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WANGANUI

31 October 2007

Collection Storage Meeting and Report

Dear Greg,

Attached please find a brief report as requested to assist with your preliminary planning in finding a solution to the storage issues discussed in our meeting on 17 October.

This is of course not a comprehensive planning document; in order to prepare that level of documentation a team consisting of conservator, architect, Sarjeant staff and WDC officers would need to work together to develop the appropriate parameters.

If you have any questions you wish to discuss as a result of this report, please do not hesitate to contact me.

In the meantime I take the liberty of enclosing an invoice for the time spent on site and report preparation.

Thank you and regards,

Detlef Klein

Sarjeant Art Gallery
Collection Storage Issues

Preliminary Evaluation & Interim Recommendations
Following a Site Visit on 17 October 2007

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Introduction

Sarjeant Art Gallery Senior Curator Greg Anderson requested *Manawatu Museum Services Ltd* to prepare a preliminary overview and evaluation of issues associated with the current storage of the Sarjeant Art Gallery collection and to this end a meeting was held on Wednesday 17 October 2007.

Following a brief inspection of the collection storage facility in the basement of the Sarjeant Art Gallery and the current off-site store on WDC premises, an alternative proposed venue for the entire collection in Park Place (the former Mitre 10 Building) was viewed from the outside.

This report reflects the approximately 90 minute meeting, with an evaluation of the apparent issues as well as making some preliminary recommendations.

Observations and recommendations are of necessity indicative only at this stage.

Within this limited context it is not appropriate to speculate on possible costs associated with the various scenarios that are presented as possible solutions to identified collection storage issues.

Present at the meeting were:

- Greg Anderson, Senior Curator
- Dennis Rainforth, Collection/Building Manager
- Detlef Klein, Conservator/Museum Consultant

Summary of Issues Discussed on 17 October 2007

1. Sarjeant Art Gallery: Existing Storage Facility

Situated in the basement of the building, the total available floor space for collection storage is approximately 200 m^2. This overall space is divided into seven small areas largely defined by the architectural features of the basement. Other areas include a small photographic dark room, a space for matting and framing and a space for photography.

The basement was not originally designed as a collection storage facility and has become this by default – as the original collection developed storage became a necessity and moved into the basement, a natural progression.

1.1 Conditions

- The ceiling height is very low with structural arches further reducing the height in many areas
- Floor levels vary
- Masonry surfaces (walls and ceiling) are very rough with open pointing
- Retro fitted HVAC services for the galleries above intrude into the space
- No direct environmental control
- The collections are densely packed into the spaces fitted out with a variety of largely makeshift shelves and rack systems

Sarjeant Art Gallery: Collection storage in the basement

1.2 Evaluation

Never designed as a storage facility for the safe keeping of artworks, the basement storage area of the Sarjeant Art Gallery cannot meet the basic requirements of contemporary museum practice.

Adhoc improvements through the custom fitting of racks and shelving over the years have not addressed the fundamental issues: the constraints of the architectural space in the basement itself.

Further, the sheer volume of the material culture housed in the basement poses significant access problems. This impacts negatively on staff efficiency and moral, creates risks to the physical safety of the artworks with associated future restoration costs and influences sector perception in respect professional credibility.

The concept of *Preventive Conservation* is based around a rational analysis of all those factors that contribute to the deterioration (damage) of collections in museums and art galleries. Simply put, no damage means no cost for repairs. Damage is caused through physical influences as well as through gradual deterioration of the materials themselves. Smart collections management practice identifies potential hazards through physical or environmental stress and mitigates these by creating a suitable physical environment and implementing best practice procedures. While this costs money to set up and maintain, the bottom line economy is similar and analogous to running a motor vehicle – providing a garage and regular service checks are cheaper in the long run than the otherwise costly repairs to body and mechanical parts. However, while a motor vehicle is replaceable, artworks are not. Further, artworks in good condition appreciate in value.

1.3 Implications for the Management of the Collections

- Access is restricted: artworks are not easily assessed for damage or their suitability for exhibitions
- Routine work such as housekeeping and cleaning of floor spaces is possible only with great difficulty because artworks block access to corners and floors
- The rough walls with open pointing collect dust and create dust since it is not possible to seal mortar surfaces in cavities with paint. These also provide hiding places for insects
- HVAC ducting intruding in the art storage spaces create a very dry and warm environment which causes dimensional change stress to the artworks
- Environmental control to more ideal conditions is not possible

- Simple preventive conservation measures are very difficult to implement
- Risk of accidental damage to artworks through awkward handling and artworks knocking against each other
- Evacuation of artworks in the cramped spaces becomes quasi impossible in an emergency
- Other implications include sector credibility in the widest sense including the 'trustworthiness' or not of the Sarjeant as a suitable venue for bequests or travelling exhibitions

1.4 Options for Improvement

Improvement of the described conditions is possible with the following caveats:

- Not all of the current collections can be accommodated in the basement of the Sarjeant Art Gallery, at a guess probably only 30% of the current volume if the purpose is to create storage conditions along contemporary practice and standards
- The entire basement would require evacuation for the duration of a project of renovation
- Existing HVAC ducting for the Galleries must either be removed or isolated from the storage spaces with a sealed wall

When considering the significantly reduced capacity of a fully refurbished basement, the question should be asked

a) whether it is desirable to split the collection
b) what part of the collection would be kept at the Sarjeant
c) why would a part of the collection be housed in a refurbished basement and not elsewhere

It is conceivable that there are advantages in housing certain collection categories within the premises of the Sarjeant Art Gallery. These may be the works on paper collection or photographic collections because paper is highly sensitive to fluctuations in the environment such as would be experienced during transfer to and from the off-site store. Or it may be the ceramics collection because these items are so fragile and at high risk of accidental damage during transport.

Irrespective however of whether the basement is refurbished to a modern collections storage facility or not, the problem of where to store the bulk of the collection remains.

Suitable and permanent off-site storage must therefore be part and parcel of any discussion of how to best house the collection of the Sarjeant Art Gallery.

2. Off-site Storage Facility at WDC Depot

A part of the collection has been housed in a temporary storage facility at the council (WDC) depot in Cook St since 1 November 2005.

This storage space is approximately 275m^2 with mezzanine floors providing an additional 100m^2 of storage.

The building is a commercial structure with no provisions for insulation. The roller door access is not isolated from the storage space and allows free access to insects and dust, as well as windborne salts whether open or closed via the gap at the top of the roller door.

Security is provided through the extra fencing and gate access to the compound.

The collections share the available floor space with art crates, exhibition furniture and miscellaneous other material.

2.1 Conditions

- no insulation
- large fluctuations in relative humidity and temperature
- dust and insect problems
- trucks backing into the roller door opening discharge diesel fumes into the storage space
- no work room facility
- no photographic area
- no custom racking or shelving

2.2 Evaluation

Never designed as a storage facility for the safe keeping of artworks, the off-site storage facility for the Sarjeant Art Gallery can also not meet the basic requirements of contemporary museum practice.

2.3 Options for Improvement

It is understood that the Sarjeant Art Gallery collection has to be moved from this facility because it is needed for another purpose.

A new off-site store has to be found and it follows that this storage facility should be spacious enough and suitable to comfortably house all the collections in the

basement of the Sarjeant plus those collections currently in the off-site store. This would allow for a re-evaluation and refurbishment of the basement. Given that a small percentage of the collection may return to the basement of the Sarjeant, the free space in the new off-site store is able to receive new acquisitions. Properly designed and conceived, the new off-site store must be able to accommodate any new acquisitions for at least 20 years into the future.

Anticipated collection growth is of course a matter of policy and curatorial discretion so will not be the subject of any speculation in this report other than to signal that this must be part of the planning process.

3. New Off-site Storage Facility

The old Mitre 10 building in Park Place was viewed as a potential new off-site store.

Given appropriate adaptive redesign and fit-out specifications, the building would have been a very good venue as a collection store.

This building is no longer available; however it may serve as a discussion model because the adaptation of the building for collection storage presents some typical issues.

In the appendix is a generic catalogue of requirements for buildings to be designed or adapted for the storage of museum or art gallery collections.

The emphasis is on a high level of insulation that substantially exceeds the building code norm, high quality interior finish, auxiliary facilities such as curatorial workspaces and staff facilities and security.

Corridor spaces between shelving systems must allow for the risk free movement of the largest object in the collection to and from its designated storage location.

Air-conditioning (HVAC) may or may not be necessary: ideally temperatures should be around 21^{o} C and relative humidity (RH) at 45 to 55%.

More important however is a constant environment with minimum fluctuations: if the average temperature is 18^{o} C and RH no less than 45% and does not exceed 60% with a daily variation of less than 5%, and if this can be achieved reliably without a HVAC system then it is useful to consider the options.

A building that relies on expensive and inherently unreliable HVAC systems to achieve the above parameters has insufficient thermal mass and inadequate insulation.

At any rate, whether or not an HVAC system is installed, good insulation will significantly reduce the running costs of the HVAC system. The initial higher expense of refurbishment is soon recovered.

4. Preliminary Recommendations

Recommendation 1

Establish a planning team that should include Sarjeant staff, WDC officers and independent conservator

Purpose 1:

To comprehensively evaluate the shortcomings of the present collection storage facilities, and develop a brief for a new offsite collection storage facility, and agree on a planning timeline to implement a collection storage project

Purpose 2

Identify likely premises within Wanganui that can accommodate the collection in terms of space potential, can be modified and adapted for the purpose and is available on a long-term lease (20 years minimum)

Recommendation 2

Commission an architect to work with the planning team of Sarjeant staff, WDC officers and independent conservator to develop the architectural and building specifications for the adaptation of the identified building

Recommendation 3

Move the entire collection to the new off-site store once this is ready and prepared to the specifications required

Recommendation 4

Commission an architect to work with the planning team of Sarjeant staff, WDC officers and independent conservator to develop the architectural and building specifications for the refurbishment of the basement of the Sarjeant to suit the needs of contemporary collections management work: design curatorial workrooms, photography space, darkroom and staff facilities as well as collection storage spaces for certain collections still to be identified

5. APPENDIX

5.1 Preventive Conservation

Current museological practice defines the concept of *Preventive Conservation* as the most cost effective way to prevent damage to collection items by mitigating the destructive influences of humidity, temperature and light; further, by addressing the potential threat to collections through fire, theft, pests and inadvertent damage caused through handling and the exhibition technology itself.

Deterioration caused or accelerated by light (fading of colors, embrittling of fibres), fluctuating Relative Humidity (RH) and temperature - shrinking / contraction of organic materials causing cracking and flaking of surfaces, is irreversible, that is, cannot be rectified through restoration treatment.

Damage or loss through fire, theft, pests or handling / display techniques may in some cases be restorable; the cost of treatment however is always greater than the cost of prevention.

Prevention of damage is therefore preferable to restoration. Preventive Conservation is not just more cost effective; the concept of *Preventive Conservation* underpins the ethically appropriate and professional management of collections, otherwise defined as responsible custodianship.

Relevant preventive conservation concepts can and should be incorporated at the design stage of any space or building intended to function for the storage or display of heritage collections.

5.2 Building Design and Preventive Conservation

5.2.1 General Conservation Requirements Checklist

Collection storage spaces, workrooms as well as display galleries should be able to meet the following environmental control specifications at all times for mixed collections:

- Relative Humidity control to within +/- 5% either side of 50% RH
- Temperature control to within 2^{o} C either side of 20^{o} C
- A well designed building requires a minimum of energy input to regulate temperature and RH. NZ Building Code insulation specifications are inadequate in this respect. A minimum of R 3.6 insulation should be incorporated at the design stage
- High quality insulation and HEPA filtered (EM 7 or better filter) passive ventilation may achieve good Museum Environments without the need for a HVAC system
- If an HVAC system is incorporated and fails, the physical characteristics of the building must be able to buffer any environmental change and prevent significant changes to the ordinary environmental conditions for at least several days
- Rate of change of conditions must be slow, therefore good thermal building mass with high quality insulation is essential
- Exterior steel cladding should be on 7mm treated plywood with insulation in the framing, and 17mm plywood on the inside
- Interior joints between roof and wall should be similar to residential buildings, that is no visible gap between the top of the wall and the ceiling or roof cladding
- Air quality – HEPA quality filters (EM 7 or better) on ventilation and/or air-conditioning units
- Visible natural light must be blocked off or easily controllable
- Ultra violet light from artificial light sources must be reduced
- Insects and vermin – effective seals to openings and construction joints
- High quality internal fit-out and finish: all concrete sealed, no exposed framing, good quality wall to ceiling joints and serviceable floor finish
- All concealed electrical ducting and plumbing must be well marked, easily traceable and accessible in the event of failure, in particular plumbing and drains
- All concrete surfaces to be sealed. Exposed concrete creates aggressive dust
- Fire sprinkler systems (wet pipe)
- Monitored security system
- Effective airlocks to all outside doors in particular around roller doors which need to be boxed to create a separate space for loading

Note*: best practice recognizes and caters for the specific preventive conservation needs of textiles, paper, wood and metal. Ideally it should be possible to modify environmental control parameters in defined collection storage spaces to best suit the various materials. For instance, metals are best stored in very dry conditions (less than 30% RH) whereas wooden objects including furniture is better stored at around 60% RH. This only makes sense however if subsequent display in exhibitions can provide the same conditions. This is why ordinarily and in practice an acceptable compromise is achieved by fixing RH levels at around 50%.*

5.2.2 Environmental Control

This is of prime importance when considering the long term effects of unsuitable environments on the preservation of historic collections as well as contemporary archives.

All damage caused by unsuitable environmental conditions is insidious in that it is not immediately apparent, and therefore it is easy to overlook the importance of monitoring these conditions constantly.

Although generally speaking people comfort is of secondary concern when designing environments suited for the long term preservation of historic collections, it is also true that climates conducive to the good health and well-being of people are similar to those recommended for archive collections.

The recommended parameters for temperature and humidity in modern collections management practice are around 18-21^{o} C and 55% RH. At these levels, long term preservation and conservation of collections is considered possible.

Temperature and humidity fluctuations can and should be reduced significantly through a high level of insulation.

The NZ Building Code provides for only minimal insulation of 1.8 R. When considering appropriate specifications for museum exhibition and storage spaces, an **insulation factor of at least 3.6 R** or better should be factored in for all walls, the ceiling and the floor.

Although double glazing or better triple glazing of large windows in particular is prerequisite to complement insulation in walls and ceiling**,** collection storage facilities and exhibition spaces are best designed without windows.

High thermal mass created by good insulation and / or building materials significantly reduces diurnal fluctuations in temperature and humidity. Further, heating and cooling costs are reduced, directly affecting operating budgets.

5.2.3 Heating

The advantages of a HVAC (*Heating-Venting-And-Cooling*) system are obvious since temperature as well as relative humidity become controllable to close parameters. However, without a well-designed building in terms of the insulation values and thermal mass, a HVAC system is not just inefficient, but also unreliable because all technology is prone to mechanical failure. Designing a storage facility where achieving the required environmental conditions depend on a continuously operating HVAC system is short sighted. The building fabric itself must be able to buffer fluctuations and ideally is virtually self regulating. If an HVAC system is not incorporated, some form of heating needs to be allowed for. Passive ventilation is very important and should be HEPA filtered (EM 7 or better filters.

Other heating options may be under floor heating together with passive ventilation. As a technology based museum, part of the permanent exhibition could be alternative energy forms such as solar heating supplemented with wind power. Heat pumps can also be used and the concrete foundation slab for the building designed to function as a heat sink, releasing stored heat over a longer period of time than energy is available from wind or solar sources. It may be possible to interest potential sponsors if the museum could be used as a showroom for this technology.

Smaller spaces within a large outer shell should also be contained with well insulated walls and ceilings because this further improves the buffer between rapid changes.

A well insulated building will keep heating costs to a minimum and, a well designed heating system coupled with a filtered passive ventilation system may even make an HVAC system unnecessary.

Any heating system or HVAC system should be designed to operate on a 24-hour 365-day basis. The system must meet high standards of reliability and cost efficiency of operation and be able to be serviced by a local maintenance firm who are capable of offering a 24 hour on call service.

A heating system or an HVAC system should be operated via a Building Management System (BMS). This must be user friendly for computer illiterate staff. The heating or HVAC system must operate as quietly as possible because staff may have to work in the collection storage area for prolonged periods of time or, in the event of collection store tours for the public, presentations by staff must not be compromised by a noisy HVAC system.

5.2.4 Interior Walls

All interior walls, including those of storage and workrooms, must be treated the same as exhibition walls. Where possible posts and pillars must be contained inside the exhibition walls to create continuous surfaces
for hanging artworks or interpretation panels. The walls are best constructed of 13 or 17mm thick flake board or plywood covered with fibrous plaster and finished to a smooth surface, sealed and painted.

Power points throughout the exhibition galleries, storage areas and workrooms at about 4m intervals. These can be hidden at the base of the walls or where appropriate in the floor.

All switches, sensors, fire alarms, and fire extinguishers to be located away from exhibition walls.

5.2.5 Light Issues

Modern design criteria for spaces intended for the storage or display of historic collections such as archives, textiles, works on paper and so forth, prescribe the control of light as essential in the preservation of those materials. This is because ***all*** light is damaging to all organic materials, in particular paper, textiles and associated colors.

Damage caused by light is manifest as embrittlement, discoloration and fading. This damage is irreversible.

Light control is most easily and reliably achieved by blocking off all natural sources of light

Window tinting to reduce the amount of certain parts of the light spectrum (usually UV) does not comprehensively achieve the desired outcome of protection of light sensitive collections, because the total amount of light (measured in LUX) does not change.

Fluorescent light must use low ultra violet fittings and be an appropriate colour temperature.

Emergency lighting must be installed also.

Compromise on this issue is only possible if one is prepared to compromise on the long term preservation of light sensitive materials.

Ideal maximum light levels in a space used for the display and storage of light sensitive materials should not exceed 50 lux for long term storage and display.

It is important to remember that even low levels of light at 50 lux cause damage, the difference being that it takes longer to manifest itself as damage.

- Window tinting to block UV (all windows, not just partially!) is recommended, but on its own is not sufficient as a means of light control. It should be done to complement other measures.

5.2.6 Other Influences

Ideally, all materials used in spaces designed for the storage or display of heritage collections will be chemically inert. In practice, this is seldom possible. It helps however to be aware of the nature of materials used, and their potentially harmful effect.

Off-gassing of harmful chemicals from paints, adhesives, carpets and wood products – these can directly affect the deterioration of organic and in-organic materials.

Generally speaking, solvent based paint and surface finishes should be avoided. Varnishes and paints should be good quality acrylic or moisture cured polyurethanes.

Solvent based adhesives must not be used.

Many wood products contain formaldehydes in the glue compounds (MDF, plywood, chipboard). Sealers (acrylic varnishes or moisture cured polyurethane) may inhibit the off-gassing of formaldehyde, but will not prevent it entirely.

High sulphur content in some carpet underlay can cause damage to metals and photographs.

Textiles used in display cases may contain sulphur compounds. Glues such as some silicones used in glass case construction will emit acidic gases. These will build up inside the confined space of the display case and can cause damage such as corrosion on metals and deterioration of organic materials.

Heat emission from lighting – type of lights used and proximity to objects and display cases. Direct light on display cases or inside the cases will create microclimates similar to a greenhouse.

UV content of lighting systems – this may nullify any attempts to reduce UV through filters on windows.

Conservators can help in the selection of less harmful materials and advise on the availability of some inert alternatives.

5.2.7 Security

Collection storage and work areas must be designed to prevent forced entry / exit at all times.

Doors and windows must be fitted with security alarms. Any ground floor windows must be fitted with security grills. All doors must be fitted with dead locks and unique keys. All fire exits must be fitted with solenoid activated locks so that they only release when the fire alarm is activated.

Security lighting on the exterior of the building will be of a type to discourage vagrants, vandals, burglars etc.

5.2.8 Dirt and Dust.

Dirt and dust cause damage to artworks and objects and will also attract insects. Any concrete surfaces within the building must be sealed to reduce dust.

5.2.9 Fire Protection

The building must meet the New Zealand Building Code Fire regulations. The materials used must be as fire proof as possible to reduce the risk and spread of fire.

Full heat and smoke sensitive alarms must be fitted throughout the building with early smoke detection in art storage areas and linked to the Fire Brigade and the building alarm systems.

A full wet feed Fire Sprinkler protection system complying with NZS4541 should be fitted throughout the building and linked to the Fire Brigade and the building alarm system. There must be provision for temporary protection in the event of Wanganui District Council supplied water not being available.

Fire Cells must be established within the design consistent with the NZ Building Code C3/AS1 to limit the potential risk to collections within the collection stores.

6. Glossary of Conservation Terminology

Acid free (card, paper or tissue)
Card, paper or tissue made from high grade pure pulp; chosen in conservation because it does not discolour or react chemically with the materials it is in contact with

Collection Management
Those activities associated with caring for museum collections or an individual item during its life within an institution. These are based on best practice procedures for documentation, conservation, care, acquisition, loan and security

Conservation
Treatment techniques or action taken to prevent or remedy the damage and deterioration of cultural property, with a minimum of restoration and repair work

Damp proofing
To prevent ground moisture from entering the building fabric via the floor or the walls

Data logger
Device that is programmed to record information, in this case the moisture content in the air (Relative Humidity or RH) and temperature variations. This is then downloaded to a computer

Diurnal fluctuation
Day and night difference or fluctuation, in this case of temperature and humidity

Ethafoam
'Inert' or chemically neutral firm and foam like material used in conservation packing because it is easily shaped to whatever form is required. Not similar and not to be confused with polystyrene, although it looks similar

Fumigation
Term loosely used to describe a variety of methods in the chemical control of insects via the dispersal of an insecticide. The process is normally a gas 'mixed' with the insecticide which is 'fumed' into a space where it can act on the target insects

HEPA filter
An extremely fine filter designed to contain even the smallest particles including mould spores. Essential in preventing the spread of mould spores and other health affecting micro-organisms when using a vacuum cleaner

Inert materials
Chemically stable, that is materials that will not react chemically when in contact with other materials, even if these are ‘chemically unstable’ (for instance, cellotape is chemically unstable and will become yellow and brittle)

Mount supports
A specially designed support system made out of inert materials so that fragile or flexible materials can be ‘mounted’ (supported) for display or storage in such a way as not to deform over time (for example, a kete without some form of internal support will over time lose its shape)

Preventive Conservation
Preservation of materials or collections by providing an environment and physical conditions that prevents damage from occurring during storage and display. Further, preventive conservation handling techniques are an awareness of and appropriate action taken to prevent accidental damage when handling taonga and objects

RH (Relative Humidity)
Refers to the amount of moisture in a given volume of air, so a measurement that determines how ‘humid’ the air is, for instance in a room

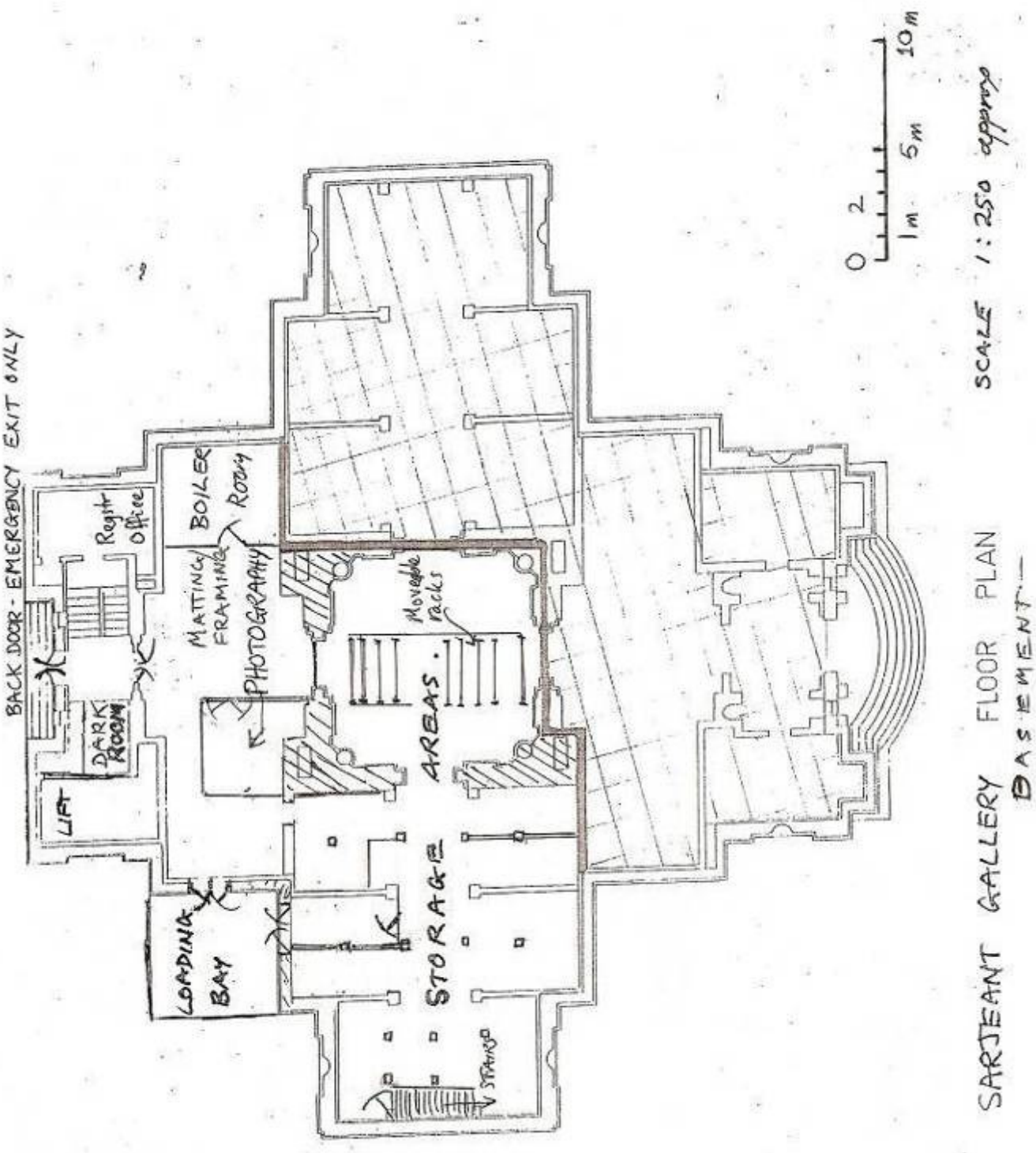
Restoration
As opposed to conservation, restoration is an attempt or process of repair whereby an object is returned to a near ‘original’ condition. It should not involve the damage or removal of any original material

Renovation
Similar to restoration but more about the improving or upgrading of the physical appearance and condition of usually a building or space

Thermal Mass
The temperature in a material and the fact that it takes longer for materials to cool down than the surrounding air. The ‘thicker’ a given material is, the longer it takes to change its temperature. This is also influenced by the type of material and factors such as insulation. The more “Thermal Mass” a building has, the more gradual any changes in temperature and by extension humidity will be

7. Floor Plan: Basement of the Sarjeant Art Gallery. Collection storage areas are marked

Drawing supplied by Greg Anderson



8. PHOTOGRAPHS

Safe access is not possible and risks damage to artworks. Cluttered corridors and impeded access are also hazardous to staff in particular during emergency evacuation procedures

Makeshift work areas place artworks at risk and affect staff morale because it creates inefficiency

Safe storage of large works is not possible