

- Replace external walls with durable, SANS approved prefabricated panels or new masonry structures.
- Replace entire roof structure with new.

Structure Classification: **Maximum Security** Structure Location: **E Boundary**

Prison- Entrance (Ablution Block)

Structure Number: **B085** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks internally.
- Dampness observed internally on eastern façade.
- Major crack in link wall between B85 and C-Section, B8. Refer to sketch attached.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Repair minor cracks to walls with superficial methods.
  - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
  - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison- Watch Tower**	Structure Location:	**E Boundary**
Structure Number:	**B086**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.

General Condition:

- No structural defects were observed.

Overall Condition Rating:

- Good.
- No structural repair work required.

Recommendation:

- None

Structure Classification: **Maximum Security** Structure Location: **E Boundary**

Prison – Entrance (Toilet facility)

Structure Number: **B087** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Make-shift, non-permanent drywall structure used for toilet facilities.
- Flat roof with rafters supported by timber poles

General Condition:

- Dry wall *Gypsum Board* not suited for external use.
- Rafters in roof badly bowed due to downward deflection. It appears to be undersized.

Overall Condition Rating:

- External walls and roof structure in poor condition.

Recommendation:

- Replace external walls with durable, SANS approved prefabricated panels or new masonry structures.
- Replace entire roof structure with new.

Structure Classification:	**Maximum Security Prison - A Section**	Structure Location:	**E Boundary**
Structure Number:	**B088**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Good.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison - B Section**	Structure Location:	**E Boundary**
Structure Number:	**B088**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Good.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison: C-Section**	Structure Location:	**E Boundary**
Structure Number:	**B088**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Good.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison: B-Section (Hospital)**	Structure Location:	**E Boundary**
Structure Number:	**B088 (Hospital)**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Good.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification: **Maximum Security** Structure Location: **N Boundary**

Prison: A and B-Sections – Prison Yard Wall

Structure Number: **B088** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- South and East prison yard wall 5.0m high, 230mm brick wall with 230mm X230mm wide buttresses.
- Roughly plastered on both faces with stippled plaster.

General Condition:

- The wall appears to be built outside normal engineering standards and practices in terms of height and lateral support.
- Several vertical cracks exist, running from top to bottom.

Overall Condition Rating:

- The wall is in poor condition and unsafe because it is structurally unstable. It can collapse in the very near future.

Recommendation:

- The wall should be stabilised with reinforced concrete buttresses as lateral supports, strictly in accordance with engineer's design and specifications SCD-0007.

Structure Classification:	**Maximum Security**	Structure Location:	**N Boundary**
	Prison: B-Section Out-Building		
Structure Number:	**B089**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Minor Block wall structure.
- Walls plastered internally and externally, with both surfaces unpainted.
- Concrete roof slab supporting water tank

General Condition:

- Minor cracks in plaster observed.

Overall Condition Rating:

- Building is in a fair structural condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- For durability, paint building to match surrounding painted surfaces.

Structure Classification:	**Maximum Security Prison - F Section**	Structure Location:	**N Boundary**
Structure Number:	**B090**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Jointing in stone cladding broken in various locations.
- Dampness observed inside external walls on north-west façade.
- Internal walls good, with minor cracks.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison - D Section**	Structure Location:	**N Boundary**
Structure Number:	**B092**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good, minor cracks in some locations.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks in walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison - G Section**	Structure Location:	**N/Boundary**
Structure Number:	**B094**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good, with minor cracks in various locations.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification: **Maximum Security** Structure Location: **N/Boundary**

Prison- F Section (Out Building)

Structure Number: **B091** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Maximum Security Prison- D Section**	Structure Location:	**Central**
Structure Number:	**B092**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification: **Maximum Security** Structure Location: **Central**

Prison- D Section (Out Building)

Structure Number: **B093** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Minor Block wall structure.
- Walls plastered internally and externally, with both surfaces unpainted.
- Concrete roof slab supporting water tank

General Condition:

- Minor cracks in plaster observed.

Overall Condition Rating:

- Building is in a fair structural condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- For durability, paint building to match surrounding painted surfaces.

Structure Classification:	**Maximum Security Prison- G Section**	Structure Location:	**N Boundary**
Structure Number:	**B094**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Dampness observed inside external walls on north-west façade.
- Internal walls good.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification: **Maximum Security** Structure Location: **N Boundary**

Prison- G Section (Out Building)

Structure Number: **B095** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Minor Block wall structure.
- Walls plastered internally and externally, with both surfaces unpainted.
- Concrete roof slab supporting water tank

General Condition:

- Minor cracks in plaster observed.

Overall Condition Rating:

- Building is in a fair structural condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- For durability, paint building to match surrounding painted surfaces.

Structure Classification:	**Maximum Security Prison - Watch Tower**	Structure Location:	**N Boundary**
Structure Number:	**B097**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.

General Condition:

- No major structural defects were observed.

Overall Condition Rating:

- Good.
- No structural repair work required.

Recommendation:

- None

Structure Classification:	**Maximum Security Prison - Out Building**	Structure Location:	**W/Boundary**
Structure Number:	**B099**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Minor Block wall structure.
- Walls plastered internally and externally, with both surfaces unpainted.
- Roof: timber trusses with asbestos roof sheeting.

General Condition:

- Vertical crack in northern wall
- Minor horizontal crack at foundation wall
- Medium cracks on walls.

Overall Condition Rating:

- Fair.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.
- Eaves overhangs: Timber to be treated and painted
- Push plaster joint above foundation wall (slab level)

Structure Classification:	**Maximum Security Prison- Cold Store**	Structure Location:	**W Boundary**
Structure Number:	**B100**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Timber roof trusses with asbestos roof sheeting.
- Concrete slab under roof trusses.

General Condition:

- Minor horizontal and vertical cracks in external walls.
- Requires painting.

Overall Condition Rating:

- Building is structurally in fair condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repaint building for structural durability.

Structure Classification:	**Maximum Security Prison- Kitchen**	Structure Location:	**W Boundary**
Structure Number:	**B101**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Walls built with cement Block walls with stone cladding externally, plaster and paint internally.
- Roof: Steel trusses with asbestos roof sheeting.
- Reinforced Concrete veranda slab over stoep.

General Condition:

- Roof trusses in fair condition inside building, but sprockets/roof overhangs badly corroded.
- Fascia boards on north-west side in poor condition.
- Minor cracks visible in concrete veranda slab and beams.
- Several cracks in stoep.

Overall Condition Rating:

- The structure is in fair condition.

Recommendation:

- Exposed sprockets/roof overhangs of steel trusses:
  - Remove corrosion and treat steel with SABS approved anticorrosion compound.
  - Apply 2 coats of paint, to match original colour.

- Concrete veranda slab:
  - Repair cracked and damaged concrete and restore to acceptable condition.
  - Repair cracks in stoep.

Structure Classification:	**Maximum Security Prison - Watch Tower**	Structure Location:	**W Boundary**
Structure Number:	**B102**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.

General Condition:

- No major structural defects were observed.

Overall Condition Rating:

- Good.
- No structural repair work required.

Recommendation:

- None

Structure Classification:	**Maximum Security Prison - Sport Hall**	Structure Location:	**SW Boundary**
Structure Number:	**B103**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Walls constructed of concrete block work.
- Plastered and painted externally and internally.
- Timber roof trusses with asbestos roof sheeting.
- Concrete slab under roof trusses.

General Condition:

- Minor horizontal and vertical cracks in external walls.
- Requires painting.

Overall Condition Rating:

- Building is structurally in fair condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repaint building for structural durability.

Structure Classification:	**Maximum Security Prison - Watch tower**	Structure Location:	**S Boundary**
Structure Number:	**B104**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- The Roof: timber trusses with asbestos roof sheeting.

General Condition:

- No major structural defects were observed.

Overall Condition Rating:

- Good.
- No structural repair work required.

Recommendation:

- None

Structure Classification:	**Maximum Security Prison- E Section**	Structure Location:	**N Boundary**
Structure Number:	**B105**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Concrete block walls with stone cladding to exterior face, plaster and paint to interior surfaces.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor cracks external walls.
- Medium cracks on walls.
- Window Sills badly weathered and cracked on southern flank of building.
- Dampness observed inside external walls on north-west façade.
- Internal walls good, with minor cracks in various locations.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to external walls with superficial methods.
- Repair window sills on southern flank of building.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification: **Maximum Security** Structure Location: **N Boundary Prison-E (Out Building)**

Structure Number: **B106** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Minor Block wall structure.
- Walls plastered internally and externally, with both surfaces unpainted.
- Concrete roof slab supporting water tank

General Condition:

- Minor cracks in plaster observed.

Overall Condition Rating:

- Building is in a fair structural condition

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- For durability, paint building to match surrounding painted surfaces.

Structure Classification: **Medium Security** Structure Location: **NE Boundary**

Prison - Multi-Purpose Hall

Structure Number: **B163** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Walls constructed with concrete blocks, and buttresses for lateral stiffening.
- It appears that restoration was previously done on the building.

General Condition:

- Minor to medium cracks occur in several locations in the walls of the structure.
- Spalling of plaster observed.
- Concrete roof slab spalling of concrete as well as dampness observed.

Overall Condition Rating:

- Fair.

Recommendation:

- Repair all cracks in walls, internal and external, according to engineer's specifications.
- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.
- Repair spalled concrete and defects in concrete roof slab in **Area "A"** with structural repair mortar or repair concrete to engineer's specifications SCD-0005
- Replace damp proofing with new torch-on damp proofing membrane.

Structure Classification: **Medium Security Storeroom**

Structure Location: **NE Boundary**

Structure Number: **B164**

Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Non-structural timber framed shed/store with corrugated metal sheeting.

General Condition:

- Fair condition

Overall Condition Rating:

- Fair

Recommendation:

- Non-structural

Structure Classification: **Medium Security** Structure Location: **E Boundary**

Structure Number: **B165** Checked By: **Chris Adams**

Date Checked: **Oct 2018**

Structure Description:

- Non-structural timber pergola

General Condition:

- Fair condition

Overall Condition Rating:

- Fair

Recommendation:

- Non-structural

Structure Classification:	**Medium Security**	Structure Location:	**W Boundary**
	Main Building		
Structure Number:	**B166**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Minor to medium cracks occur in several locations in the walls of the structure.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Repair minor cracks to external walls with superficial methods.
- Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Medium Security**	Structure Location:	**S Boundary**
	Main Prison		
Structure Number:	**B167**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- It appears that restoration was previously done on the building.
- Roof: timber trusses with asbestos roof sheeting.
- Concrete slab under timber roof.

General Condition:

- Minor to medium cracks occur in several locations in the walls of the structure.
- Spalling of plaster observed.
- Dampness in walls above windows at eaves levels
- Medium horizontal cracks at roof/wall interface
- Medium horizontal cracks above window openings
- Major horizontal crack in wall above opening; it appears opening was formed without lintels above.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Repair major horizontal crack above opening according to engineer's specifications.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.

Structure Classification:	**Medium Security**	Structure Location:	**N Boundary**
	Prison Yard Wall (between B163 – B167)		
Structure Number:	**B0163 – B0167**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- North-East/West prison yard wall 5.0m high, 230mm brick wall with 230mm X230mm wide buttresses.

General Condition:

- The wall appears to be built outside normal engineering standards and practices in terms of height and lateral support.
- Several vertical cracks exist, running from top to bottom.
- Major diagonal cracks in wall above opening; it appears opening was formed without lintels above.

Overall Condition Rating:

- The wall is in poor condition and unsafe because it is structurally unstable. It can collapse in the very near future.

Recommendation:

- The wall should be stabilised with reinforced concrete buttresses as lateral supports, strictly in accordance with engineer's design and specifications SCD-0007.
- Repair major horizontal crack above opening according to engineer's specifications

Structure Classification:	**School**	Structure Location:	**Central**
Structure Number:	**B319**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Typical block wall building with stone cladding on the exterior and plaster and painted on the interior wall surfaces.
- Timber roof with corrugated metal sheeting.

General Condition:

- Major structural vertical cracks on external wall on south-west corner of school
- Minor to medium cracks on external and internal walls
- Crazed cracks on plaster of external wall on west side
- Medium horizontal crack above door on west side of school
- External cladding badly deteriorating
- Medium dampness on internal walls
- Veranda above stoep in a poor state, posts and railings rotten and dry
- Timber fascias rotten

Overall Condition Rating:

- Fair.
- South-west corner of school in a poor condition due to foundation settlement.

Recommendation:

- Foundation at south-west corner to be under-pinned to engineer's spec SCD-0006
- Repair cracks to wall with superficial methods
    - Repair minor 1mm – 2mm wide cracks to Engineer's specification.
    - Repair medium 2mm – 5mm wide cracks to engineer's spec SCD-0002
- New plaster where required
- New cladding/jointing where required
- Veranda roof timber to be cleaned and painted, posts and railings to be replaced
- New gutters to match existing where required

Structure Classification:	**School: Walkway**	Structure Location:	**Central**
Structure Number:	**B320**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Walkway between B319 and B322/4. Steel posts with timber rafters and corrugated metal sheeting.

General Condition:

- Timber rafters in fair condition.
- Roof sheeting missing.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- Timber rafters to be cleaned and treated to Engineer's specification.
- Replace roof and cladding with new corrugated metal sheeting (to match existing).

Structure Classification:	**School Ablutions**	Structure Location:	**S Boundary**
Structure Number:	**B321**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Minor cracks on external and internal walls.
- Timber fascias rotten.
- Roof sheeting damaged.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Replace damaged & missing roof sheeting with new Nutec roof sheeting to match existing where required.

Structure Classification:	**School Classroom**	Structure Location:	**SW Boundary**
Structure Number:	**B322**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Minor cracks on external and internal walls.
- Medium cracks on walls.
- Timber fascias rotten.
- Roof sheeting damaged.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.
- Replace damaged & missing roof sheeting with new Nutec roof sheeting to match existing where required.

Structure Classification:	**School Ablutions**	Structure Location:	**Central**
Structure Number:	**B323**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Minor cracks on external and internal walls.
- Medium cracks on walls.
- Timber fascias rotten.

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.

Structure Classification:	**School Classroom**	Structure Location:	**NW Boundary**
Structure Number:	**B324**	Checked By:	**Chris Adams**
		Date Checked:	**Oct 2018**

Structure Description:

- Brick walls, plaster and paint to exterior and interior surfaces.
- Roof: Timber rafters with asbestos roof sheeting.

General Condition:

- Medium vertical crack on internal wall from top down to foundation on west side
- Minor to medium cracks on external and internal walls
- Medium horizontal crack below window on north side of classroom
- Medium dampness on internal walls
- Timber fascias rotten

Overall Condition Rating:

- Fair.
- No major structural repair work required.

Recommendation:

- No major structural repair work required.
- Repair minor cracks to walls with superficial methods.
    - Repair 1mm – 2mm wide cracks to Engineer's specification.
- Repair major cracks to walls with superficial methods.
    - Repair 2mm – 5mm wide cracks to Engineer's specification.
- Replace timber fascias with new to match existing.

Estimated Quantities:

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1. Refer to Architects' specifications for minor plaster cracks.
    - Refer to Engineer's Specification for minor crack repair detail.

2. Medium and major structural crack repairs – approximately 260 linear meters.
    - Refer to Engineer's Specification for medium and major crack repair detail.

3. Typical RC wall corner repairs (2x No. Off.): Concrete 1.5 m^3
   Reinforcement 125 kg
    - Refer to SCD-0003 for typical RC wall corner repair detail.

4. RC wall crack repairs – approximately 75 linear meters.
    - Refer to SCD-0004 for typical crack on RC walls repair details.

5. RC slab repairs – approximately 50 m^2
    - Refer to SCD-0005 for typical RC slab repair detail.

6. Underpinning of existing foundations: Concrete 1.2 m^3
   Reinforcement 26 kg
    - Refer to SCD-0006 for underpinning detail.

7. Remedial work to yard walls at Maximum and Medium Prisons:
   Concrete 90 m^3
   Reinforcement 10 000 kg
    - Refer to SCD-0007 for remedial work to yard walls of prisons.

Please note that the above quantities are estimates and subject to change after further investigation on site.

B. Electrical Engineer's Report

COEGA DEVELOPMENT CORPORATION

CDC 453/ 2017: ROBBEN ISLAND SITE INSPECTION

ELECTRICAL ASSESSMENT

TITLE: CDC 453/ 2017: ROBBEN ISLAND BUILDINGS CONDITION ASSESSMENT

ELECTRICAL ASSESSMENT

DOCUMENT NUMBER: 10741-1-4033-001

REVISION: 0

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Robben Island Conditional Assessment: Basis of Preliminary Cost Estimate – Electrical

A restoration date of 1990 coinciding with Mandela's release have been assumed - should the facilities have to be restored to an older date the basis of cost estimate will have to be reviewed and updated.

1 Assumptions: Lighting

Although in most areas day time light levels are high enough without needing any supplementary artificial lighting to comply with OHS Act regulatory lighting levels, it is still recommended to have artificial lighting since in some areas on overcast days light intensities might drop below regulatory levels requiring supplementary artificial lighting. Furthermore, night time access might be required for ad hoc inspections (or potential future night time exhibitions). For these reasons there must be functional lighting in all areas.

The current requirements as per the brief is to use the existing installed lighting and restore this to working condition. It must be noted that this solution is of a temporary nature that will only be valid for another 5-7 years as fluorescent lighting technology is currently being phased out and replaced by LED. In terms of lighting there are no replacement LED light fittings for open channel fluorescent light fittings that will still provide the same heritage aesthetic look.

The recommendation based on the current brief is to restore all existing functional lighting to working condition as at the base date. This imply that all T5 fluorescent lamps should be replaced by T8 lamps and new T5 fittings are to be replaced by old T8 fittings if still commercially available. If this is not viable, the decision has to be made whether T5 lamps and light fittings (which only became available during the 1990's) will be acceptable from a heritage perspective (T8 dates back to as early as the 1950's so this will be the better heritage solution). Regardless of whether T8 or T5 technology is selected, it is recommended that a substantial amount of spare parts (lamps, ballasts, starters, lamp sockets and light switch internal parts) if available, are procured now to enable maintenance over the next 5-7 years or as long as the lighting has to remain functional. Spare lamp quantities should allow for at least two complete lamp replacements as fluorescent lamp life is between 7000-15000 hours (which equates to between 2.5 to 5 years based on an 8 hour day usage).

The alternative lighting solution is to decommission the existing lighting installation and design a new solution based on the revised requirements of a museum. This will allow the installation of new LED technology as it will be considered as part of the exhibition lighting and not part of the functional lighting. This will also provide and optimal solution as the new lighting will only be installed where required from a functional perspective. It is envisaged that this solution will have to be implemented in near future when the existing fluorescent lighting has reached its end of life.

Based on the assumption that there are no night time visits or any form of night time work ever envisaged for all the buildings except ad hoc night time access by staff or security for incident inspection, the external area lighting around the buildings are not to be upgraded. For this purpose staff will require portable lights for night time area access as well as certain rooms or parts of buildings. The existing area lighting must be decommissioned and preserved as part of the exhibition. Should regular night time access be required in future then the area lighting will have to be upgraded at that time.

2 Assumptions: Power

The project brief has stated that the facilities identified must be restored to the fully functional condition. This has been interpreted to be a fully functional museum and not a fully functional prison. For this reason it is assumed that socket outlets in all prison areas are no longer required to be functional other than the need for cleaning purposes. It is therefore recommended that only certain identified socket outlets are restored to fully functional condition and marked and that the remainder be decommissioned. Cleaning and maintenance staff will have to use suitably long extension cords.

3 General: Applicable to all areas

3.1 All fluorescent light fitting housings that are damaged or not suitable for use for the next 7 years to be replaced by new identical/equivalent open fluorescent light fittings if available – if required by Heritage Architect the fitting housings can be weathered to give a rustic/old look. Suitable housings of which the electrical parts are no longer functional must be rewired and new ballasts, starters and lamp sockets installed. All missing or incorrect light fittings to be replaced by new fittings identical to what was determined to be installed previously – fittings can be weathered to match the existing installation.

3.2 On all other light fittings with obscured lenses the light lamp holders must be replaced with the wiring using a new modern screw type base (E27) and a 5W obscured 230V, LED bulb type lamp fitted.

3.3 On all light fittings with clear lenses the lights must be decommissioned and the fitting and lamp preserved. For all fittings without lamps it must be attempted to fit a lamp matching the lamps that were installed before 1990 (most likely incandescent) – lamp does not have to be in working order.

3.4 All lighting wiring (live, neutral and earth) to be replaced by new 2,5mm^2 PVC insulated house wire – approximate wiring lengths to be measured between fittings and estimated/anticipated route to DB's. Old wiring to be removed from conduits to light fittings prior to installation of new wiring.

3.5 All functional light switch cover plates and toggles that are damaged or not suitable for use for the next 7 years to be replaced by new identical/equivalent switches if available – if required by Heritage Architect the switch housings can be weathered to give a rustic/old look. Suitable switches of which the electrical parts are no longer functional must have new switch mechanism installed if available. All missing or incorrect switches to be replaced by new switches identical to what was determined to be installed previously – switch housings can be weathered to match the existing installation. Alternatively all light switches can be decommissioned entirely and lighting circuit connected to sensors that will switch on when it gets too dark during day time with an override switch if occasional night time access is required. A decision has to be made if all light switches are to be of the same type as those in the medical wards in C-Section and if so it has to be determined if they are still commercially available. See photo below.

3.6 All DB boxes that are not corroded and that are structurally sound to be retained but all circuit breakers, earth leakages and wiring to be replaced in order to comply with latest regulations – for DB's up to 10 circuits allow ±R9500, for up to 20 circuits allow ±R15000 for up to 30 circuits allow ±R30000.

3.7 All socket outlets to be disconnected and electrically isolated from mains power – allow ±R150/socket for decommissioning. On all designated socket outlets to be retained the switch

mechanisms have to be replaced by suitably new or replacement parts if available and the wiring to these sockets (live, neutral and earth) to be replaced by new 2,5mm^2 PVC insulated house wire – approximate wiring lengths to be measured between sockets and estimated/anticipated route to DB's. Old wiring to be removed from conduits to these socket outlets prior to installation of new wiring. Alternatively each common space can be fitted with a new socket outlet for cleaning purposes, hidden away in a box, cupboard or DB board compartment (recommended) to be used with suitably long extension leads. This will eliminate the need for replacing existing socket outlets or wiring.

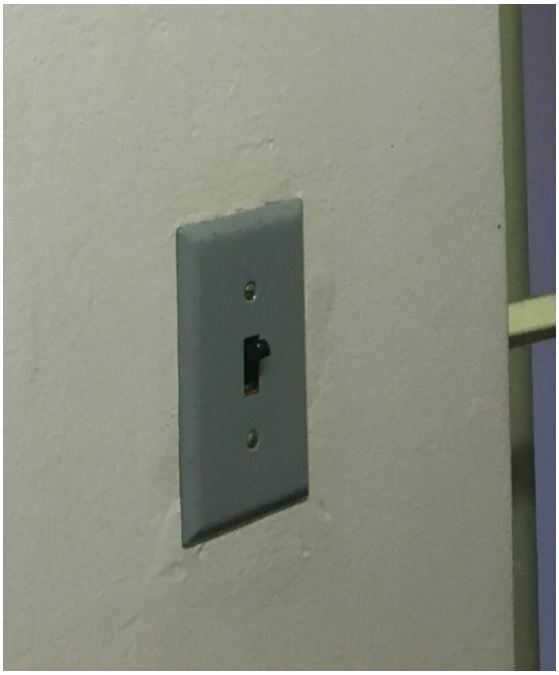
3.8 All surface mounted conduits that will remain functional that are not corroded and that are structurally sound to be retained otherwise to be replaced by new identical conduits – conduits can be weathered to match the existing installation.

3.9 All electrical equipment (eg. pieces of cable/wires fixed to walls/hanging down, sections of unused conduits, temporary lights/socket outlets, etc), that does not have heritage value or that was installed post the restoration date to be removed from buildings or terrain and then the building/terrain to be restored to its original state.

3.10 All other electrical equipment (such as pumps, fans, geysers, heaters, etc.) to be decommissioned and preserved. Electrical equipment still required to be functional to be replaced by new equipment through redesign of the functionality. Currently none are foreseen.

3.11 All external lighting around buildings inclusive of pole mounted light fittings to be decommissioned and preserved.

3.12 All building lightning earthing as well as electrical DB earthing to be tested and replaced where not compliant with regulation. To be included on Electrical Certificate of Compliance to be issued post restoration.



Light switches in C-Section (Refer to 3.5)

4 Ou Tronk

4.1 Does not appear to have area lighting at this site – maintain status quo unless night time visits are planned

4.2 Toilet at entrance gate – no power & lights – keep as is – not for use by public

4.3 Overhead power cable between B064-B063 – restore to working condition & install new cable & cable supports ±R35,000

4.4 Power pole on Northern Side of site feeding B063 needs to be straightened and stay wires must be installed – new cable to be installed feeding site & new DB - ±R185,000

4.5 External metallic on/off lights switches to be disconnected and retained for aesthetic purposes – lights to be wired to new lights switches or sensor as described under 1.3

4.6 Overhead power cables between buildings B059, 060, 061,062 and 063 to be replaced by new cables, supports and insulators at ±R950/m

4.7 External Main DB on south side of B060 (inside enclosure numbered 7) to be replaced by IP 65 DB inside old enclosure if still used - allow ±R55000 for this

4.8 All electrical equipment inside B058 are to be replaced by same redundant equipment if possible to obtain – otherwise existing electrical equipment to be restored as best as possible and refitted – restoration date to be determined but is much older than the other facilities – new minimal intrusive lighting to be installed if required to heritage arch spec. = allow R25,000 for new lighting.

See 4.3

See 4.4

See 4.5

See 4.6

See 4.7

5 Kramat

5.1 Does not appear to have area lighting at this site – maintain status quo unless night time visits are planned

5.2 Remove all internal and external surface mounted electrical cable, light fittings and socket outlets and restore to original architectural finish

5.3 Remove Fluorescent light fitting and bulkhead at building entrance and replace with suitable heritage type fitting or omit altogether. If any night time visits are envisaged to the Kramat or if any area lighting is desired then consider installing an LED floodlight against the back of the watch tower at roof level or if this is not allowed install a light pole identical to the one south of the substation and fit an LED light inside a replica of the enclosure of an old floodlight or retrofitted inside a real floodlight salvaged from another pole elsewhere.

5.4 Remove the main external DB installed against the wall at the back. If the HVAC units are to remain then use the existing cable route for their supply cables but installed inside an architecturally acceptable enclosure/conduit.

5.5 Install an outdoor power pillar in a suitable position on the site or DB inside the watch tower (if the watch tower will never be opened to the public for viewing) – feed the power supply cables to the HVAC units from this power pillar/DB.

5.6 Install three IP65 socket outlets inside the power pillar to be used for cleaning of the Kramat building inside as well as for external catering equipment if and when required.

5.7 Replace all the chandelier light bulbs with look alike equivalent 220V LED lamps which should then provide adequate lighting for the entire Kramat inside for night time use on rare occasions or very overcast daytime visits (normal natural lighting levels are adequate & hence no artificial lighting is required during daytime).

See 5.2

See 5.3

See 5.4

See 5.7

6 Maximum Security Prison

6.1 Does not appear to have area lighting at this site along the outside of buildings – maintain status quo unless night time visits are planned.

6.2 There are a small number of high mast lights in this area – **not** to be restored to working condition (refer to 1 Assumptions: Lighting).

6.3 Propose that the electrical substation at entrance to sports field be provided with battery backed-up outside lights x6 eg. bulkheads to assist with access during power failures

6.4 Remove temporary cabling as indicated below

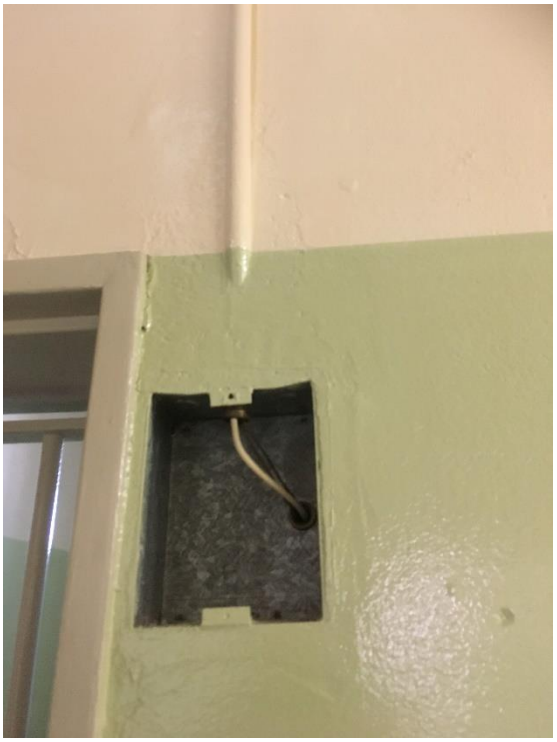
6.5 Make corrections to light switches and junction box as indicated in photos below

Block F: Remove surface mount cable/extension

Block F: Remove surface mount cable/extension

Remove loose overhead cable/extension between Main Kitchen & watch tower

C-section medical ward: Replace white toggle with original black toggle if obtainable otherwise remove bottom switch & conduit & retain top switch. Refurbish both switches to new condition – if not possible decommission and wire lights to new switch mounted inside DB board or in position indicated by architect



Replace missing cover with identical unit as before

7 Old School

7.1 Area lighting will be required for this facility since it will become a functional unit and night time access is envisaged. This can be achieved by adding LED floodlighting around the perimeter of the building (possibly at the apex only (to keep the façade clean) of the front and back of the high pitch roofed sections on the sides of the building) if a low level of flood lighting over the whole area is desirable – this can accentuate the area around the building at night. The issue of light pollution to be addressed if this solution will be considered. There will be one or two bulkheads required along the sides of the building as well as around the other outbuildings (B320 along the stairs, B321, B322, B323, B324) identical to those in the front under the roof (if these are heritage compliant). The internal parts of the lights might have to be replaced to accept suitable 220V LED lamps. These lights would provide adequate area lighting in the absence of the flood lighting mentioned. It might also be required to add lighting along the access walkway from the road.

7.2 Proposed that all fluorescent light fittings inside the buildings are to be replaced by LED strip light in suitable enclosure with obscured lenses to resemble enclosed fluorescent light fittings as close as possible. This will provide a durable, energy efficient, low maintenance solution with an expected 15 year lamp life.

7.3 Decision to be made by Heritage Architect whether to retain all surface mounted conduits and DB boards or whether to recess these into the walls (structural engineer approved in principal cutting and chasing into walls).

7.4 The number of sockets outlets in the rooms are inadequate and either new individual socket outlets are to be installed in designated places or power skirting to be installed that will also enable installation of electronic services (if required).

7.5 All cabling and fixture that were surface mounted against walls, ceilings or roof that was not part of the original installation at the desired heritage date to be removed – see examples below.

Remove bulkhead and all surface mounted cables

Decide whether to recess DB's & conduits

Remove surface wiring and hide away new wiring

Remove surface mounted fixtures

Remove all surface mounted fixtures and cables

Decide whether to retain cheese fittings or replace with new enclosed LED strip light

Disconnect & preserve old switchboard & install new DB

Lighting required along stairway

Install new lighting in all ablutions buildings

Remove all surface mounted wiring and if still needed install new wiring hidden away (eg. cut and chase conduit into inside wall and plaster over & restore to desired heritage level)

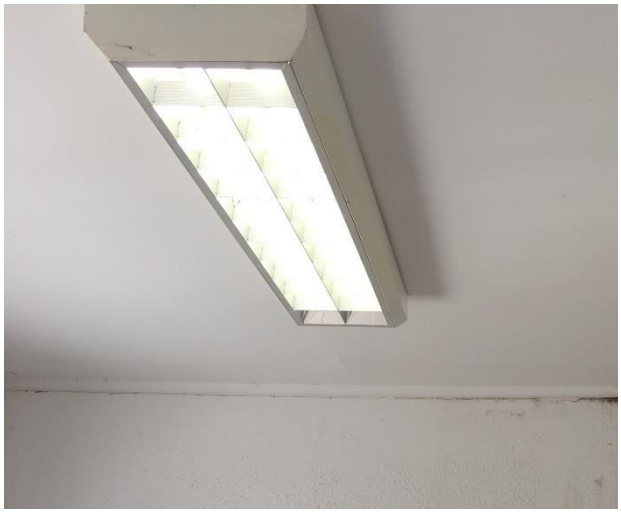
8 Medium Security Prison

8.1 As this facility is declared to remain a functional unit and not for sole purpose of museum exhibition the electrical equipment and systems can be upgraded to new condition in order to comply with regulations and reduce maintenance.

8.2 Area lighting exists for the facility but will have to be upgraded to comply with legal requirements. Heritage architect to decide suitable type of fitting and all non-compliant fittings to be replaced with chosen type.

8.3 There is a large variety of light fittings installed inside the buildings. Recommend to replace internal light fittings with chosen heritage compliant fittings equipped with LED lights/technology.

Area lighting required.



Evaluate existing fittings for heritage compliance. If required, internal light fittings can be recessed in ceiling voids - where there's not adequate ceiling space the lighting design can be modified to suit.

As with the Maximum Security prison if fluorescent light fittings are standardized on as functional lighting then adequate spare parts must be procured to maintain them for the remainder of their anticipated life of ± 7 years after which they will have to be replaced by modern light fittings. Alternatively new LED lights can be installed and the existing fluorescent lights decommissioned and retained for heritage value.

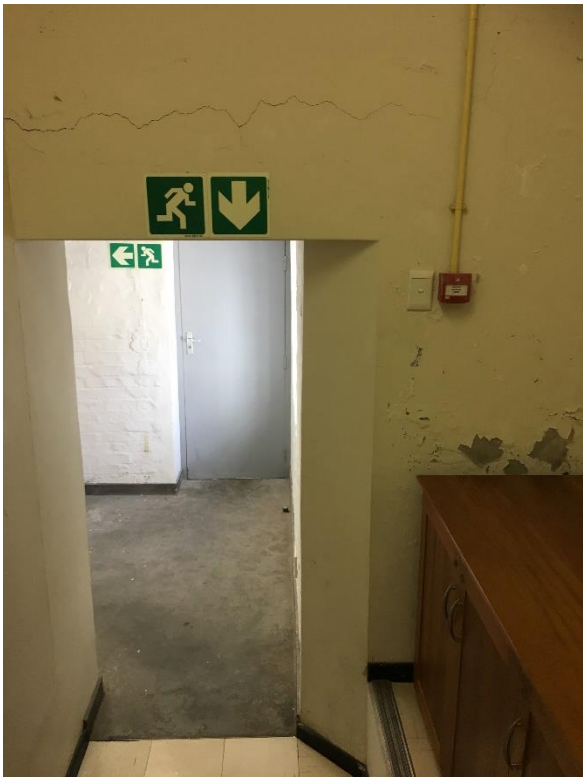
Decision to be made whether additional socket outlets are required in prison cell overnight rooms and whether they should be surface mounted or recessed.

Trunking and wiring to be removed and relocated into ceiling void

Additional socket outlets in kitchens to be provided – existing outlets are inadequate. Decision by Heritage Architect whether to retain surface mounting or to recess sockets in walls.

Standardise on light fittings – vapour proof type for bathrooms

Conduiting to be replaced and switch made good



Surface mounted conduit to be recessed

Replace light fitting with heritage standard

Electrical supply to be corrected and Isolator recessed

Installation to be corrected

Installation to be corrected

Installation to be corrected

Correct lighting and surface mount conduit to heritage standard if required

Installation to be corrected

C. Mechanical Engineer's Report

COEGA DEVELOPMENT CORPORATION

CDC 453/ 2017: ROBBEN ISLAND SITE INSPECTION

MECHANICAL ASSESSMENT

TITLE: CDC 453/ 2017: ROBBEN ISLAND BUILDINGS CONDITION ASSESSMENT

MECHANICAL ASSESSMENT

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ROBBEN ISLAND CONDITIONAL ASSESSMENT: BASIS OF PRELIMINARY COST ESTIMATE – MECHANICAL

1 BUILDING CLASSIFICATION

Classification of all building/museum spaces shall be reviewed in terms of the regulations to determine the compliance requirements. The following are assumed:

1.1.1 The Old School going to be used as a training facility.

1.1.2 The medium security prison, currently has beds and is occupied and therefore considered a dormitory with its own fire regulations and occupancy and is to remain so.

1.1.3 It is assumed that the Ou Tronk will become an exhibit.

1.1.4 The Kramat is assumed to be an active place of worship and not a museum exhibit.

2 FIRE

As per Sans 10400 fire regulations all buildings need a manually activated alarm. Fire or smoke detection is not a requirement per SANS 10400, but it is recommended that for places of heritage value, these be installed in the museums. The Medium Security Prison already has smoke detection installed and is deemed adequate and covering all the required spaces.

Fire Hose reels are required at one per 500m^2 in all buildings larger than 250m^2, however as per SANS 10400 T4.34.5, these can be substituted by fire extinguishers in areas where there is no water supply. It is assumed that water supply will be restored to all sites and that Fire Hose Reels are to be installed where necessary.

All active fire hose reel system will have to be inspected regularly for proper functioning and compliance with specifications.

Where fire extinguishers are installed they will have to be serviced and maintained on a scheduled basis. All decommissioned fire equipment will have to be distinctly demarcated as not in use (eg. either by signage or change of colour coding). The following assumptions have been made:

2.1.1 The existing fire ring main supply on the island is in use and in working condition – based on maintenance stamps on the existing fire hydrants.

2.1.2 There is adequate bulk water storage/alternative water source (eg. sea water) for fire water compliant with regulations.

2.1.3 Based on the above, then the regulations require a fire hose reel system for the School, Ou Tronk and Maximum Security Prison.

2.1.4 The Kramat only requires fire extinguishers.

2.1.5 The Medium Security Prison is going to remain classified as is.

The Client needs to verify if there are any rare/original exhibits that might require a dedicated fire extinguishing installation. For these parts the correct main fire extinguishing system as well as dedicated extinguishing systems must be determined, eg. the use of water could destroy/damage certain artefacts.

3 WET SERVICES

All wet services have been reviewed for compliance with regulations. Wet services no longer in use are to be disconnected and decommissioned. Where restoration of ablutions is to be undertaken, it is recommended that separate public bathrooms be erected along with new water supply and wastewater reticulation systems. These are to tie into existing services. It is difficult to say with certainty that the condition of old or mothballed pipe systems not be corroded or leaking. The following assumptions have been made:

3.1.1 Bathrooms at the School and Ou Tronk have heritage value and are to be restored only. Separate ablution facilities are required to be purpose built to modern standards to facilitate the proposed training centre.

3.1.2 Water is still used at the Kramat as a place of worship. The wash area will have to be renovated.

3.1.3 New water supply lines will need to be installed to any new ablutions facilities such as at the Old Tronk and School.

4 HVAC

The existing Heating and Cooling at the sites has been reviewed. The cooling system in the restaurant at the Medium Security Prison consists of two ducted systems. Only one was operational when inspected. Poor installation and placement of condenser at the Kramat requires attention. Either a temporary solution can be employed, or a permanent solution is to be installed. A permanent HVAC system will require additional space for locating condensers, while a temporary solution will require storage space for portable air conditioners. The following assumptions have been made:

4.1.1 The Medium Security Prison is to remain as is and the restaurant remain operational. As such the second air conditioning unit needs to be made operational.

4.1.2 No additional areas are to be heated or cooled mechanically.

All areas will be evaluated for ventilation compliance with the building regulations. The following assumptions have been made:

4.1.3 All existing systems no longer in use will be decommissioned eg. fume extraction in kitchens and mess halls in the Maximum Security Prison.

5 ASSESSMENT

5.1 Fire

Based on the Building Classification Codes, the following Fire Safety needs to be adhered to in accordance with SANS 10400-T (2011) Fire Protection:

All structural walls assessed are constructed of either: stone clad concrete blocks or double skin, plastered brick and are considered Type FR, with a fire resistance time of 60min.

5.1.1 Ou Tronk:

The buildings at the Ou Tronk are in a poor condition. As these buildings are generally classified as C2, Exhibition Halls, the following requirements apply and need to be implemented:

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected. To be substituted by 2x 9kg DCP Fire Extinguishers if no water supply is available.
- 1x 9kg DCP Fire Extinguisher per 200m^2, or per building.
- 1x Manual Call Point, Emergency Siren and Light.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

5.1.2 The Kramat:

The Kramat remains a place of worship and is not an Exhibition. Therefore, the building is classified as A4, a Place of Worship. As such, the following requirements apply and are to be implemented:

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected. To be substituted by 2x 9kg DCP Fire Extinguishers if no water supply is available.
- 1x 4.5kg DCP Fire Extinguisher per 400m^2, or per building.
- Emergency Exit signage is to be placed above Exit doors

5.1.3 Maximum Security Prison:

The prison is no longer in use and as such, the building classification is not as a Place of Detention. Rather, the Maximum Security Prison is occupied by Offices and Exhibition Halls. The total area is divided into two parts; the Exhibitions and Offices. As such the office spaces are classified as G1 and the exhibitions as C1.

The following fire regulations apply to the Office space – G1:

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected.
- 1x 4.5kg DCP Fire Extinguisher per 200m^2, or per building.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

The following fire regulations apply to the Exhibitions, the old prisons – C1:

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected.
- 1x 9kg DCP Fire Extinguisher per 200m^2, or per building.
- 1x Manual Call Point, Emergency Siren and Light.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

5.1.4 Medium Security Prison:

As with the maximum security prison, the medium security prison no longer operates as a place of detention. Rather, the medium security prison has been renovated to accommodate a dormitory and offices. These spaces are classified as H2 and G1 respectively.

The following fire regulations apply to Dormitories – H2

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected.
- 1x 4.5kg DCP Fire Extinguisher per 200m^2, or per building.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

The following fire regulations apply to Offices – G1

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected.
- 1x 4.5kg DCP Fire Extinguisher per 200m^2, or per building.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

5.1.5 School:

The school is to remain as a place for tuition and will be converted to a training facility. As such the space remains classified as A3, a Place of Instruction. The following fire regulations apply to Places of Instruction.

- 1x 30m Fire Hose Reel positioned such that the end of the hose reaches any point in the area to be protected.
- 1x 4.5kg DCP Fire Extinguisher per 200m^2, or per classroom.
- 1x Manual Call Point, Emergency Siren and Light.
- Emergency Exit signage is to be placed above Exit doors
- Running Man Emergency Route signage is to be place in corridors where a clear exit is not visible.

5.1.6 Summary

Table 1 below summarizes the existing fire protection and the required protection and aims to provide a high level cost estimate of the fire related recommendations. These need to be verified in conjunction with the Project Quantity Surveyor.

Place/Area	Existing Fire Protection	Additional Notes	Additional/Required Fire Protection
Ou Tronk	1x Fire Hydrant		7x 9kg DCP Fire Extinguishers 7x Emergency Exit Signage 2x Running Man Signage 1x 30m Fire Hose Reel plus 25mm piping 1x Manual Call Point 1x Audio and Visual Alarm System
The Kramat	None		1x 4.5kg DCP Fire Extinguisher 1x Emergency Exit Sign
Maximum Security Prison	Fire Signage Fire Extinguishers Fire Hydrants	In corridors where an exit route has been established and there is a change of elevation, no handrails have been provided. This is to be corrected. Old Fire Hose Reel cabinets have been left on site with the FHR removed. These are not clearly marked and may be misleading to fire officials.	5x 30m Fire Hose reel plus 300m of 25mm piping 1x 9kg DCP Fire Extinguisher 2x 4.5kg DCP Fire Extinguishers 2x Handrails at change of elevation. 1x Fire Hose Reel Inoperable Signage 2x Emergency Exit Signage 1x Running Man Signage 10x Manual Call Point 10x Audio and Visual Alarm System
Medium Security Prison	Fire Signage Fire Extinguishers Fire Hose Reels Fire & Smoke Detection Manual Call Points Audio and Visual Alarms	In corridors where an exit route has been established and there is a change of elevation, no handrails have been provided. While Fire Protection is to code, a fire hose was found abandoned in the courtyard, far from the Fire Hydrant. Some Fire Detection elements are hanging from the ceiling and should be reattached.	3x Handrails at change of elevation along emergency escape routes. Clear Emergency Exits in Dormitories. Reattach hanging smoke detectors.
School	1x 9kg DCP Fire Extinguisher	The school has hooks and backboards for additional Fire Extinguishers. These have been removed. It is recommended that manual call points and alarms be placed in each major building on this site.	2x 30m Fire Hose reel plus 100m of 25mm piping 10x 4.5kg DCP Fire Extinguishers 10x Emergency Exit Signage 4x Running Man Signage 3x Manual Call Point 3x Audio and Visual Alarm System

Table 1: Fire requirements summary for costing

5.2 Wet Services

All wet services have been reviewed for compliance with regulations. It is recommended that wet services no longer in use to be disconnected and decommissioned.

5.2.1 Ou Tronk:

No water supply was found to be operational on this site. It is recommended that a similar solution be implemented for bathroom facilities as was done at the maximum security prison; that is, to have separate prefabricated washrooms for visitors. All other water supply and wastewater can be isolated and disconnected to the site.

5.2.2 The Kramat:

The water supply to the wash area outside the Kramat is operational. A tap is broken and the polycop supply pipe is exposed and looks messy. It is recommended that the whole wash area be renovated along with the drainage and water supply.

5.2.3 Maximum Security Prison:

While water and wastewater has been disconnected in most parts where it is no longer required, the A and C-Section showers still have running water. These can be isolated and disconnected from the water supply and wastewater systems.

The hot water reticulation system running from the outhouses and along the internal walls of the precinct are old, corroded and falling apart in places. This must either be removed in its entirety, or fully restored.

5.2.4 Medium Security Prison:

Water supply to the Medium Security Prison is adequate and in a working condition along with electric hot water geysers. The garden tap in the courtyard behind the conference room (building 165) is inaccessible. Vegetation in the area should be trimmed back or removed.

5.2.5 School:

The school's external ablution facilities and bathrooms do not have running water and are in a state of disrepair. The bathrooms are currently too small for the anticipated number of people to be trained at the facility and, as such, it is recommended that separate prefabricated ablution facilities be erected to cater for the training facility. All water services to the existing bathrooms are to be isolated and disconnected.

The kitchen still has water supply and waste water systems operational and should remain as such if the kitchen area is to be maintained. All other water supply and wastewater services can be isolated and disconnected on site

5.2.6 Summary

Table 2 below summarizes the existing wet services and the required remedial work and aims to provide a high level cost estimate of the wet services related recommendations. These need to be verified in conjunction with the Project Quantity Surveyor.

Place/Area	Existing Wet Services	Additional Notes	Additional/Required Wet Services
Ou Tronk	None	Add new ablution facility for visitors.	New prefabricated ablution facility for visitors. (TBC)
The Kramat	Wash Area	Broken tap, poor drainage and messy polycop water supply pipe installation. To be restored and renovated.	1x plastic tap Remedial Work
Maximum Security Prison	Mostly disconnected Separate visitor ablution facility Water to Office Kitchens and bathrooms	Isolate and disconnect water supply and waste water system in A and C Section shower facility.	Remedial Work Remove or restore hot water lagged piping.
Medium Security Prison	Water supply to restaurant, offices, conference room and dormitory bathrooms.	Courtyard tap is inaccessible due to vegetation overgrow.	Maintenance.
School	Water supply and waste water system to Kitchen is adequate.	Add new ablution facility for trainees.	New prefabricated ablution facility for visitors. (TBC)

Table 2: West Services requirements summary for costing

5.3 HVAC

The heating, ventilation and air-conditioning for the site is largely up to standard, while some maintenance is required for some services. Below is a detailed description of the HVAC services on the sites.

5.3.1 Ou Tronk:

The buildings at the Ou Tronk are naturally ventilated and meet SANS codes for ventilation. This is done by means of openable windows and air bricks.

5.3.2 The Kramat:

The Kramat has two split unit, 5.5kW cooling air-conditioners. Their respective condensers are placed on the roof of the Kramat. A heat load calculation shows that there is sufficient cooling for the required 8.5kW of cooling. The installation is however messy. Three options are suitable subject to heritage architect's and Client approval.

Option 1 (Least obtrusive):

It is recommended that all existing HVAC systems be removed, and the building made good.

The nearby watchtower or a separate building is to be built and used as a plant room where a packaged system is to be located. The condenser will be naturally ventilated, and warm air expelled through a duct. Cooled air is to be ducted underground in lagged ducts to the entrance of the Kramat and cut and chased along the plastered entrance wall. A supply grille will be situated inside the building. Return air will be extracted in the same manner along the adjacent plastered wall and expelled at the stairs or ducted back to the plant room and then expelled.

This is the least obtrusive, permanent way of effectively cooling the space and may cost in the order of R90 000-R110 000.

Option 2 (Semi-obtrusive)

It is recommended that all existing HVAC systems be removed, and the building made good.

One or two small packaged units are to be placed outside adjacent to the building at low level. The cool air will be supplied into the building via supply grilles at low level. The external packaged unit is to be fenced with a lattice in keeping with the architectural style as determined by the heritage architect.

This semi-obtrusive installation reduces unsightly pipes and ducts, but requires space and placement nearby the building. The solution may cost in the order of R60 000-R80 000.

Option 3 (Temporary solution)

It is recommended that all existing HVAC systems be removed, and the building made good.

As the building is seldom used and requires cooling for short periods of time, two externally placed portable air-conditioning units are to be used. These are to be ducted to a fitting and attached to the openable windows' frame. The portable air-conditioners will provide cooling for a period of time before being stored elsewhere.

This temporary solution is based on the building's intermittent use and questions the need for a permanent cooling. This solution has no permanent HVAC feature nor heritage impact on the site and as such, this solution may cost in the order of R30 000-R40 000.

5.3.3 Maximum Security Prison:

The only ventilation applicable at the Maximum Security Prison is at the kitchen and mess hall. The extraction fans are to be electrically isolated and disconnected and the fans decommissioned.

5.3.4 Medium Security Prison:

There are extraction fans in the bathrooms on this site which comply with regulations and are in working condition. There are several air-conditioning split cassette units in the conference room, and arts facility. These are correctly sized for the area and in working condition. There is also air-conditioning in the restaurant area. Two ducted systems cool and ventilate the area, however, during the time of inspection only one was working. There are also leaks present in the ducting of the one system which requires maintenance.

5.3.5 School:

The school is naturally ventilated via 30 wall grilles. Three require replacing on the South West facing wall. There are a further two in the front of the school which are covered by sand on the outside and should be uncovered to allow for adequate ventilation to the rooms.

5.3.1 Summary

Table 3 below summarizes the existing HVAC services and the required remedial work and aims to provide a high level cost estimate of the HVAC services related recommendations. These need to be verified in conjunction with the Project Quantity Surveyor..

Place/Area	Existing HVAC Services	Additional Notes	Additional/Required HVAC Services
Ou Tronk	None	None	None
The Kramat	2x 5.5kW Split A/C units 1x Air Curtain	The Air Curtain is noisy and the location of the condensers of A/C units cannot be accepted from a heritage stand point along with the installation of the piping to the A/C system.	Option 1: 2x Supply and Return air grilles 1x Small packaged system 1x plinth 1x extraction fan Construction Installation of new piping Option 2: 2x Supply and Return air grilles 1x Small packaged system 1x plinth Lattice Fence Ducting Option 3: Modification of windows frames 2x Portable air conditioning units
Maximum Security Prison	Extraction fans at kitchen	Electrically isolate and disconnect extraction fans.	Remedial Work
Medium Security Prison	Bathroom extraction fans, Cooling in Arts Room, Conference Room and Restaurant	Maintenance is required on the Restaurant Units. One unit is not working and ducting has leaks.	Maintenance.
School	Naturally ventilated by wall grilles	3 x Remove, replace and make new wall grilles on south west wall. Paint all other grilles 2 x Unblock wall grilles on east facing wall.	3 x wall grille Paint Maintenance.

Table 3: HVAC requirements summary for costing