



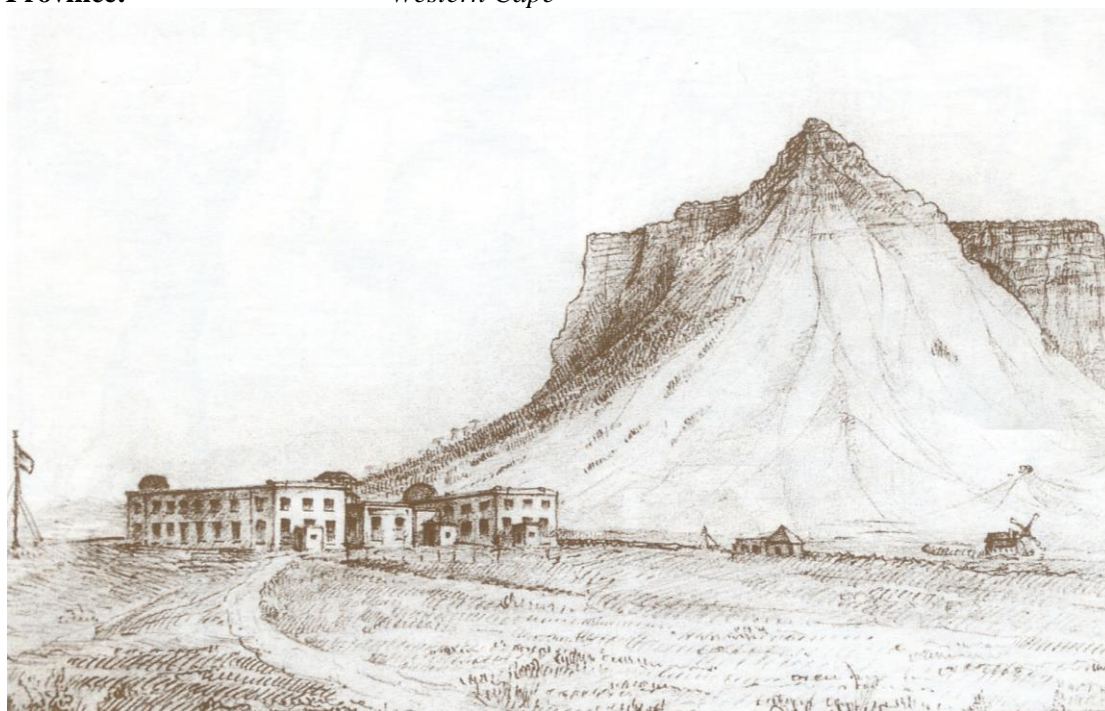
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**NOMINATION FOR GRADE 1 STATUS and PROVISIONAL PROTECTION
for the
SOUTH AFRICAN ASTRONOMICAL OBSERVATORY, OBSERVATORY
CAPE TOWN
WESTERN CAPE PROVINCE**

Based on document of 18 July 2008 to be RESUBMITTED 6 September 2013

Site and Name: *South African Astronomical Observatory*
Owner: *South African Astronomical Observatory*
City: *Cape Town*
Province: *Western Cape*



*The South African Astronomical Observatory, Observatory
Pencil drawing by Thomas Bowler circa 1834*

EXECUTIVE SUMMARY

The matter had served before the Grading and Declarations Committee on the 18 July 2008. At the time three issues were raised. These included concerns around the significance of the architecture and its colonial origins; secondly, the First Peoples presence on the site, the astronomy related activities and contribution of the First Peoples (the Ancients) and, lastly, the existence of other sites of equal significance in South Africa.

In order to address these issues a review of the document was done and several additional elements introduced. The key drivers in this regard was that of cultural landscape issues and in that manner speak to the underlying Khoi presence (this has never been proven through archaeological investigations, as per the University of Cape Town's Archaeological Contracts Office) at the Cape and how this has impacted on the larger site development. It was also felt that a serial approach would be the best to resolve the matter and those other sites would be addressed at a later stage.

Additional information has been included, expressed as an annexure to the main draft. These include the architectural survey, the landscape framework, a summary of intangible resources and an unsupported summary of the Khoi activities at the Cape. The last is included for interest only because it does speak to the issue of Khoi presence at the Cape.

1. LOCATION IN THE GREATER URBAN CONTEXT

The locality map, below, **Figure 1: Location map** shows the location of the SAAO site in respect of primordial and manmade infrastructure. Key heritage areas are identified on the map placing the site in the context of a larger heritage resource, the City of Cape Town, a city of Dutch Colonial origin with large scale Dutch and British interventions over time.

The primordial elements are Table Mountain (and its associated foothills- Signal Hill being one of these) and the Atlantic Ocean. The Castle of Good Hope is the star shaped element set just below the line linking the SAAO with the Lion battery situated on Signal Hill. The map identifies a number of heritage areas in the City of Cape Town. The key drivers in regard to the location have been that of visual connectivity. The dashed-and-dotted lines show the site's relationship to Signal Hill and the harbour related to its primordial function- that of providing ships with an accurate measure for its timing devices and also for geo-positioning relative to the sun's arc.

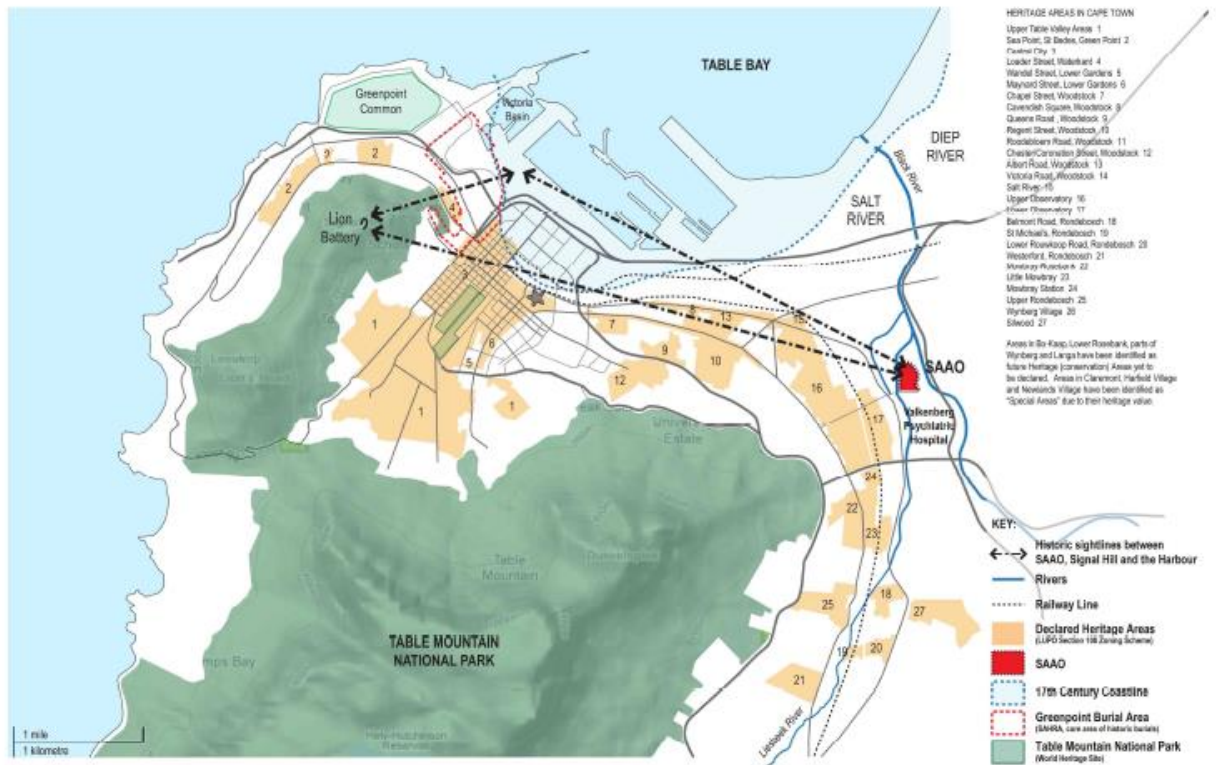


Figure 1 Location map [Baumann and Winter: The South African Astronomical Observatory: A Heritage survey (Final) - 2011:8]

2. LOCATION OF SITE: LOCAL CONTEXT



Figure 2: Local context (Google Maps)

(LOCATION OF SITE: LOCAL CONTEXT)

The Observatory (marked A in the blue balloon) itself is located on a raised hill - a corner site between two landmark developments, the Valkenberg Psychiatric Hospital (east) and The River Club (west). It is placed on the extension of Station Road, Observatory, which terminates as Observatory Road adjacent to Valkenberg Psychiatric Hospital. Observatory Road is essentially a dead-end that converges into a pedestrian bridge which spans both the Black River and Black River Parkway to give access to the Maitland Garden Village, the Oude Molen Estate and the Alexandria Hospital precinct. West and northwest of the site the Black- and Liesbeeck River confluence creates a wetland with remnants of indigenous plants, reed and wild grass. The site is further bracketed by Liesbeeck Parkway to the west and Black River Parkway to the east.

3. LEGAL CONTEXT

Section 27 (1) indicates that the responsibility lies with SAHRA to identify places of exceptional quality that should be investigated for its desirability to be declared National Heritage Sites (NHS). Section 27 (3) indicates that anybody may submit a nomination to SAHRA for a site to be declared a NHS. In this regard SAHRA may prescribe what the format and procedures for declaration are.

Section 30 deals with Heritage Registers and requires that a planning authority compile an inventory of the heritage resources which falls within its jurisdiction. The inventory should then be submitted to the relevant heritage resources authority which shall list in the heritage register those heritage resources which fulfil the assessment criteria contained in the National Heritage Resources Act [Baumann and Winter: The South African Astronomical Observatory: A Heritage survey (Final) - 2011:11].

It should be noted that the site is constituted of a number of layers. These layers are the confluence area of the Black- and Liesbeeck Rivers (creating a natural wetlands area with a large reed 'forest' and a natural bird sanctuary- now formalised), the macroscopic elements pertaining to the site [the larger built context (River Club and Valkenburg Sanatorium) and the created and historical green elements], the site itself -inclusive of all built structures and related objects of historical significance, all borne by the volume of highly significant intangible scientific contributions made to the oeuvre of astronomy and related scientific knowledge. There are also the microscopic elements, that is, the natural environment with its unique fauna and flora. These all subtend the overarching and substantial scientific verification, achievements made and the collation of scientific data on the site.

The identification and proposed declaration of the buildings and site have been on the agenda as far back as the National Monuments Council in 1998. The process, however, was thwarted by the introduction of the National Heritage Resources Act, no 25 of 1999, and the moratorium imposed by the Minister of Arts and Culture at the time. This situation left the property without any formal

protection and consequently left the site and its buildings vulnerable to possible insensitive maintenance and developmental work. One of the key reasons for the declaration would be to protect the intangible and tangible, the scientific discoveries deemed intangible and the more physical built resources for posterity.

The buildings on the site do enjoy some protection under the General Protections provision of the National Heritage Resources Act no 25 of 1999. It is specifically protected under Section 34 (1) of the Act which states that no person may alter or demolish any structure or part of a structure that is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

It is important to ensure that all work on site is done within the framework of the law. It is therefore of grave importance that the most important buildings on the site be identified and graded as part of the larger site and because of its situation and 'situatedness' within the historical context of the observatory.

In respect of the grave on the site, Sections 36(1) and 36(3) (b) states that no person may, without a permit issued by SAHRA or a competent PHRA, disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority.

4. THE CULTURAL LANDSCAPE OF THE SOUTH AFRICAN ASTRONOMICAL OBSERVATORY: THE LIESBEECK-BLACK RIVER CONFLUENCE

4.1. Preamble to the significance of the landscape

The reason for addressing the issue of the cultural landscape context of the South African Astronomical Observatory (SAAO) is to provide a background to the location and choice of site. The choice of site may or may not have been made with all these constructs in mind but they certainly play a role in our contemporary reading and assessment of the site and the SAAO's significance as a scientifically significant heritage site.

4.2. The primordial landscape

In deep time an extensive estuarine system of marshes was created by the confluence of the Black- and Liesbeeck Rivers flowing into the Salt River together with the Diep River from the north. This effectively created Paarden Island- a low level sandbank with a surface hard enough to carry the weight of a number of horses often kept there for protection and safekeeping. An 1865 map shows it as a true island because of these rivers entering the sea to the north and the south. The marshes so formed appear to have extended well inland and may have formed part of a broader wetland system stretching from Rietvlei to Zeekoevlei and to Sandvlei on the Indian Ocean side of the Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

Hippopotami, elephants and Cape buffalo may have kept open the channels and pools amongst the reed beds and Palmiet. The banks would have displayed varied pasture types for herds of grazing antelope and zebra, as well as, sand plain fynbos dominated by restios, riverine shrub and woodlands near the mountain Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

It is believed that, for millennia, small groups of hunter-gatherers followed the seasonal cycle of this landscape, collecting plants and seafood, catching wild birds and animals. They found shelter in caves and rock formations. They also constructed windbreaks and waterproof 'skerms' (shelters made of dried and leafy plants) in more open areas. This landscape began to change about 200 years ago (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

3.2. The Pre-colonial landscape

It is speculated that the seasonal nature of the Peninsula's vegetation and water supply enabled a scenario where nomadic herdsman could herd their sheep and cattle to this marshland for grazing. However, the grasses that grew in this manner were only able to support the herds for short periods of time. When the grazing receded and all but disappeared during summer they moved back into the interior where summer rains would provide much required nutrition for the cattle and sheep. This cyclical movement of large herds of domestic animals across the landscape created broad trails across the Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

The cyclical movement of these animals, more likely than not, had a significant impact on the ecology of the Peninsula and in particular the site of the SAAO and surrounds. Archaeological confirmation of hunter-gatherers and pastoralists has been confirmed elsewhere in the Peninsula but not on this site. Their existence on the site of the confluence area is however yet to be confirmed Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

3.3. The Dutch Colonial Period

Once the Dutch East India Company (VOC) established its refreshment post in the Table Valley dramatic changes ensued. The consequence of these actions resulted in pastoralists gradually being excluded from grazing their herds along the Liesbeeck River until; finally, in 1657 freehold grants were given to the Free Burghers. This in effect was the end of the Goringhauqua's use of the land for grazing. Between 1657 and 1660 this was reinforced by

the introduction of palisades along the Liesbeeck- and Salt Rivers. A wild almond hedge was planted stretching from the Salt River to the hill at Wynberg where extensive sections still remain Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).



Figure 3: Location and historical overlay map [Baumann and Winter: The South African Astronomical Observatory: A Heritage survey (Final) - 2011:9]

The green dotted line, see **Figure 3: Location and historical overlay map** above, indicates the extent of the Two Rivers Urban Park. The dotted red line indicates the old fence line. The red diamonds, starting at left and going anti-clockwise represent *Coornhoop, Ruijterwacht I, Ruijterwacht II* and *Keert de Koe*, the earliest developments in the area. The elongated light red haze indicates the broad boundary of the first frontier war. The yellow indicates the SAAD site. A series of historical settlements, occupied by the Free Burghers mark the central spine of the map. The purpose of this enumeration of interventions is the fact that it situates the SAAD in the midst of a layering of primordial, pre- and post-colonialist developments. This in and of itself adds further significance to a site of great historical value Peninsula (Above paragraph from *Two Rivers Urban Park: Baseline Heritage Study- Draft Report May 2002. Aikman Associates Heritage Management*).

The Free Burghers or Settlers grew fruit and vegetables and planted wheat between the Liesbeeck River and the main route to the south- the *Wagenpad na't Bos*, all mapped in **Figure 3** above. Their main activity though was the rearing of stock. A group of farms developed near the present day *Coornhoop* known as '*De Hollandse Thuijn*'. The homestead of another farm known as *Onderneming* is now known as *Wrensch House*, the *Westoc Homestead*, embedded in 19th and 20th century suburban developments (Aikman 2002).

Lying between *Coornhoop* and the sea was Jan van Riebeeck's own farm *Uitwyk*, later known as *Malta* farm. This farm may have lent its name to what is now Malta Road. The farm *Vaarschedrift* lay between *Malta Farm* and the Salt River. This home was also demolished in the 20th century by the Union government. It was a cattle drift between the Table Valley settlement and the interior. There were several farms between the two rivers, *Valkenberg*, *Bloemendal* and *Vredenberg*. There was little development to the east of the Black River which remained a wilderness of marshland and shifting sands and almost no land grants were made. Instead, a series of windmills were erected, the *Oude-* and *Nieuwe Molen*, all between 1780 and 1800. The road network was extended with a number of crossing points over the rivers. Besides the *Oude-* and *Nieuwe Molen* complexes the *Valkenberg* farmstead is probably the most significant remaining element from the VOC period. The extensive pastures and fields of grain have almost disappeared under suburban development (Aikman 2002).

3.4. British Colonial Period

From the beginning of the 19th century, residential, commercial and industrial development began to encroach on the agricultural landscape. Land within the Liesbeeck- and Black River area itself was largely unaffected by these processes and farming continued at *Malta* farm, *Westoc*, *Coornhoop* and *Valkenberg*. The Mostert Family, who owned a number of farms in the area, acquired *Valkenberg* in the early 19th Century and developed the property. Road networks grew significantly and so did the 19th century railway network. At the beginning of the 19th century, there were two main routes, the Main Road to the south, and to the north, what is now known as Voortrekker Road. The two rivers in the area were left- largely intact. The landscape character of the area was distinctly agricultural, essentially a patchwork of pastures for dairy cows who took water at the river, plots of vegetables and orchards, fields of winter wheat and screens of Poplars to protect them from the winds (Aikman 2002).

3.5. The Institutional Period

Although the area retained its agricultural character well into the 20th century, it was playing an increasingly institutional role. In 1827 a portion of *Valkenberg* was sold for the establishment of the Royal Observatory. A large complex subsequently developed

around the Observatory including subsidiary residential and administrative buildings (Aikman 2002).

From 1881 the institutional role grew with the agricultural character largely retained. Valkenberg was bought, for the establishment of the first reformatory, by the Cape Colonial government with money from the Porter Bequest Fund. In 1888 the reformatory moved to Tokai and the Valkenberg complex was taken over by the Cape Colonial government as a replacement for the Robben Island *lunatic* asylum that had closed down (Aikman 2002).

On the west bank of the Liesbeeck River the smaller farms in private ownership were gradually reduced in size through residential subdivision. Land along the river used mainly for dairy farming in the 20th century with the old silo in Durban Road, a relic of Louw's Dairy (Aikman 2002).

The abandonment of farming by the authorities left large, grassed open spaces, the former pasturage, unused. Along the Liesbeeck River, the neglect led to the rapid development of woodland, which is now an entirely new landscape element that screens the Valkenberg Manor House from view (Aikman 2002).

3.6. Urban infrastructure

After the Second World War, the City Council constructed Settler's Way, Black River - and Liesbeeck Parkway (1950's and 1960's) which affected the riverine landscape of the confluence area. These new systems cut through the existing historical links and spatial relationships. Valkenberg Road, which provided access to the hospital from Mowbray Village in the south, closed. The road and bridge from Valkenberg to Oude Molen was replaced with a bridge over Black River Parkway.

The canalization of the Black- and Liesbeeck Rivers was created after the flooding of the winters of 1941 and 1943. Large areas of wetland along the Black River canal developed to accommodate the Settler's Way-Black River Parkway Interchange. The development of the railway system had led to the destruction of the Salt River marshes and the Vaarsche Vlei (Aikman 2002).

3.7. SIGNIFICANCE OF THE CULTURAL LANDSCAPE ASPECTS OF THE TWO RIVERS AREA

3.7.1. Places of cultural significance

The cultural landscape qualities of the area, adjacent and, specifically, inclusive of the SAAO site, have great value as historical, social, aesthetic, architectural, scientific and environmental resources. It has associational links with past events, persons, uses, community memory, identity and oral history. The significance of the site is at the overall landscape, precinct and object scale (Aikman 2002).

The Two Rivers landscape is a complex composite of natural, cultivated and built landscape elements. It is indeed a cultural landscape expressing both artistic and innovative qualities in terms of its natural setting, architecture and patterns of planting. It possesses a number of inter-related precincts that clearly serve to demonstrate its various roles and uses as a place for indigenous hunter-gatherers, grazing grounds for herders, colonial farms, a scientific research station, a reformatory and hospitals (Aikman 2002).

The groups of buildings, patterns of planting and routes have intrinsic social, aesthetic and scientific significance and contextual significance in regard to developing an understanding of the two river's confluence inherited landscape qualities, its history and associated memory (Aikman 2002).

3.7.2. Historical Settlements and Townscapes

The Observatory complex, the Alexandra Institution, Maitland Garden Village and the Oude Molen Complex represent archetypal settlement forms in terms of layout, response to topography and architecture. Still retaining a sense of its agricultural past, the Valkenberg Homestead is the only truly farmstead building remaining on the Liesbeeck River (Aikman 2002).

3.7.3. Landscape and natural features

The cultural landscape has been shaped by the effect of water, soil and climate. Much of the riverine landscape is degraded but retains the potential of becoming agriculturally productive and ecologically functional. The institutional use of the Two Rivers Urban Park, and consequently the larger area, has ensured that the area has not been as urbanized as the rest of the land along the Black and Liesbeeck Rivers (Aikman 2002).

The Cultural Landscape possesses qualities that could yield historical evidence relating to the pre-colonial, colonial and institutional periods. The Oude Molen site, the miller's house and grain store are still largely untouched. The land near the Oude Molen complex is the subject of a debate in respect of its cultural significance by Khoi-and San interest groups. The Cape Cultural Heritage Association is pivotal in this debate. Nothing remains of the Vaarschedrift Farm. It was a VOC outpost protecting the crossing place of the river and could be of enormous archaeological interest (Aikman 2002).

3.7.4. The history of Slavery

The Valkenberg farmstead and the two mill sites date from the end of the 18th Century when slave labour played a role in the transformation of the natural landscape into a productive agricultural landscape. The Freeburghers used VOC slave labour and often owned slaves of their own. Indigenous cattle keepers who were dispossessed of their cattle were also engaged to assist in labour driven activities. When slavery was abandoned in 1838, many freed slaves remained trapped in servitude due to the Vagrancy Acts and stayed on as wage labourers on the farms (Aikman 2002).

3.7.5. Archaeological Sites, Graves and Burial Grounds and Associational Value with Persons, or Organizations of Importance.

There are a number of archaeologically sensitive sites in the area but no proper archaeological survey is available. This was confirmed in a telephonic conversation with the UCT Archaeological Contracts Office. There is a typical family graveyard on the Valkenberg farmstead site. Another of these graves is that of Fearon Fallows on the site of the Royal Observatory (more adequately discussed further in the document). He essentially founded the Royal Observatory in 1827. The Astronomer Royal, Sir John Herschel and later Sir William Porter who is associated with Valkenberg succeeded him (Aikman 2002).

3.7.6. Creative and Technical Achievements at a particular period in time

The Valkenberg Manor House represents an important example of rural vernacular architecture dating from the early 19th Century. The surviving Nieuwe Molen was based on Dutch windmill technology deemed to be the most advanced at the time (Aikman 2002). The development of the mills has its origins in the vast 17 Century drainage and reclamation projects in the area due to expanding farming activities

The Valkenberg Psychiatric Hospital, using the historical site, was designed according to the latest principles around in the late 19th Century when health authorities were moving away from prison-like conditions of the likes of Bedlam (Aikman 2002).

3.7.7. Exhibiting Particular Aesthetic Characteristics Valued by a Community or Cultural Group

The Two Rivers Urban Park of which the Observatory forms a part possesses numerous aesthetic or sense of place qualities that describes its various historic uses and roles. The trees and architecture expresses the special qualities of this area. The hospitals and other institutions have

lent a particular aesthetic to the context. The vast openness- within a highly urbanized context- underlines the contrast.

Consistent with the belief that the area holds significance for the Khoi and San people the Cape Cultural Heritage Association have begun expressing interest in formal recognition. Their, yet unqualified, claim is that the land in the context of the Oude Molen Complex, is of cultural and historical significance to them (Aikman 2002) and should be appropriately addressed. No convincingly composed physical or documentary evidence to support this claim has been presented to any of the authorities

3.7.8. Movable Objects of Cultural Significance

There are numerous collections of movable objects related to the various institutions on site. This includes the Observatory that has equipment, instruments, machinery, artefacts, art objects and furniture that would be of great significance. Over the history of the Observatory objects of heritage value have been created, stored and manufactured on site (Aikman 2002).

The enhanced significance of the observatory is the fact that there are historical links between this and other sites in South Africa. The South African Observatory has links and probably embryonic to the development of the modern observatory in Sutherland in the Karroo. The original observatory on the SAAO site has become largely obsolete as lighting levels increased and created a loom. The Observatory is currently still in use as recreational educational facility, offices and a research library.

4. CULTURAL LANDSCAPE

4.1. Global Assessment of Significance

The Black River-Liesbeeck River landscape has great cultural significance. Intrinsic to the site is its historical, social, aesthetic, architectural, scientific and environmental value. Its role is to unlock the content of past beliefs, uses, events, persons, periods, techniques and design. Locked into the places, buildings, structures and equipment, the cultural landscape has shaped the collective consciousness of all of Cape Town. It has associational links with past events, community memory, identity and oral history. It clearly has a strong sense of place expressed at the scale of the overall landscape, precinct, site and object scale (Aikman 20002). It is protected by the National Environmental Management Act no 107 of 1998.

This cultural landscape has undergone significant change over the last three hundred plus years. Each period left its mark in the form of paths, roads, planting patterns, drainage, irrigation furrows and

structures ranging from terracing to walls, dams and buildings. This has led to a complex composite of natural, cultivated and built landscape elements. It is a cultural landscape that has been transformed by thousands of years of settlement history. It expresses both artistic and innovative qualities (Aikman 2002).

There are also narrative qualities in the rich layering of physical evidence brought alive by people who worked and lived or were committed to hospitals in the area. It possesses a number of distinctive yet interrelated precincts which serve to clearly demonstrate or are strongly associated with its roles and uses as a place for indigenous hunter-gatherers, grazing grounds for herders, colonial farms, a scientific research station, reformatory and hospitals. Each of these precincts are groupings of buildings, patterns of planting and routes which have intrinsic social, aesthetic and scientific significance and also contextual significance in terms of understanding the inherited qualities, history and associated memory (Aikman 2002).

5. BRIEF HISTORY OF THE ROYAL OBSERVATORY

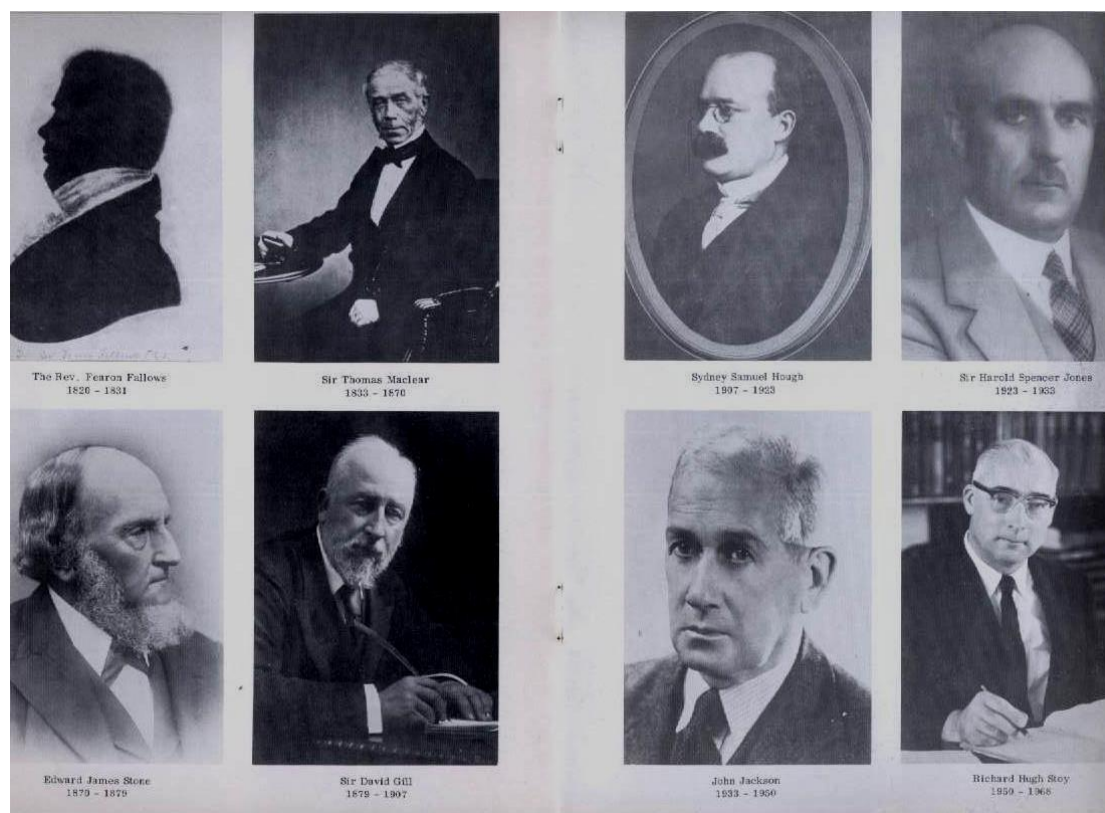
5.1. Developmental history of the Royal Observatory

Dutch and Portuguese navigators on their way to the east made the earliest astronomical observations in South Africa. The observations were made essentially for the determination of latitude and longitude. In a personal journal dating from 1652 Jan van Riebeeck logged the observation of a comet. A more specialized form of record keeping was begun when, in 1685 a party of Jesuit Priests, bound for Siam, landed at the Cape and had among its passengers **Father Guy Tachard**. A temporary observatory was set up for observation on the site which later became the Old Supreme Court. Following after Tachard, Pieter Kolb, a German, continued making astronomical observations in around 1707. Collectively, however, the two did not make any overtly significant discoveries during their tenure (Laing 1970:35).

The visit by **Abbé Nicholas Louis de LaCaille**, sent to the Cape in 1751 by the Academie Royale des Sciences de France, resulted in the *definition of many constellations* that includes Mons Mensa and the *accurate determination of the earth's radius in the Southern Hemisphere*. This was confirmed at the observatory situated at No 2 Strand Street (Laing 1970:35).

Early in 1820 the Commissioners of the Board of Longitude proposed the establishment of an Observatory at the Cape. The 'King's Most Excellent Majesty in Council' authorized the 'Lord's Commissioners of the Admiralty to cause an observatory to be erected at the Cape of Good Hope'. The Order-in-Council, which formally established the Observatory, was signed on the 20th October 1820 defining its stated purpose as that of the improvement of practical astronomy and navigation. In 1825 construction of the Main building started. The garden, Rozenhof, at 13 Kloof Street was used as a temporary observatory during the construction phase of the Observatory at Observatory (Laing 1970:8).

5.2. Royal Observatory history



The first astronomer at the Royal Observatory was **Reverend Fearon Fellows** who is buried near the entrance to the main building. His first task was to select a site for the new observatory. The location of the Observatory had to satisfy three conditions. The conditions were that it had to be in the sight of Table Bay so that visual signals could be passed to ships in the harbour; it had to be sufficiently far east of Table Mountain to have an unobstructed meridian and it had to be on Government-owned land. While awaiting the completion of the main building on Slangkop he used small semi-portable instruments to view the brighter stars. The main building was completed in 1827 with the transit instrument, the mural circle and a new Harrison clock in position. Farrows could now start the serious work. He died in 1831 from complications of scarlet fever and was buried on the observatory grounds at his request (Laing 1970:9).

Thomas Henderson (1831-1833), a lawyer by training, gave the world a catalogue of the principle Southern stars of an equal accuracy with the contemporaneous work of the best observatories in the Northern hemisphere. He was also responsible for the most accurate measurement of the distance from the earth to the moon including observations from which the distance of a star from the earth could be measured. In 1833 he also measured the light shifts in the position of Alpha Centuri, the equivalence of measuring the size of a 1 cent coin 4 kilometres away. He resigned in May 1833 and returned to Edinburgh.

Thomas Maclear's arrival in 1834 heralded a further phase in the development of South African Astronomy with the remeasuring of Lacaille's Arc of Meridian and the carrying out of massive survey work. Maclear, an Irish born physician, finally put the organization on a firm footing. Since his arrival the volume of observations greatly exceeded the limited facilities at his disposal for their reduction. He realized that an early epoch for the first accurate observations of as many stars as possible was particularly important; their reduction could be left for later (Laing 1970:10).

The Airy Transit Circle was acquired and installed in 1855 and it replaced the earlier models. He also engaged land surveying, magnetic, meteorological and tidal observations. From 1838-1847 he spent a considerable part of his time organizing and participating in the remeasuring and extension of the meridian arc that Abbé de Lacaille had measured during 1751-1753. Lacaille's measurements were affected by the mass of the mountains on either end of the arc and his results did not agree with measures made in other parts of the world

Sir John Herschel arrived 10 days after Maclear. He resided at the Cape during the period 1834 and 1838 occupying the home Feldhausen in Claremont starting what was an effective partnership and mentorship between the two.

Edward James Stone followed Maclear at the Observatory and spent his time, 1870 to 1879, largely with the reduction of Maclear's observational data. He also did a systematic survey of all the stars brighter than the seventh magnitude in the southern sky. He also found time for such investigations as the determination of the speed of sound from chronographic measures of the interval between the flash of the noon gun and the instant that the sound was heard at the Observatory. Stone resigned in 1879 and died in 1897 (Laing 1970:11).

Next to arrive at the Cape was **David Gill**. His main task was to eradicate all arrears of reductions and to recondition the existing instruments especially the Airy Transit Circle. Photographs of the bright comet of 1882 drew Gill's attention to the possibility of charting and measuring star positions accurately by means of photography. This led to the photographic charting of the whole heavens. For this purpose an Astrographic refractor was acquired. Work at the Cape significantly improved measurements of the mass of Jupiter and the moon. The beginning of the 20th century saw the Royal Observatory (SAAO) to be the finest in the southern hemisphere.

Sydney Samuel Hough worked at the Observatory from 1907 to 1923. He arrived at the time when it was being expanded to its present size. It was also being re-equipped with the finest instruments at the time. Gill had designed and obtained the instruments and Hough was responsible for bringing it into service. It was also played the role of seeing Gill's programs being brought into reality. This included the preparation of fundamental catalogues of precise star positions with the new transit circle (Laing 1970:14).

Sir Harold Spencer Jones (1923-1933) arrived at the Cape when changes and upgrading were beginning to be necessary. Equipment was increasingly in need of repair due to the lack of proper maintenance from the war years onward. He was able to replace aging equipment, modernize the accommodation and build a new office block. during his tenure the Astrographic zone was completely re-photographed.

John Jackson spent time at the Royal Observatory between 1950 and 1968 and managed the observatory with no groundbreaking discoveries made.

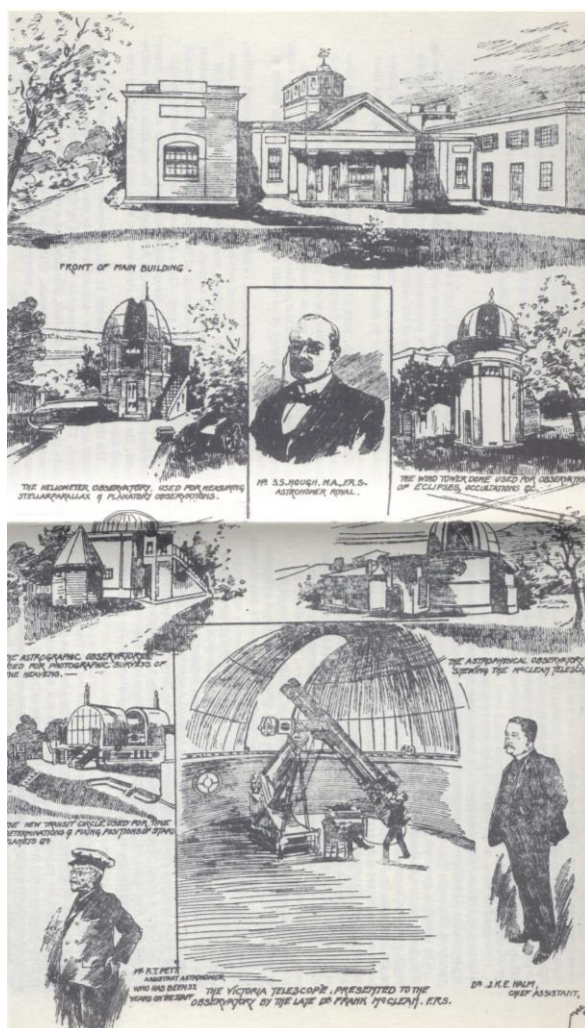
5.3. Contemporary History

The South African Astronomical Observatory (SAAO) was formed in the 1970's with the merging of the Royal Observatory, Cape Town (date of origin 1825-28), the Republic Observatory, Johannesburg (date of origin 1903) and the Radcliffe Observatory in Pretoria. The Council for Scientific and Industrial Research (CSIR) of South Africa and the Science and Research Council (SERC) of the United Kingdom in combination formed the SAAO.

The current status places it as a facility of the National Research Foundation under the Department of Science and Technology. Its prime function is to conduct fundamental research in Astronomy and Astrophysics by providing an excellent facility and by promoting Astronomy and Astrophysics in Southern Africa. A number of historic telescopes are found on site housed in a number of domes with the museum concentrating on historic scientific instruments

The headquarters of the SAAO is located on the grounds of the Observatory. The administrative headquarters, computing facilities, engineering workshops, the national library for astronomy and space sciences are located in close proximity on site. The original Observatory Building houses the offices, national library and computer facilities. The site currently houses 87 people (May 2010). 12 are students. 38 people work in the main building, 28 in the technical building, 9 in the administration building, 2 in the Ground's office and 4 in the RTC Dark Room, 5 staff and 3 students in the MRM Building. Two visiting lecturers are in the archive building near the MacLean telescope. 10 staff members are resident on site (van der Walt and Strong 2010:12).

6. PHYSICAL DESCRIPTION



6.1. The built Fabric and Associated Technical Instruments

The key buildings on the site are the south-facing Main building, a neo-Classical building of Georgian and Greek reference, and the Observatory building which houses the McClean telescope. The uniqueness associated with the telescope is its age, its associated history with colonial rule at the Cape and the scientific contributions that it has made to South African astronomical research.

The Main Building, designed by John Rennie circa 1821, has four ornate Doric timber columns with fluting of thin slivers of timber dressing the main body of the columns. It is an accurate reconstruction of the façade of a Greek temple. The building is symmetrical with two double storied wings extending to the front with two large windows with detailed surrounds within which it is set. Some of the windows on the wings facing onto the courtyard at the rear were false arising from an incorrect assumption by the architect that a window tax was applicable (Warner 1979:17). The central room initially had a centralised lantern placed there in 1824. To the rear of the main elevation, a square

tower now rises upward, currently housing some of the services of the building. Internally the building has retained some of its original fireplaces, teak joinery and two staircases built by the carpenter responsible for the stair lost in the partial demolition of the Cultural History Museum.

The parapet wall surround has an offset projection that terminates the wall and adds some ornate detailing as finishing element. At the rear of the main building a stable was built with a wall surround creating a small courtyard. In addition, this wall was the subject of a partial demolition due to its precarious overhang.

The other building of considerable importance is the observatory building housing the McClean Telescope. Frank McClean, who visited the Royal Observatory in 1890, donated the building and telescope. Herbert Baker is the designer of this building. The telescope, lift and dome turning mechanisms remain in original and in relatively good condition. Recent events have seen this condition compromised with water leakage from its hydraulic lift mechanism and some leakage in regard to the dome which was and is currently being refurbished. The McClean telescope is still in use by the public when visiting the observatory.

7. REVIEW AND SUMMARY: MOTIVATION FOR THE DECLARATION OF THE SOUTH AFRICAN OBSERVATORY FOR PROVISIONAL PROTECTION AND NATIONAL HERITAGE SITE

7.1. Historical significance as a site of pre-colonial and early colonial site of San and Khoi communities

The site has considerable significance reflecting the broad patterns of South African history as a place of conflict, contestation, incarceration and displacement (Baumann and Winter 2011:47).

This information is derived from the fact that the site is part of the larger Liesbeeck Valley which was most likely used for grazing, hunting and gathering by indigenous people in the pre-colonial period. This is; however, largely conjectural as no archaeological survey has ever been done in the area to verify the idea but logic dictates that it may indeed have been the case because of the abundance of water and grazing land. Environmental conditions of this valley were far more preferable to those in the Table Valley in the Dutch colonial period hence the move to occupy this part of the site (Baumann and Winter 2011:46). The movement and production systems by the Dutch East India Company (DEIC) and the consequent fencing, fortifying and farming activities inevitably led to conflict between the two groups (Baumann and Winter 2011:46). This was evidenced by the 1659-1660 war of the Valley when the Khoina raided the Company's stock and Free Burgher farms along the Liesbeeck- and Black River. If it is true that the site has been extensively used and occupied by the Khoi it also hints at being one of the first sites of

displacement of local communities (Baumann and Winter 2011:46).

Significance is also attached to the location of the first watch house, circa 1660, on the hill between the Liesbeeck and Black River as part of the boundary of the 'begrepen circle', land claimed by the DEIC. The watch house was called Ruitervacht and housed the mounted soldiers that patrolled the fence. The roll of the gate house was to protect the gate in the fence to the Hottentots Holland Mountains and the site of arrival from the Overberg. The area was used to herd the company's cattle outside the Liesbeeck boundary and a large stock pen was used as an alarm to 'foreign' invasions. Ruitervacht was closed when the Peninsula Khoi ceased to be grazers with a claim to the land. In 1708 the last of the surviving Macassar royalty and other dignitaries were banished to the Cape (Baumann and Winter 2011:46).

7.2. Historical significance as the oldest scientific institute in Africa founded in 1820 and the first permanent observatory in the southern hemisphere

The site is deemed to have significance in the pattern of South African scientific history and research because it offers an overview of the history of astronomy both in the local and international sphere. It speaks of the notions of a 'living site' with a history of more than 150 years, still retaining its pre-eminence in the international astronomical community. Its instrumentation is no longer technologically or scientifically useful apart from a role in public outreach programmes (Baumann and Winter 2011:47).

The SAAO continues to house its national headquarters, associated administrative offices, engineering workshops and the National Astronomical library. It is also the headquarters of the Southern African Large Telescope (SALT), an international astronomical centre. The site is further used by the Cape Centre of the Astronomical Society of South Africa which has had regular meetings on site since 1940 and will be celebrating its centenary during 2012 (Baumann and Winter 2011:47).

The site has also been a place of interest for many prominent travellers such as Darwin and Livingstone who met with Sir Thomas Maclear on site in the mid-nineteenth century. The site thus possesses uncommon and rare examples of South Africa's cultural heritage. In this context it has the potential to yield information that will contribute to an understanding of South Africa's scientific heritage and it is important in demonstrating the principle characteristics of a particular class of South Africa's cultural places or objects, namely its historic role in the international astronomical community (Baumann and Winter 2011:47).

7.3. Historical significance as the location of a number of astronomical advances of international significance from the 1830's

The *tour de force* is the site's association with the significant contributions made to the international

fount of scientific and astronomical research. These contributions include the introduction and the importation of highly sophisticated instrumentation. It was at the forefront of astronomical research and instrument sophistication. The research reservoir includes:

- The first accurate measurement of the distance to the stars elevating the research done on site into the pioneering role in this regard The most significant and most seminal of earlier achievements was the first accurate measurement of the distance to a star- Alpha Centauri- made between 1832-1833.
- The first photographic survey of the sky associated with David Gill. He was also credited with the most accurate measurement of the distance between the earth and the sun in the nineteenth century. This value became the yardstick by which all other cosmic distances are measured. This period represented a paradigm shift in astronomy from laborious and subjective eye based observations to multi-object observations which yielded a permanent objective record.
- The progression of instruments from the Transit and mural circle to the airy transit circle to the Gill RTC shows the progress in astronomical position determination over the period 1828-1905.
- Development of spectroscopy (the science of estimating the chemical composition and temperature of stars from the varying intensities of the 7 colours of the electromagnetic spectrum of which the colours of the rainbow is composed).
- The first identification of oxygen on a star in 1898- to which McClean is associated
- Being a world leader in astronomical photometry (stellar brightness) associated with the work of Cousins in the latter half of the twentieth century.
- The original location of the Magnetic Observatory accommodated in a number of structures- the so-called Wind Tower.
- The main building, the McClean telescope and the heliometers have considerable scientific significance due to the contribution made internationally during the latter half of the nineteenth century. These are all closely associated with David Gill who was regarded as one of the leading astronomers of the time (Baumann and Winter 2011:48).

A summary of the achievements of the South African Astronomical Observatory (see **Annexure A: Intangible Heritage**) indicates that a catalogue of the principle southern stars, of accuracy equal to the best observatories in the northern hemisphere, was documented. The most accurate measurement of the distance from the earth to the moon, including observations from which the distance of a star from the earth, could be measured. In 1833 the shifts in the lights of the position of Alpha Centauri was measured. The remeasuring of Lacaille's Arc of the Meridien was done. The Airy transit Circle was acquired and installed in 1855. General land surveying, magnetic, meteorological and tidal observations were also done. The systematic survey of all the stars, brighter than the seventh magnitude in the southern sky, was also done. The determination of the speed of sound, from the chronographic measures of the interval between the flash of the noon day gun and the instant that the sound was heard at the

Observatory is another achievement. The photographic charting of the heavens using an Astrographic refractor can also be ascribed to the Observatory. This resulted in the establishment of fundamental catalogues of precise star positions with the new transit circle.

7.4. Historical scientific significance in terms of the range of objects and instruments associated with major advances in astronomy during the nineteenth and twentieth centuries

The telescopes and related scientific objects form an integral component of the significance of the site. The nature of these objects, notwithstanding the fact that some are moveable contributes substantially to the significance of the site as a whole. Some of these instruments have been used consistently over a 180 year period (Baumann and Winter 2011:48). There are also a number of smaller instruments in the Astronomical Museum – the McClean Telescope is still in situ and some are in use during public open nights. Of these the most recent ones, the 18” (inch) reflector (Baumann and Winter 2011:48).

The instruments are also intrinsically linked with the architectural significance of the Main Building, designed by John Rennie during the period 1825 to 1828, *and* the Observatory Building housing the McClean telescope. The main building is a building of Georgian disposition built in the Greek Revival Style. The other significant building on the site is the domed structure and *observatory- annex* which houses the only working mechanical McClean telescope in the Southern Hemisphere. The design of the building, McClean Telescope, was by Sir Herbert Baker, a turn of the century master of architecture with a substantial portfolio in Cape Town and South Africa. The grave of the first Director (1820-1831) of the South African Astronomical Observatory, Fearon Fallows, is also on site and is set virtually directly in front of the main building.

7.5. Significance due to the association with a number of astronomers who were pre-eminent in the field during the nineteenth and twentieth centuries

The array of influential astronomers has already been enumerated above. An important association has been struck between local and international astronomers. Some of these illustrious people are-

- Robert Innes worked under Gill and identified the nearest known star- Proxima Centauri.
- Jacob Halm one of the pioneers of stellar dynamical theory
- Joan Voute who determined the first reasonably accurate distance to the nearest star and pioneered distance determination by photography.
- David Evans who pioneered high speed photometry and stellar diameter determination using lunar occultation.
- Alan Cousins a leading exponent of precision photometry (Baumann and Winter 2011:49).

7.6. Aesthetic significance in regard to a number of architecturally significant buildings with a dominant and distinctive dome typology set within a cultural landscape- encapsulated by

major two rivers, the Liesbeeck and Black Rivers at the centre of the Two Rivers Urban Park

The site is built up with a series of architecturally significant buildings with distinctive domes. The Main Building and the McClean Observatory

The foregoing paragraphs define some of the main constructs for the argument for the site's significance. In summary, several key reasons guide the decision to signify the South African Astronomical Observatory site as a Grade 1 site, with its immediate intermediate Provisional Protection, with the follow-on intention of having it declared a National Heritage Site (NHS) as soon as a CMP has been devised. In a nutshell, then, the primary motivation revolves around the significance of the volume of scientific research done on the site and the personalities and scientists involved in the discovery process.

8. RECOMMENDATION

The recommendation is therefore:

- That the entire site is seen as significant enough to warrant Grade I status.
The above rests in the historicity of the two major buildings, the associated housing, the associated socio-cultural history of and with the astronomers *and* the astronomical developments produced through research.
- That the cultural and natural setting of the landscape, its adjacency to the Liesbeeck-Black River Urban Park, i.e. the rivers, the natural vegetation and its adjacency to the Valkenburg Psychiatric Hospital- a building of some townscape and architectural presence, should be protected.
- There is also the associated planning development such as the subdivision of farms for developmental purposes, i.e. the creation of Observatory.
- The site is adjacent to the location of a historical brickyard, now long defunct, in the area immediately west of the confluence of the two rivers.
- The associated history of the Khoi and San groups that inhabited the area as part of their larger movement patterns.

9. GUIDING PRINCIPLES IN REGARD TO CONSERVATION ACTIONS AT THE SOUTH AFRICAN ASTRONOMICAL OBSERVATORY

In reading the site it is important to consider heritage management principles derived from International Charters on Conservation and best practice. Key policies were also derived from policies and principles identified in the City of Cape Town's IMEP Cultural Heritage Strategy (Baumann and Winter 2011:12).

9.1. Authenticity and integrity

Authenticity and integrity are seen as key components to any conservation action and to any conservation authority. It speaks to what is true and original. The construct of ‘authenticity’ in regard to the site relates to the physical fabric and the underlying intangible social and spatial meanings associated with buildings, spaces, places and objects.

In the case of the SAAO, significance of the scientific objects, telescopes among many objects, are housed on the site, often independent of the buildings in which they are housed. Authenticity is ingrained in the objects which are not subject to change and modification. In regard to the constructs of *authenticity* and *integrity* the SAAO encapsulates a much broader (Baumann and Winter 2011).

9.2. Layering of historical periods

In this regard the layering has to do with how early, intact, representative or rare the relevant, place or object might be. Baumann and Winter argue that it is important not to emphasise the scientific and technological developments at the expense of other aspects of the site’s evolution. Balance should therefore be maintained and all aspects which reveal the historical layering of the site should be appropriately conserved and interpreted. IN CONCLUSION

1. **TOUWS RIVER**
Astronomical Relic 1938 - 07 – 08
2. **Piketberg**
Northern Terminal of Maclear's Arc of Meridian
and treshing floor, Farm Klipfontein 1994 - 06 - 17

10. ANNEXURES

ANNEXURE A: INTANGIBLE HERITAGE

ANNEXURE B: TANGIBLE HERITAGE- THE BUILT ENVIRONMENT

ANNEXURE C: LANDSCAPE FRAMEWORK- SELECTED SUPPORTIVE

Annexure C

Photographs and Plans

Annexure D

Site Plan with proposed boundaries

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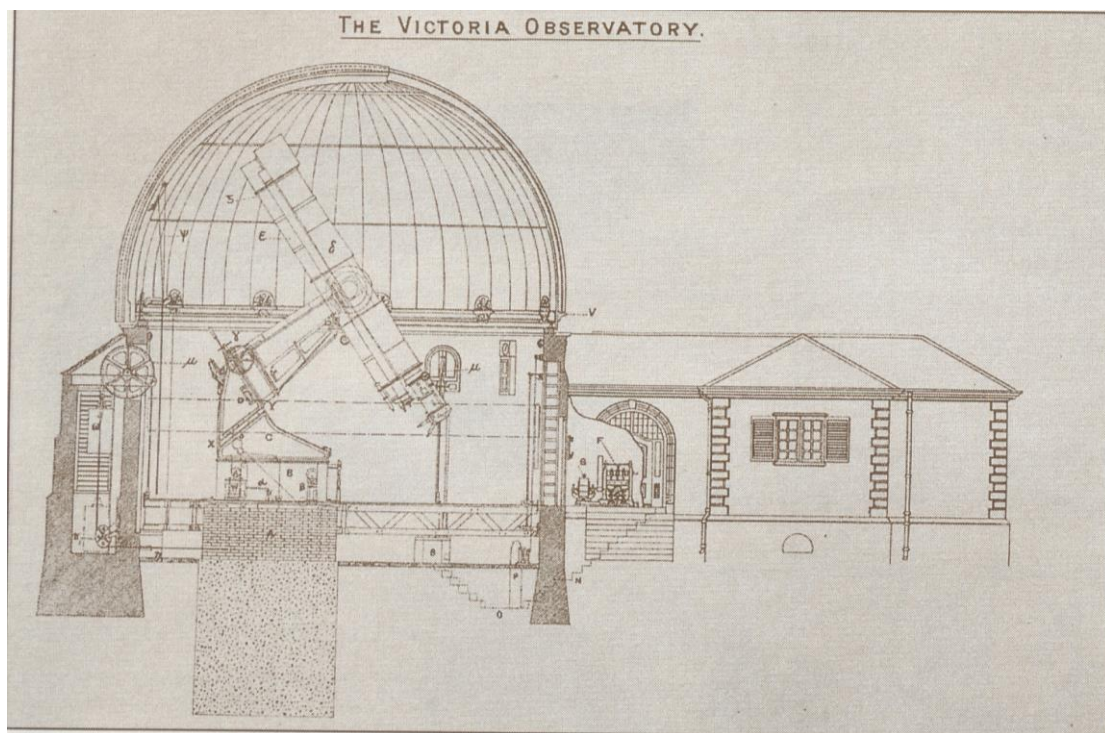
Annexure A *Locality Plan*
 Site Plan

Annexure B

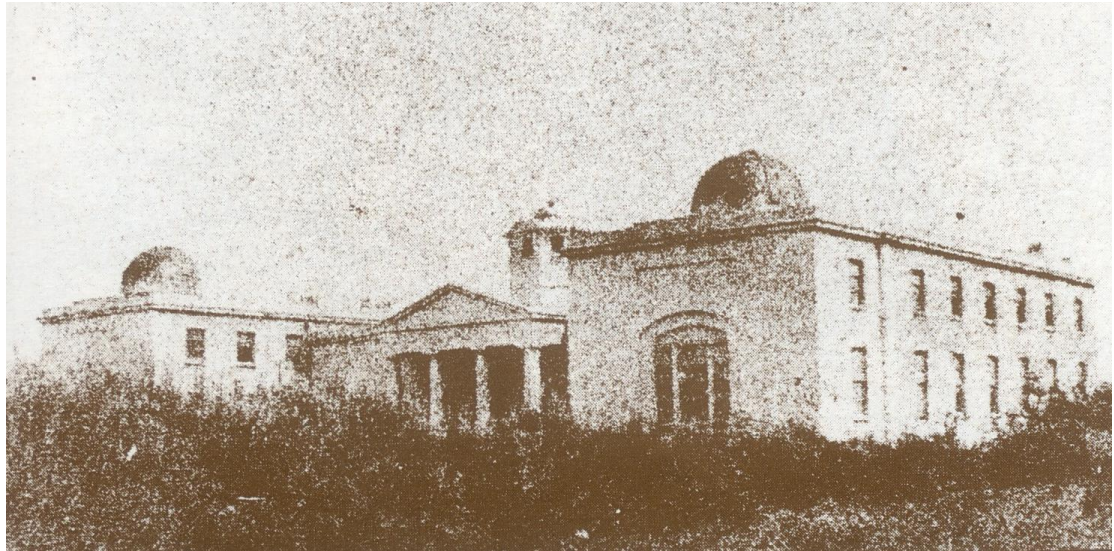
Annexure C *Photographs and Plans*

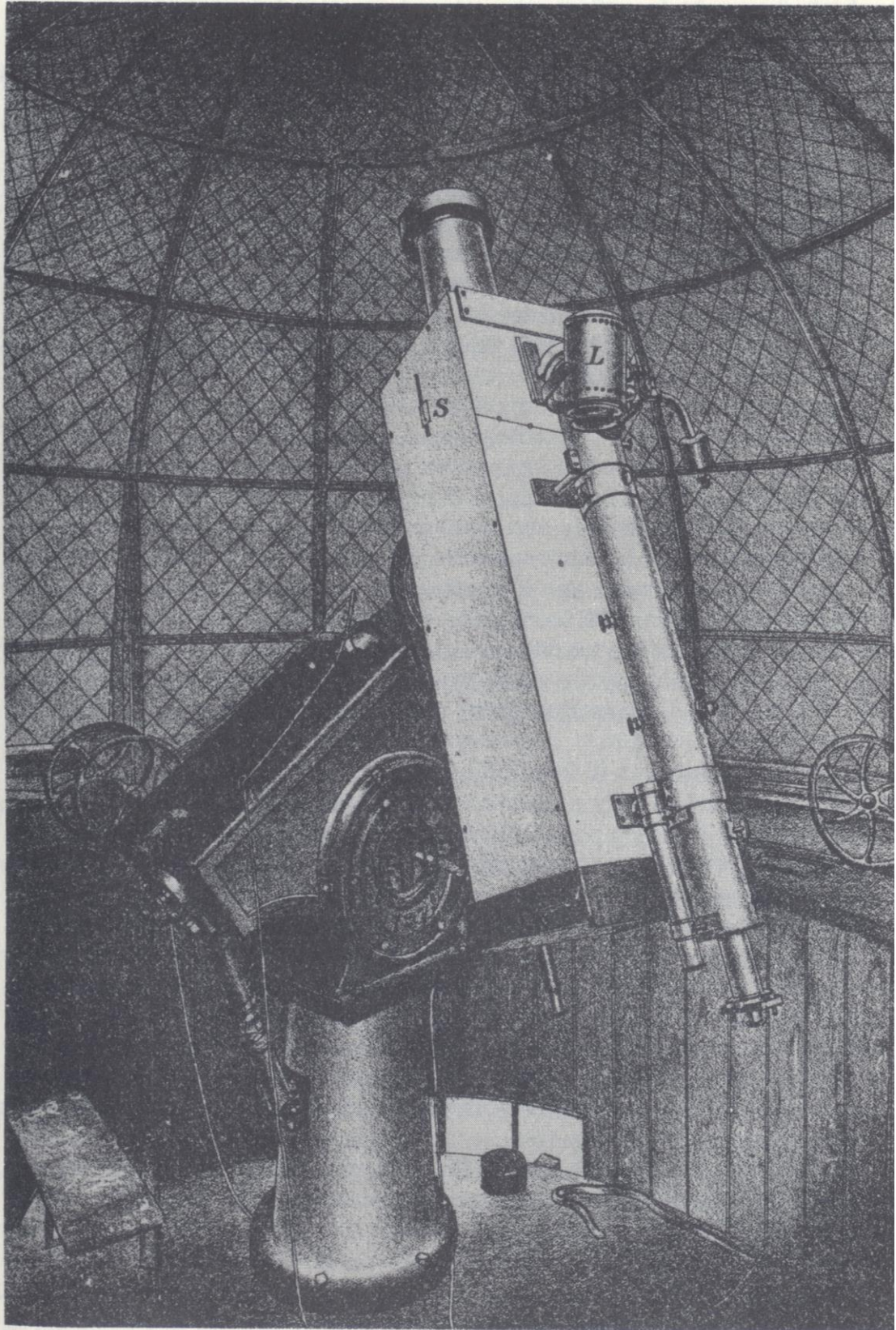
Annexure D *Site Plan with proposed boundaries*

Annexure E *Original submission for nomination*

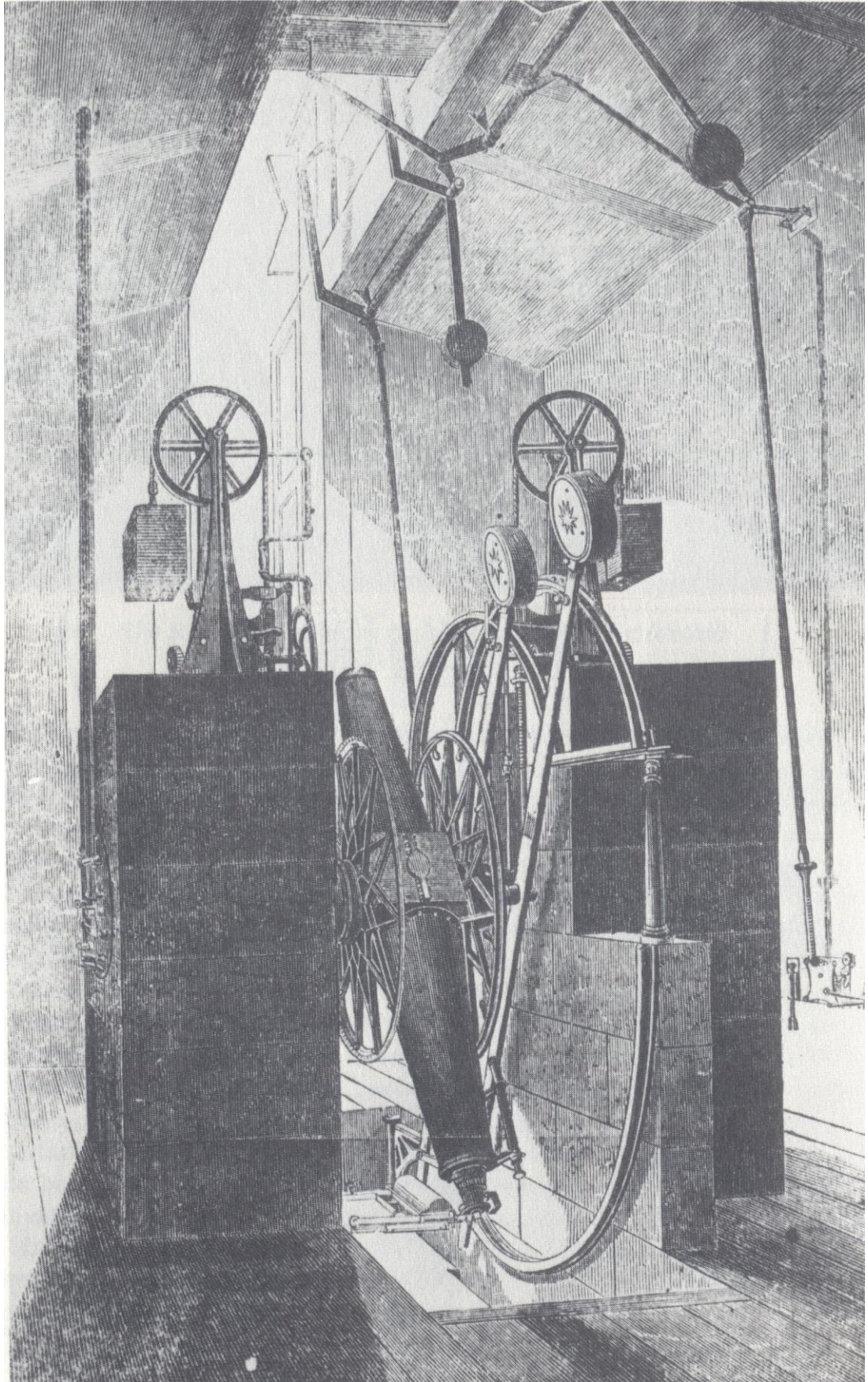


13. Plans for the Victoria telescope donated by Frank McClean, with 24-inch and 18-inch refractors on the same mounting.

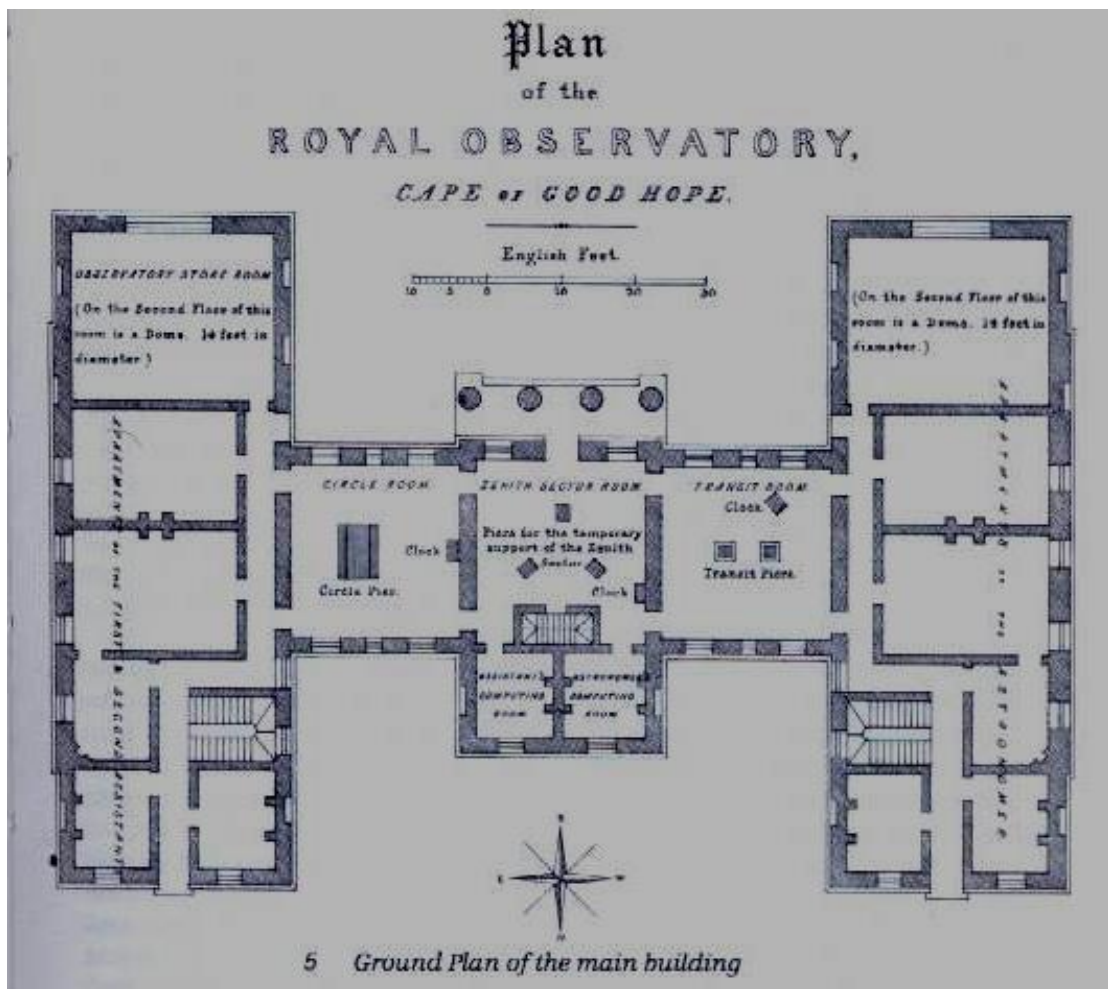
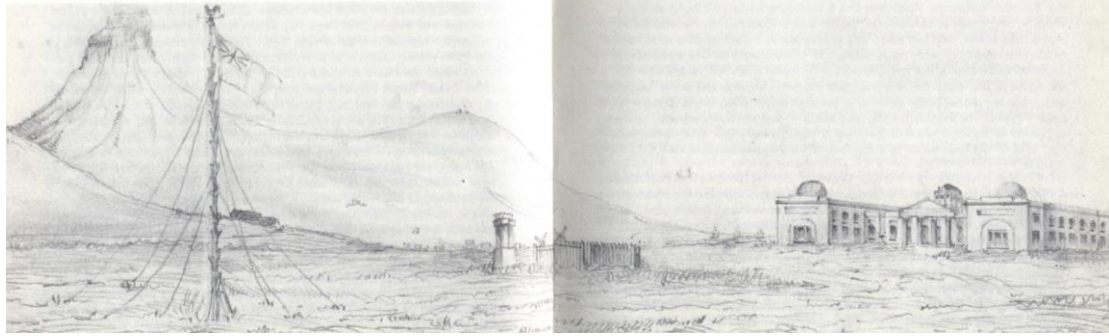


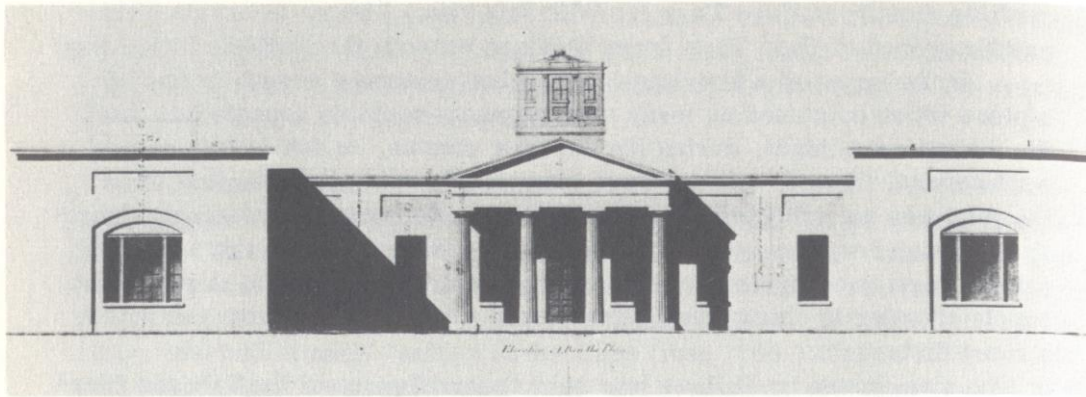


29 *Gill's first astronomical camera*



14 Bowler pencil sketch, c.1834, looking north-west (detail)





4 *Redesigned appearance of the Observatory*



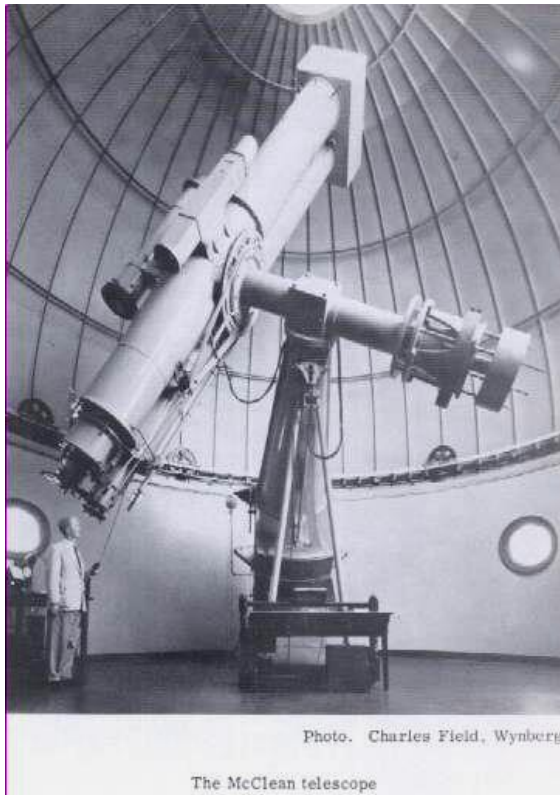


Photo. Charles Field, Wynberg

The McClean telescope

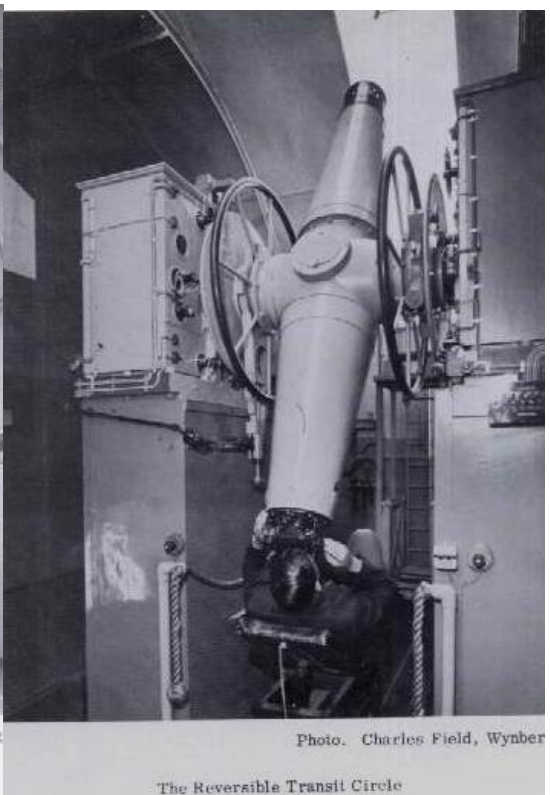
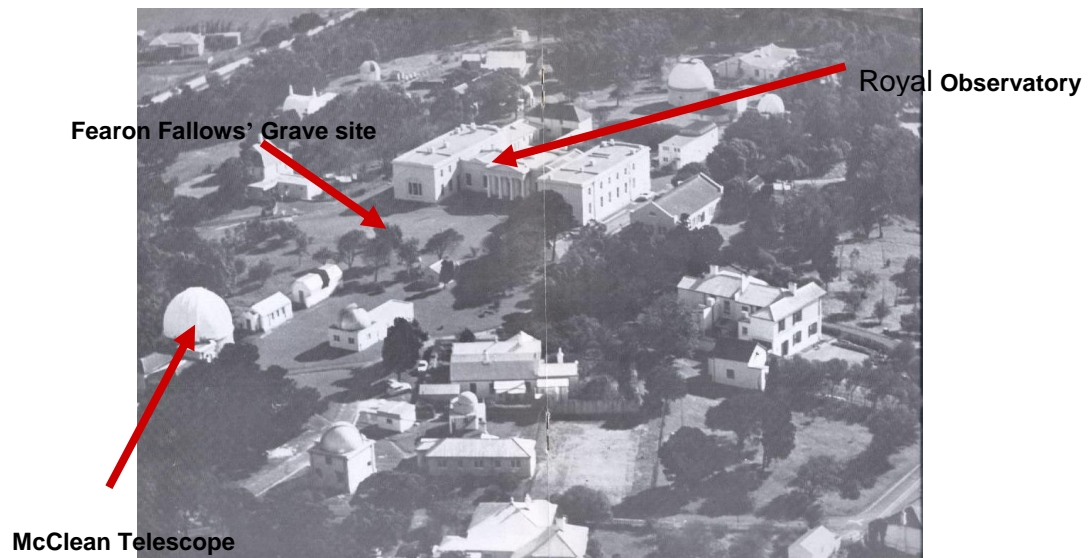


Photo. Charles Field, Wynberg

The Reversible Transit Circle



Royal Observatory Site Map



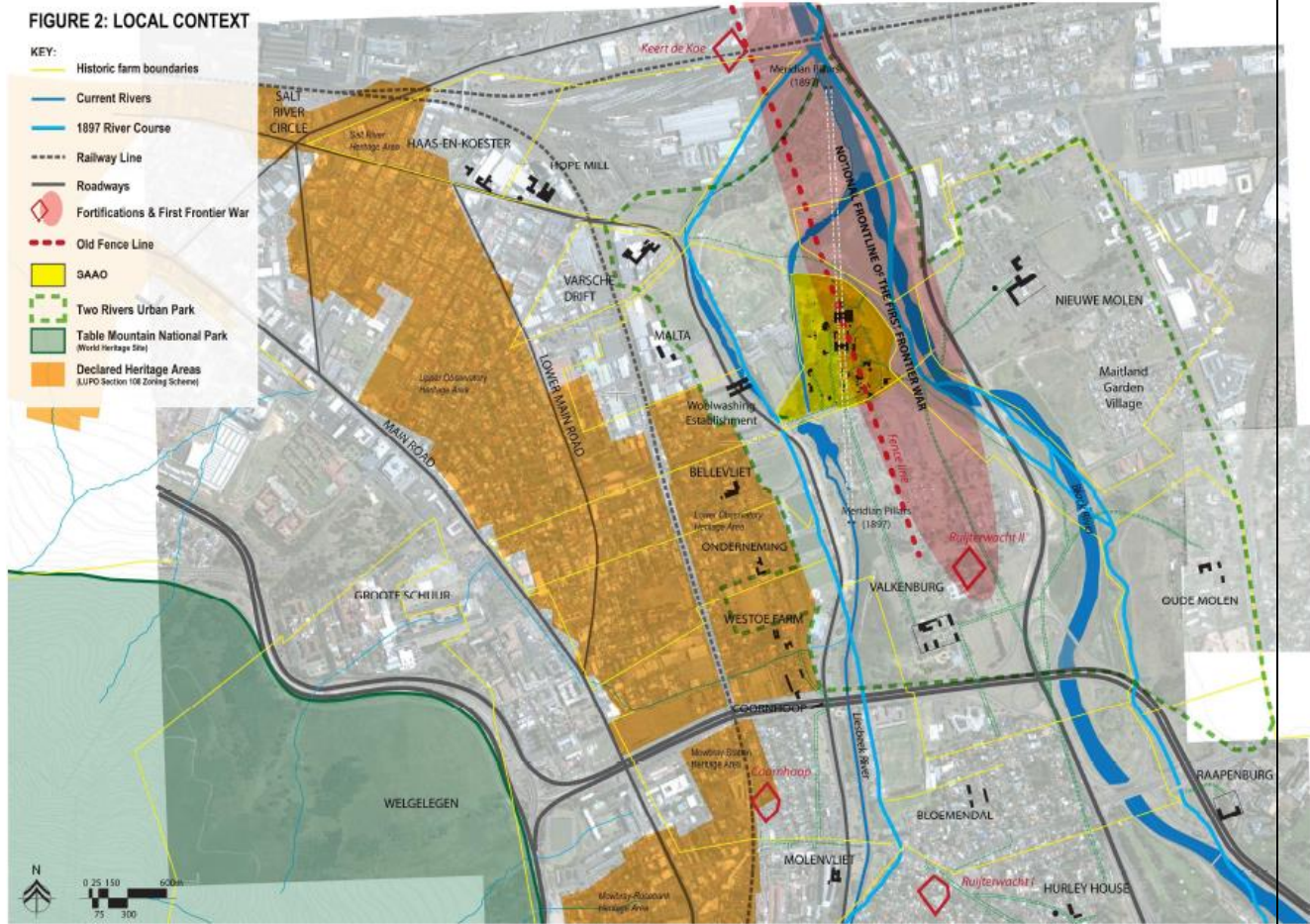
McClean telescope and Observatory 1896-1899- Suggested Grading- 1

Source: South African Astronomical Observatory- A heritage Survey Final
Compiled for the SAAO by Nicholas Baumann and Sarah Winter, July 2011

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South African Astronomical Observatory Heritage Survey

Table 1: Conservation-worthy buildings and suggested gradings

REF	NAME	PERIOD	SUGGESTED GRADING
1	Main Building / Staffs	1825/1834	2 / 3C
3, 50	McQueen Telescope & Laboratory	1845/1859	2
5	Reynolds Transit Circle	1851	3B
6	Heliograph	1847	3B
7	16" Telescope	1857	3A
8	Astrographic Telescope	1850	3C
13	House 3	1803-1810	3B
14	House 4	1803-1810	3B
15	House 6	1863-1868	3B or 3C
16	House 7	1863	3B
17	House 8	1863-1813	3C
18	Bathory House	1888	3C
19, 80, 64, 71, 72	Engine House	Prior 1905	3C
25	House 9	1810	3C
30	Scientist Clock House	Prior 1905	3C
31	RNA Building	Drawings?	3C
34, 35	Admin Building	c. 1920	3C
38	North Mark RTG	1901	3C
42	North Collimator	1901	3C
44, 75	Chronograph House & Wireless Receiving Room	1901	3C
45	South Collimator	1901	3C
50	South Mark TRG	1901	3C
57	House 8	c. 1800	3C
79	House 10	1838	3C
86	Lydol Chronograph	1838	3C
88	Kine Theodolite	1807	3C
89	6" Telescope	1835	3C
95	Fallen's Grave	1835	2
99	Maceon's Grave	1867/1879	2
97	Mooreach Pillars	1867-1868	3C
98	South Meridian Mark	1820s	2
99	Sundial	1861	3C

- KEY:
- - - SAAO Boundary
 - Grade 2 Buildings (PHS)
 - Grade 3A Buildings
 - Grade 3B Buildings
 - Grade 3C Buildings
 - Not Conservation Worthy



FIGURE 3: Naming, numbering and grading buildings

B.2 Contribution of all periods/layering of history

All periods contribute to the history of a place and should wherever possible be respected. Levels of significance relate to how early, intact, representative or rare the relevant fabric, or place, or object might be. In the case of SAAO, where peaks in terms of scientific/technological innovation are evident, this should not be emphasized at the expense of other aspects of the site's evolution. All aspects which reveal the historical layering of the site over time should be appropriately conserved and interpreted. If a place includes the fabric of different periods, as occurs on the SAAO site, revealing the fabric of one period at the expense of another can only be justified when what is removed is of slight cultural significance and the fabric which is to be revealed is of much greater cultural significance. In the instance of the SAAO an attempt should be made to conserve buildings and objects which are representative of all periods of the site's history.

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C. THE ROLE OF THE SITE

C.1 Metropolitan context

The site occupies a strategic location close to the centre of gravity of metropolitan Cape Town. Its prominent siting on a raised hill at the confluence of the Black and Liesbeek rivers and its relationship with a number of historical eighteenth century farmsteads located within the Liesbeek Valley contributes to its significant metropolitan role. At a more local level it fulfils an important role within the Two Rivers Urban Park.

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C.2.1 Heritage base-line study (May 2002)

The baseline heritage study for the TRUP, dated May 2002, was formulated to inform the Spatial Development Framework (SDF) for the area. It drew on existing information from a wide variety of sources but budgetary and time constraints did not allow for any public consultation. Components of the baseline study which have relevance to the heritage significance of the SAAO and its context include:

- Two Rivers Urban Park landscape has great cultural significance. It has historical, social, aesthetic, architectural, scientific and environmental value. It contributes to an understanding of past attitudes, beliefs, uses, events, persons, periods, techniques and design. It has associated links with past events, persons, uses, community memory, identity and oral history. It possesses a strong sense of place. The cultural significance is expressed at several scales: the overall landscape, precinct, site and object scales.
- The overall landscape is a complex composite of natural, cultivated and built landscape elements. It is a cultural landscape, one transformed by thousands of years of settlement history. The landscape expresses both artistic and innovative qualities in terms of its natural setting, architecture and patterns of planting. It also has narrative qualities, possessing a rich layering of physical evidence brought alive by the oral histories of the people who lived and worked in institutions such as the hospitals and the Observatory.

Different historical narratives are woven together to create a story of pioneering and philanthropy, social reform and identity, self-sufficiency, farming and institutionalization.

- It possesses a number of distinctive and interrelated precincts which serve to clearly demonstrate or are strongly associated with its various historical roles and uses as a place for indigenous hunter-gatherers, grazing grounds for herders, colonial farms, scientific research, reformatory and hospitals.
- Within each precinct are groupings of buildings, patterns of planting and routes, which have intrinsic social, aesthetic and scientific significance and contextual significance in terms of their contribution to an understanding of the TRUPs inherited landscape qualities, its history and associated memory.

Early astronomy at the Cape: The earliest astronomical observations in South Africa were made by Dutch and Portuguese navigators on their way to the east. The observations were made essentially for the determinations of latitude and longitude. In an early record of 1652 Jan van Riebeeck logged the observation of a comet in his personal journal (Warner 1988).

The first scientific observations made at the Cape to determine its longitude were made by Father Guy Tachard. He was a member of a group of Jesuit Priests bound for Siam in 1685. These observations were made from the Slave Lodge at the entrance to the Company Gardens. Following Tachard, Pieter Kolb, a German, also made observations during 1707 (Laing 1970 *In SAHRA Nomination 2008*; Warner 1988).

Of greater importance was the visit of Abbé Nicholas Louis de la Caille, sent to the Cape in 1751 by the Academie Royale des Sciences de France, and which resulted in the definition of many constellations, a catalogue of nearly 10 000 star positions and a measurement of the Earth's radius in the southern hemisphere. Lacaille's observatory was situated in No 2 Strand Street, since demolished (Laing 1970:35 *In SAHRA Nomination 2008*; Warner 1988).

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D.2 Royal Observatory (1820-1905)

Early in 1820 the Commissioners of the Board of Longitude proposed the establishment of an Observatory at the Cape. It was created by an Order of King George IV. The Order-in-Council, which formally established the Observatory, was signed on the 20th October 1820. Its stated purpose was to find accurate star positions and to provide a reliable time service to aid the navigation of ships. The Royal Observatory at the Cape was placed under the administration of the Admiralty (Laney 1995; Warner 1988).

The first astronomer at the Royal Observatory (RO), **Reverend Fearon Fallows**, arrived in 1821. He set up a temporary observatory at 13 Kloof Street, known as Garden Rozenhof. Late in 1822 Fallows moved to Garden Zorg en Lust, a site now occupied by the Ladies Christian Home. From these two sites, Fallows established the first time service communicating with the ships in Table Bay by means of an Argand Lamp (Laing 1970 *In SAHRA Nomination 2008*; Warner 1988).

The selection of a suitable permanent site for the RO had to fulfill a number of criteria. The site had to be in direct line of sight of Table Bay in order to pass on visual time signals to ships in the bay. It had to be high enough to avoid dust. It also had to be sufficiently east of Table Mountain to have an unobstructed meridian. The original choice had been Tygerberg Hill but this site was later dismissed because it was subject to mist. The site eventually selected was located between the swampy areas created by the Liesbeek and Black Rivers on a barren rocky mound crossed by cattle trails (Laing 1970 *In SAHRA Nomination 2008*; Laney 1995).

After a permanent site for the RO had been selected, Fallows set up his small telescopes in order to determine the north-south direction with high accuracy. He also conducted some measurements on the Earth's gravity (Warner 1988). Fallows began observing the southern stars and a catalogue of 273 'principal fixed Stars' was published in the 1824 Philosophical Transactions of the Royal Society. The only one of Fallow's portable instruments still at the observatory is a Dollond 'repeating circle.' (Laney 1995). According to Warner (1988) the stone piers on which his portable instruments were mounted were demolished in the 1950s.

A prefabricated hut served as the first observatory. By 1834 it was part of a group of huts north of the new observatory building (Laney 1995). The construction of the observatory building began in 1825 and was completed in 1828. It was designed by the Engineer of the Admiralty, John Rennie. The building process was hampered and challenged for various reasons. The site, known as Slangkop (Fallows saw 90 snakes killed by the digging crew in one day) was claimed by several different local inhabitants. The Admiralty Office also mislaid the plans for the observatory which then had to be redrawn. When a contractor was found in 1825, there was a shortage of skilled stone masons. Thirty tons of lead for the roof as well as massive stones for mounting the permanent instruments had to be carted to the site (NMC Nomination 1998).

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Thomas Maclear's arrival in 1834 marked an important phase of both astronomical and survey work. Between 1838 and 1847 he spent considerable time re-measuring and extending Lacaille's Arc of Meridian measured during 1751 and 1753, and which did not agree with measurements in other parts of the world. Maclear and his assistants Charles Piazzi Smyth and William Mann established the true shape of the Earth in the southern hemisphere, and also made the first accurate geodetic surveys of Southern Africa (Laney 1995). Maclear erected large conical piles at his survey points, since replaced by modern trigonometric survey beacons (Warner 1988). Maclear's astronomical observations were of excellent quality but greatly exceeded the limited facilities at his disposal for their reduction. The voluminous results took decades to publish (Laing 1970 *In SAHRA Nomination 2008*; Laney 1995).

Among his many achievements, Maclear founded the Meteorological Commission, was an active member of the Weights and Measures Commission and the Committee of the Associations for Exploring Central Africa and many other bodies (Laney 1995).

Maclear's Beacon on Table Mountain was erected in 1979 as a commemoration of the centenary of his death. In 1861 Lady Maclear died and was buried in front of the Main Building. Thomas Maclear retired in 1870 and when he died in 1879 was buried beside his wife (Warner 1988).

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From about 1860 the RO had deteriorated in condition, with no important instruments added after the acquisition of the Airy Transit Circle in 1855. In 1879, with the arrival of Gill, the RO rapidly regained its place as equal to the best in the world. Under Gill's direction, numerous new and large telescopes, and auxiliary instruments were acquired and their associated buildings erected. Many of the buildings presently scattered over the Observatory site date to Gill's time. A few of these are important in the history of astronomy in South Africa and indeed, in the world. However, many now have little or no functional value (Warner 1988). Key examples of buildings erected during Gill's time include the McClean telescope (1896), the Reversible Transit Circle (1901), the 18 inch telescope (1887) and the Astrographic telescope (1890).

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FIGURE 11: Lithograph of the McClean dome, a Herbert Baker building, by artist and astronomer Charles E. Peers (ca 1930) (Ian Glass)

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Between 1933 and 1947 most of the trees planted by Maclear were dying and so were replaced by hundreds of Eucalyptus (bluegum) trees, which characterize the site today.

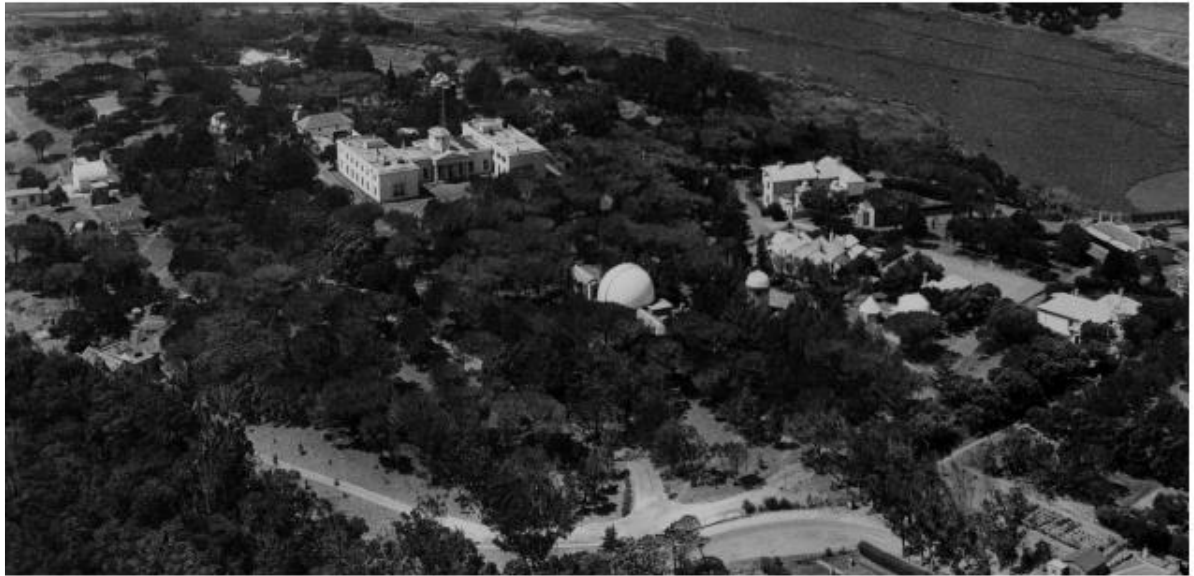


FIGURE 17: Aerial view of the Royal Observatory in 1931 or before. The dome of the McClean telescope is a prominent feature in the landscape (SAAO Archives)

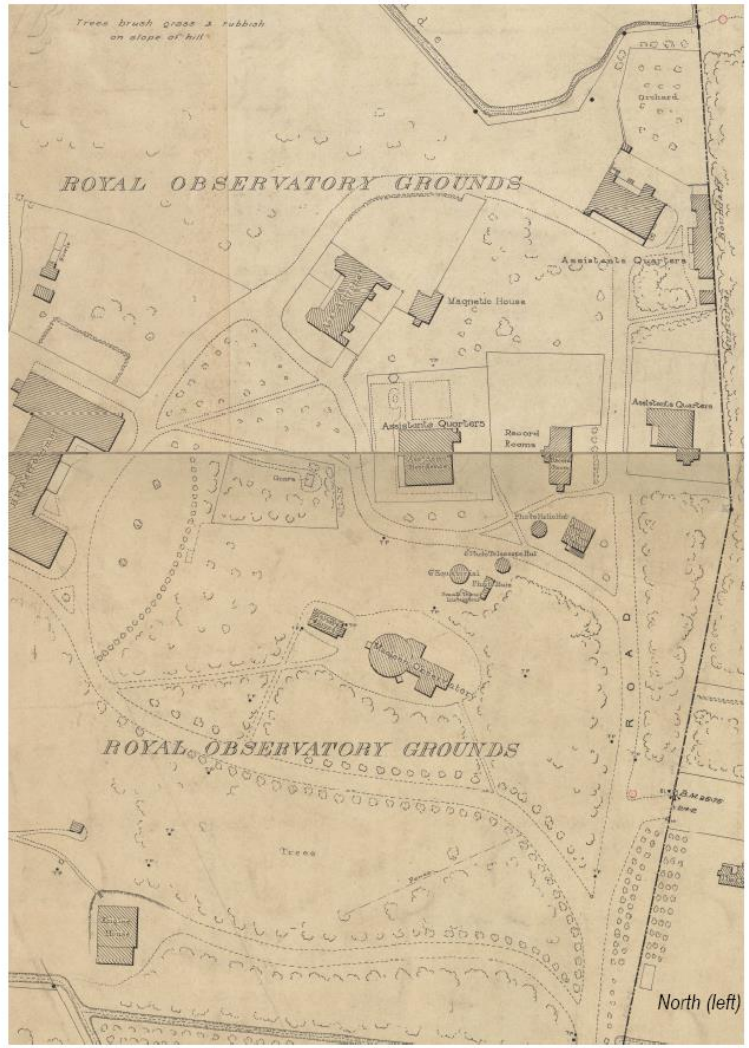
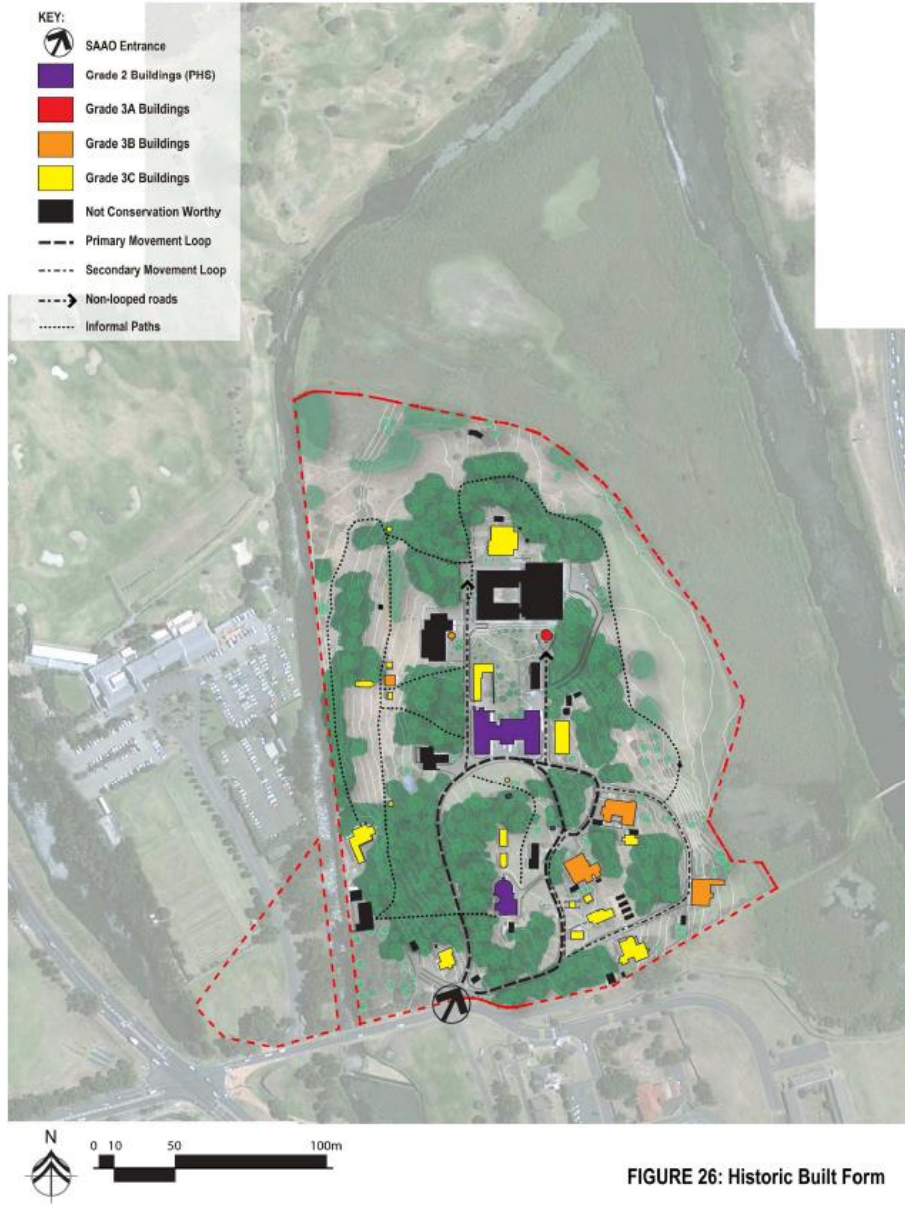


FIGURE 18: Braine & Drake Survey dated 1901 showing only a portion of the site but with a fair amount of detail including building names. Note the alignment of trees in front of the Main Building (Source).



G.1.1 Historical significance as a site of pre-colonial and early colonial occupation by the San and Khoi communities

The site has considerable significance as an integral part of a larger Liesbeek Valley which was most probably used as an area for grazing, hunting and gathering by indigenous people in the pre-colonial period. The nature and extent of seasonal grazing patterns is, however, acknowledged to be debatable.

In the Dutch Colonial period, it is evident that environmental conditions in the Liesbeek Valley were far preferable to those in the Table Valley and the movement of production systems by the DEIC and the consequent fencing, fortifying and farming activities inevitably resulted in conflict with the indigenous people, (D. Sleight, 1993: *Die Buiteposte*, pp 128-143).

The area thus has considerable historical significance as the site of the war for the valley (1659 – 1660) when Khoina raiders attacked the Company's stock and free burgher farms along the river from the East. In hot-pursuit operations the Khoina retreated, sometimes with captured stock, back across the Liesbeek to the Black River. The area could thus be regarded as a war zone at the time (Dan Sleight: *Valkenberg East Heritage Study*, pers.com. 20 February 2004). In terms of the history of the settlement for the next 400 years the site thus has considerable significance as one of the first sites of displacement of local communities.

Significance also resides in the location on the hill between the Liesbeek and Black Rivers, near the Observatory site, of a watch house built in 1660 as part of the boundary around the "begrepen circle", the land claimed by the DEIC. The watch house, called *Ruiterwacht*, housed the mounted soldiers that patrolled the fence. It also guarded the gate in the fence on the road to the Hottentots Holland, and was the final point of departure and the first point of arrival for travelers on expeditions to and from the Overberg. The area was also used by soldiers to herd the Company's cattle grazing outside the Liesbeek boundary and a large stock pen was used when the alarm of a "foreign" invasion was given. The *Ruiterwacht* was closed when the Peninsula Khoina ceased to be graziers with a claim to the land. In 1708 the last surviving members of the Macassar royalty and other dignitaries who were banished to the Cape

G.1.2 Historical significance as the oldest scientific institute in Africa founded in 1820 and the first permanent observatory in the southern hemisphere

The site has considerable significance in terms of the pattern of South African scientific history as it offers a palimpsest of the history of astronomy both internationally and nationally for some 150 years. This role has endured and the observatory retains its pre-eminent role in the international astronomical community. In terms of continuity it can be considered both a “living” and “relic” site. The scientific instruments were the most sophisticated of the era at the time, predominantly during the latter half of the nineteenth century and the early decades of the twentieth century, but no longer have a technological/scientific function, apart from a public outreach programme.

As a centre of scientific excellence, the site continues to have significance as one of the country’s most historic and internationally acclaimed scientific institutions. It continues to house the SAAO headquarters, and associated administrative offices, engineering workshops and the National Astronomical Library.

It is also the headquarters of the Southern African Large Telescope (SALT), an international partnership, and has functioned as an astronomical centre of excellence for over 150 years. The site is also used by the Cape Centre of the Astronomical Society of Southern Africa which has had its regular meetings on the site from 1940 and which will be celebrating its centenary in 2012. The site has played a significant scientific/social role over time. Many prominent travelers such as Darwin and Livingstone met with Sir Thomas Maclear on the site in the mid-nineteenth century and their social interactions had implications on later scientific advances. The site has thus played a role of continuing and enduring scientific significance over time. In terms of the criteria for cultural significance contained in the NHR Act the site possesses uncommon and rare examples of South Africa’s cultural heritage, it has the potential to yield information that will contribute to an understanding of South Africa’s scientific heritage and it is important in demonstrating the principle characteristics of a particular class of South Africa’s cultural places or objects, namely its historic role in the international astronomical community.

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G.1.3 Historical scientific role as the location of a number of astronomical advances of international significance from the 1830s

- At the individual building scale, the Main building, the McClean telescope and the heliometers are considered to have considerable scientific significance due to the contribution they made internationally during the latter half of the nineteenth century. They are closely associated with David Gill who was regarded as one of the leading astronomers of the time.

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G.1.4 Historical scientific significance in terms of the range of objects and instruments associated with major advances in astronomy during the nineteenth and twentieth centuries

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The nature of the scientific objects related to the Observatory, most notably the telescopes, are an integral component of the significance of the site as a whole. While some of them are moveable, and not an integral part of a specific building, their significance as a collection contributes substantially to the significance of the site as a whole.

The scientific instruments within the structures located across the site have been used, with varying degrees of continuity and consistency, for approximately 180 years.

While many of the smaller instruments are in the Astronomical Museum, the older and larger telescopes, such as the McClean telescope are still in situ and some of them are used to demonstrate astronomical objects to the public on open nights. The most recent of the older telescopes, the 18" reflector, was used in the late 20th century by Alan Cousins to set up stellar standards (Ian Glass, Pers. Com.)

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G.1.7 Location of a number of conservation worthy structures of architectural significance

There are a number of buildings of architectural historical significance which reflect changing architectural styles during the course of the nineteenth century. The Main Building, a Georgian building built in the Greek revival style, and with distinctive neo-classical pillars on the front portico, was designed by the British naval architect, John Rennie, and was completed in 1828. The oldest dome on the site, the heliograph, dates from 1847 and runs on cannon balls. The McClean telescope building was designed by the architect Sir Herbert Baker and dates from 1897. It is a landmark building and highly representative of his style and is recommended for Provincial Heritage Site status. There are a number of workers houses scattered across the site with distinctive ornamental gardens characteristic of the Victorian style. Significance statements for individual structures and recommended heritage gradings are included in the section below.

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Reference	0003		
Official name	McClellan Observatory Victoria Telescope	Other names	McClellan Observatory Centre of Dome (1932)



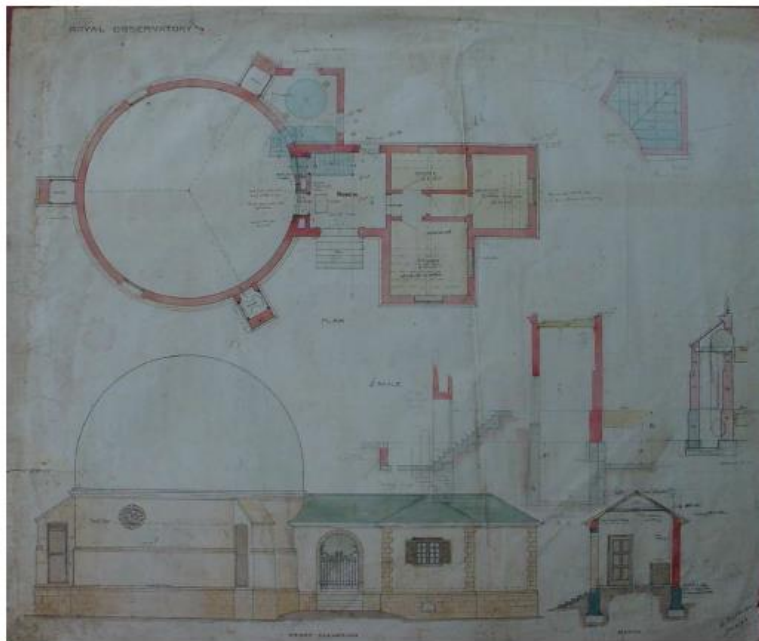
Original hydraulic pump still in use for driving rising floor

McClellan Building (right) and Physical Laboratory (left)

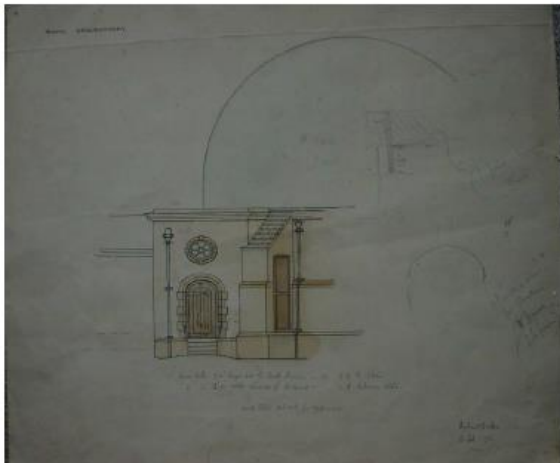
Photographs by Ian Glass (March 2010)

Construction date	1896-1898	Date of alterations	1899
Original use	24 inch and 18-inch refractors	Current use	Information centre/museum Public outreach
Architect/builder	Building: Herbert Baker (1862-1946) Telescope: H. Grubb, Dublin Dome: T. Cook and Sons, York.		
Site description	<p>Situated on axis with the front of the main building. Dome observatory with a single storey laboratory, stone plinth, roughcast plaster with quoining. The <i>oeuil-de-boeuf</i> windows are a typical Baker characteristic. Houses the Victoria Telescope erected in 1898.</p> <p>The dome was originally driven by a hydraulic motor until 1931. The original hydraulic pump for driving the rising floor is still in use. The laboratory now houses an interpretative display on the history and technological development of the observatory. Plaque reads:</p> <p style="text-align: center;">"1897 The Victoria Telescope The Gift of Frank McClellan Of Rushall Kent David Gill HM Astronomer"</p>		
Major alterations	Addition of the Physical Laboratory in 1899		
Historical background	<p>Built in 1896 to house a 24 inch and 18-inch refractors donated by Frank McClellan. The laboratory was constructed 3 years later in 1899. It was the biggest telescope of its kind at the time and is similar to the Thompson Refractor at the Royal Greenwich Observatory. The McClellan or Victoria Telescope and laboratory were used first for spectroscopy and later for stellar distance measurements. With this telescope silicon and europium were first detected in stars other than the Sun, and astrometric and photometric work continued into the mid 1980s. Today it is mainly used on open nights, introducing visitors to some of the showpieces in the sky.</p>		

Historical images



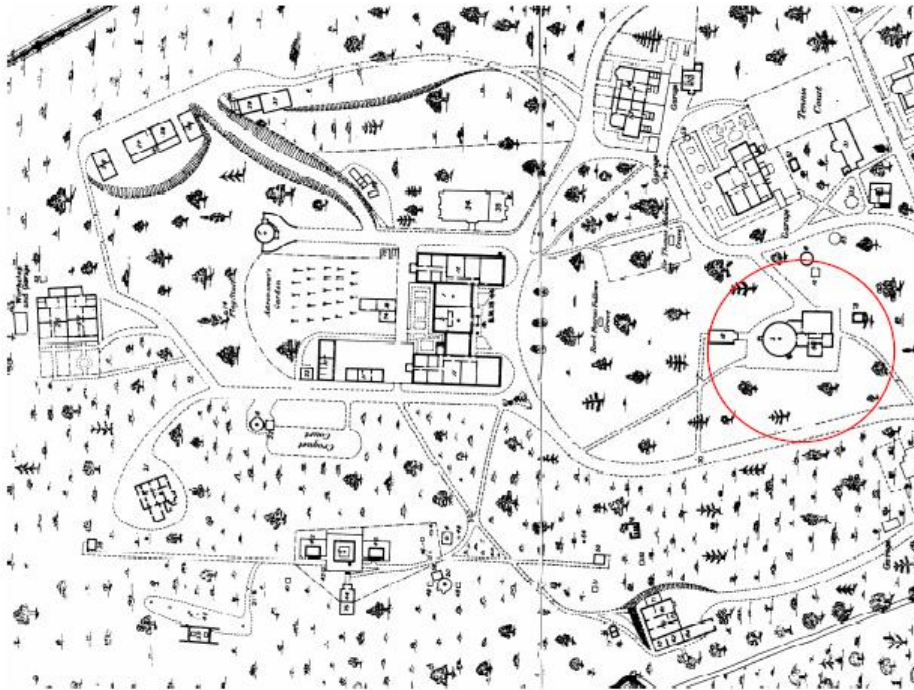
Architectural plans by Herbert Baker dated June 9, 1896 (SAAO records)



Detail of door, signed by Herbert Baker, 6 Feb. 1896 (SAAO records)



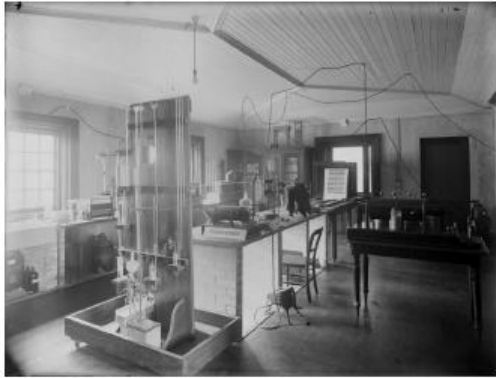
Lithograph of the McClean dome, a Herbert Baker building, by artist and astronomer Charles E. Peers (ca 1930) (Ian Glass)



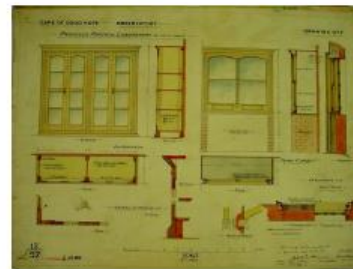
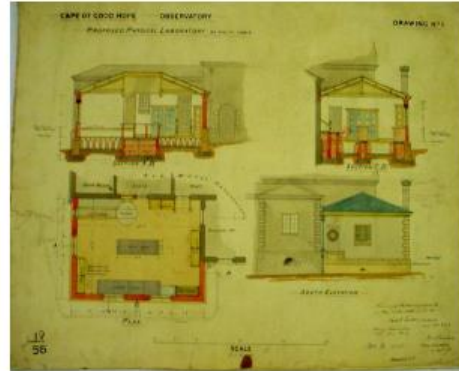
Enlargement of 1911-1932 plan of the Cape Royal Observatory. Prepared by the Civil Engineer in the Chief's Department of the Admiralty (In Warner 1979). The McClean Observatory is highlighted.

NHR Act criteria	Historical, technological, scientific, architectural and aesthetic.		
Significance statement	The McClean Observatory is of considerable heritage significance. The telescope has technological and scientific significance being the biggest telescope of its kind in the southern hemisphere at the time and in terms of the contribution it made internationally to astronomical research during the late 19 th century/early 20 th century, particular in the field of spectroscopy. It is strongly associated with Gill who was regarded as one of the leading astronomers of the time. The laboratory was the first spectroscopic laboratory in South Africa. The Observatory has architectural significance in terms of being designed by Herbert Baker. It is largely intact with most of its original fittings. It possesses visual-spatial qualities in terms of its axial relationship with the Main Building and forming a focal point at the end of the lawned forecourt space. The dome has considerable landmark significance in terms of views towards the site from the M5. The adjacent battery house has significance due to the use of huge chemical batteries prior to the use of electricity.		
Current heritage status	Older than 60 years (NHR Act, S34)	Proposed grading	1
Physical condition	Fair but exterior woodwork needs attention. Telescope is in working order and is used visitor tours. Dome shutters are not working and neither is the rising floor mechanism.		
Opportunities & threats	Ongoing role in public outreach at the SAAO, e.g. open nights. Restoration the dome shutter and rising floor mechanism. Telescope and building needs ongoing repair and maintenance. Installation of fibre optic communications and security measures.		
Recommendations	To be declared a National Heritage Site Retain in terms of ongoing public outreach programme of the SAAO. Formulate a repair and maintenance schedule including guidelines for the installation of fibre optic and security measures. Consider restoration of the dome shutters and rising floor mechanism. Exterior and interior alterations require heritage approval. See generic conservation management recommendations for Grade 2 structures.		
References	Charles, Anne. SAAO Inventory of Buildings and Structures (February 2010) Fransen, Hans (2004). The Old Buildings of the Cape. Jonathan Ball Publishers, Johannesburg and Cape Town. Glass, Ian. SAAO Royal Observatory Site. Extant and former buildings (March 2010) Glass, Ian (2010) The Royal Observatory – A Cape Town Treasure. Article for the Cape Times, 16 th April 2010 Glass, Ian. Notes prepared for Heritage Survey (Jan 2011) SAAO website; text by Laney (1995) Warner, Brian. (1988) The Remnants of the Cape's Astronomical Heritage. Department of Astronomy, University of Cape Town. Public Address Presented at SAMA Conference: Stellenbosch, May 1988. Published by SAMAB, 18 (3): 103-105 (1988) Interview with Brian Warner, Mike Feast and Anne Charles: SAAO, 15 December 2010		

Historical images



Early 1900s. This was the first spectroscopic laboratory in South Africa. Used as an infrared laboratory 1972-1987 (SAAO records)



Above: Architectural plans dated 1899 (SAAO records)
Below: Cupboard details (SAAO records)

NHR Act criteria	Historical, scientific, aesthetic and architectural		
Significance statement	Of considerable heritage significance in terms of being the first spectroscopic laboratory in South Africa. It is strongly associated with Gill who was regarded as one of the leading astronomers of the time. The laboratory is largely intact with most of its original fittings. It is a repository for a valuable collection of instruments and archival records, and plays an important role in the interpretation of the history of the observatory.		
Current heritage status	Older than 60 years (NHR Act; S34)	Proposed grading	1
Physical condition	Fair but exterior woodwork needs attention. Downpipe recently installed.		
Opportunities & threats	Well suited to its role as a museum and interpretative centre. In need of ongoing repair and maintenance.		
Recommendations	To be declared a national heritage site. Exterior and interior alterations require heritage approval. Retain in terms of ongoing role as a museum and interpretative centre. Formulate a repair and maintenance schedule. See generic conservation management recommendations for Grade 2 structures.		
References	Charles, Anne. SAAO Inventory of Buildings and Structures (February 2010) Fransen, Hans (2004). The Old Buildings of the Cape. Jonathan Ball Publishers, Johannesburg and Cape Town. Glass, Ian. SAAO Royal Observatory Site. Extant and former buildings (March 2010)		