

Report Fremantle Prison GIS Predictive Model

for

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Geographic co-ordinates in this report are based on the GDA94 coordinate system.

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INTRODUCTION

This report outlines preliminary historical research and results of GIS work undertaken by Eureka Archaeological Research and Consulting UWA (Eureka) at Fremantle Prison. In February 2006 Palassis Architects (Palassis) contacted Dr Alistair Paterson (UWA) to discuss the proposed development of the Parade Ground in this heritage listed site by the Department of Housing and Works (DHW).

DHW propose to develop the Fremantle Prison Parade Ground to provide a more functional level area. This involves ground disturbance in areas where archaeological features are known to exist and as outlined below may potentially impact other as yet unknown features. An excavation depth for the current development is believed to not exceed 0.3m beneath the current ground surface.

This report presents the results from this GIS study and preliminary recommendations for works. Recommendations are provided in the event that archaeological material or features are encountered during ground disturbance.

PROJECT SET UP AND METHODS

In April 2008 a meeting held at the Fremantle Prison with Christopher Paterson (Palassis), Bill Bowker (DHW), Bevan Beaver (Fremantle Prison), and Dr Kate Morse, Dr Alistair Paterson, and Kelly Fleming (UWA/Eureka) outlined the need to identify any archaeological material or features that may be disturbed during the development of the Parade Ground (Figure 1).

The meeting recommended that a GIS Predictive Model be prepared. This model would be used to identify potentially significant archaeological deposits and features prior to the proposed development, allow us to develop strategies to mitigate any destruction of these features, and to begin formulating procedures i.e. archaeological monitoring, during future ground disturbing works.



Figure 1. Fremantle Prison site plan (Bavin 1990 [February]: Figure 3) indicating extent of proposed development of Parade Ground

Data Collection

The historical documentary evidence for the Fremantle Prison site is extensive. The DHW electronic database (Department of Housing and Works) contains scanned copies and digital originals of some 1650 plans ranging from site plans to architectural and engineering drawings. The State Records Office contains a further unknown number of plans and other documents relating to the Prison and its administration. For the purposes of this project only a small percentage of these sources were utilised. There is obviously considerable potential for additional documentary research to be undertaken.

Contact was made with Bill DaSilva at the DHW plan room and 13 digital copies of site plans for the Fremantle Prison were acquired (Department of Housing and Works). Attempts were made to take a sample covering the period from the Prisonøs construction in 1854 to the present day. The quality of images is however varied and the database, although extensive, is not catalogued by date. This made sampling adequate appropriate material difficult. Dr Alistair Paterson provided

ten digital plans, both originals and copies, received from the State Records Office, Palassis Architects or the Fremantle Prison during preliminary research undertaken in 2006. After careful examination of all material collected it was decided that original copies of some of the plans would need to be obtained. A desktop survey of the State Records Office catalogue identified a number of Fremantle Prison site plans. These were subsequently viewed and digital scans acquired.

Site Survey

Eight site plans reflecting the period c.1858 to 1990 were reviewed and a site survey was planned to collect GIS compatible survey data for georeferencing. Common, visible points were identified to enable a good level of accuracy. Before the survey commenced a differential GPS was used to establish a grid and survey station. A Total Station was then used to plot 27 reference points at the corners of extant structures and features.

Review of Existing Material

On acquisition of the survey data, plans were georeferenced and a number of anomalies in dates and visible features were identified. Copies of documents held at the Prison research room and a number of secondary texts were subsequently consulted in an attempt to clarify these anomalies. Not all original plans at the State Records Office could be located; unfortunately many of the accessioning references were not comprehensive enough to locate the material easily or, as they were based on references to the 1990 cataloguing system, were no longer relevant. Those that were located were viewed and digital copies obtained.

Summary of Bavin (1990)

The primary archaeological references for the Fremantle Prison Compound are Bavin 1990 (February) & 1990 (June). A brief summary of these, focusing on the area encompassed by the Parade Ground development (see Figure 1), is provided below. Eight features are shown by Bavin as being within the Parade Ground development area (Figure 2).



Figure 2. Plan showing structures/features identified in Parade Ground development area in Bavin (1990 [February]: Figure 3)

Details of these features are provided in Bavin (1990 [February] ; 1990 [June]). As detailed in Table 1 below four were investigated through limited archaeological excavations in 1990.

Structure	Date	Extent of Excavations	Result
Tunnels/Drains	1854	No Excavation	NA
Wooden Division	1856	1 trench 1x1m	Not Located
Cisterns (south)	1857	5 trenches either 1x1m or 1x2m	Located
Proposed Metalled Roads	1862	1 trench 1x1m	Not Located
Parade Area	1862	No Excavation	NA
Grass and Shrubs	1862	No Excavation	NA
Incinerator	1900	2 trenches 1x1m	Not Located
Laundry and Ablution Block	1950	No Excavation	NA

Table 1. Archaeological features and structures identified by Bavin (1990 [February] ; 1990 [June]) as occurring in the Fremantle Prison Parade ground

Tunnels/Drains

Bavin suggests a series of tunnels and drains form the main sewer lines for the Prison. Construction of these began in 1854 however they do not appear on Bavinøs construction plan (1990 [February]) until 1856 so may have been completed at this time. Bavinøs initial report (1990 [February]) recommended the entrance to these tunnels be investigated. This was not undertaken.

Wooden Division

Constructed in 1856 to accommodate excess prisoners, the Wooden Division is believed to have held 176 men (Bavin 1990 [February]: 3.3.03). Demolished in 1897, the materials from the Wooden Division were apparently recycled and reused. A 1 x 1 m excavation of this feature α northwest corner in 1990, failed to find any evidence for the wooden division.

Cisterns (South)

Constructed in 1857 the cisterns -operated as a reservoir for the storage and distribution of water throughout the prison during the late 19th Centuryø(Bavin 1990 [June]: 5.2.01) remaining in use until approximately 1897. Archaeological excavation of five trenches in 1990 located the roof of the cistern, outlines of which are still presently visible.

Proposed Metalled Roads

Bavin suggests that in 1862 a metalled (stone gravel) road was laid in front of, and parallel to, the Main Cell Block (1990 [June]: 8.1.02). She earlier refers to this road as \div proposed@and it is unclear whether it was actually constructed at this time. The stratigraphic sequence observed in a 1 x 1 m trench excavated in 1990 in the approximate location of the road was interpreted as suggesting that \div the existing metalled road is also the original metalled road following repairs@ (Bavin 1990 [June]: 8.2.03).

Parade Area

A prison parade ground was established in front of the North Main Cell Block in approximately 1862 and in 1908 a small Officer¢s Shelter Shed was possibly constructed within its boundaries (Bavin 1990 [February]: 2.2 No. 40). Limited detail exists for both of these potential features. Excavations proposed in 1990 to investigate these features were not undertaken.

Grass and Shrubs

In 1862 a garden is believed to have been established in front of the South Main Cell Block (Bavin 1990 [February]: 2.2 No. 41). Its boundaries and layout are unclear. Excavations to investigate the metalled road in 1990 were not extended far enough east to encompass the potential site of the garden area which is believed to have been situated between the road and the South Main Cell Block (see Figure 2).

Incinerator

In 1900 an incinerator was constructed to dispose of Prison refuse. It was used until the 1960s when it was demolished and new incinerators constructed nearby (Bavin 1990 [June]: 5.3.01). In 1990 two 1 x 1 m trenches were excavated at the location of the 1900 incinerator. Remains or features of the incinerator and associated rubbish deposits were not found but a brick wall thought to be associated was identified nearby.

Laundry and Ablution Block

Constructed in 1950. No excavations were carried out in this location.

Georeferencing

The brief for the first stage of this project was to produce a GIS Predictive Model for the Fremantle Prison Parade Ground Development Area. This was achieved by using the historical plans and survey data discussed above. A digital copy of each plan was uploaded to a GIS mapping program then georeferenced using between 8 and 20 surveyed points. This allowed each plan to be spatially projected and overlaid, for individual features to be recognised, their locations marked, and for sequentially dated plans to be rapidly compared. Maps of various stages of this process were then produced.

RESULTS

This research has resulted in additional information about previously identified archaeological features, new information about potential archaeological features that were not identified by Bavin, and more accurate spatial information about these features. This allows a revised archaeological zoning plan based on the GIS Predictive Model to be produced prior to the proposed Parade Ground development and enables recommendations to be made to mitigate against any destruction of the archaeological record prior to and during the planned development.

Summary 2008 Findings

Tunnels/Drains

The earliest plan showing the locations of tunnels and drains within the Prison complex is undated but can be approximated to c.1858 based on features shown though it may be closer to 1857 (Public Works Department c.1857/1858). The main sewer lines are shown on the c.1858 plan but it is unclear at what depth they are located. Bavin, referring to the entrance to these drainage tunnels, suggests that \div the system to flush the dilute human faeces from the prison did not

succeedø(1990 [February]: Area No.XIII). No record of the date at which they stopped being used has been found. Two plans dated to 1898/1909 (Public Works Department c.1898/1909) and 1899 (Penal Commission nd [c.1899]) shows the drains and suggests they are \div old 6 x 3 (feet?) drainage tunnel[s] to be stoppedøbut the plan quality is poor. An undated sewerage plan (Metropolitan Water Supply Sewerage and Drainage nd [c.1900]) does not show the tunnels. It seems likely then that they were probably out of use by the early 20th Century. An excavation depth for the current development has not yet been provided but it is understood to not exceed 0.3m beneath the current ground surface.

• It is **recommended** that further documentary research to confirm the depth of these drains is required. Archaeological excavation at some stage may still be recommended.

Wooden Division

Information regarding the wooden division in Bavin (1990 [February]) was based on a reproduced copy of the original c.1858 Convict Grant plan in Campbell (1975: 31) and the British Parliamentary Papers Vol. 13 (BPP). Although the latter has not yet been explored an original copy of the c. 1858 plan was located (Public Works Department c.1857/1858) and the position of what is believed to be the wooden division verified. Georeferencing of this plan and overlaying of the 1990 excavation square (Bavin 1990 [June]: Figure 4), shows that the excavation intersected with the northwest corner of the known location of the wooden division. The extent of the excavation was limited and there is a possibility that evidence for the Wooden Divisionøs presence was missed.

• It is **recommended** that archaeological excavations be undertaken prior to any ground disturbance work on the Parade Ground to confirm the presence or absence of remains associated with the wooden division.

Cisterns (South)

Archaeological excavation of this feature in 1990 was relatively extensive and was successful in uncovering some of its components. Part of the cistern is now visible at the ground surface adjacent to the Prisonø southern boundary wall. The GIS model indicates the presence of a number of drains leading from the cisterns. The depths of these are unknown and further research or test excavations are required to determine their location.

• It is **recommended** that developments should be designed to avoid impacting the cisterns (south) or any associated infrastructure.

Metalled Roads

Sources for this feature have not yet been explored due to problems with accession information cited (Bavin 1990 [February]). It is not clear how the course of the proposed road was determined by Bavin (1990 [February]: Figure 3) and further research is required to establish if it was actually metalled at this time. An oblique aerial photograph of the prison (Gore 1935) and an aerial

photograph taken in 1948 directly overhead (Landgate 1948) show a road in the approximate location indicated by Bavin (1990 [February]: Plan 7). This follows the route of the current bitumen surface but runs closer to the South Main Cell Block than is shown for 1862. The 1935 road appears to be limestone while the 1948 road is darker in colour to those at the front of the Prison Compound and rear of the main cell block. The 1990 archaeological excavation was limited to a 1 x 1 m square and results were interpreted as indicating the current road and the proposed road were the same (Bavin 1990 [June]: 8.2.01).

• It is **recommended** that archaeological excavations be undertaken prior to the work on the Parade Ground to confirm the presence or absence of the road outlined above. These will need to investigate a larger area than in 1990.

Parade Area & Grass and Shrubs

As discussed above sources for this feature have not yet been explored due to discrepancies in accession information.

• It is **recommended** that further research is required to locate additional information on the extent and nature of the garden.

Incinerator

The 1990 excavation found no evidence for the c.1900 incinerator or any associated rubbish dumping although two 1 x 1 m square test pits were excavated in this location (Bavin 1990 [June]: 5.3.01). Unfortunately the incinerator¢ position according to Bavin can not be confidently verified as it is unclear if the PWD Plan (c.1908) she used has been correctly identified (1990 [June]: 5.3.01). A plan believed to possibly be that cited shows the incinerator at the south wall (Metropolitan Water Supply Sewerage and Drainage nd [c.1908]). Bavin (1990 [February]: 2.2 No. 47) cites Votes and Proceedings, the Department of Corrective services and the PWD plan and shows the incinerator at the south wall but plans used during the construction of the GIS model place it further west (Government Electrical Engineer 1919 ; Metropolitan Water Supply Sewerage and Drainage nd [c.1900]). Bavin (1990 [June]: 5.3.01) mentions +eight rows of early machine bricksí .located 3.8m west of trench 3ø which +scale the natural limestone embankmentø and suggests this was part of the incinerator. However, two plans showing the incinerator (Government Electrical Engineer 1919 ; Sewerage and Drainage nd [c.1900]) indicate it was probably set into and just beyond this retaining wall. Discrepancies in the incinerator location are likely a result of differential plan accuracy.

• It is **recommended** that more excavations of this location are conducted to test for archaeological evidence for the incinerator.

Laundry and Ablution Block

This feature, constructed in 1950, was not excavated in 1990 and, due to its presumed low significance, excavation is not recommended. Excavation of this feature may contribute to an understanding of the evolution of Prison infrastructure during its 154 year history and can be undertaken at the request of DHW.

Additional Features

Well c.1858

The use of a reproduced plan (Campbell 1975: 31) in Bavinøs 1990 report has demonstrated the need to refer to original documents whenever possible. A well, clearly visible on the original plan, 25 m west of the South Main Cell Block and 20 m north of the north-eastern corner of the wooden division, is not shown on the reproduction. A Sewerage Plan (Penal Commission nd [c.1899]) shows what appears to be an inspection chamber at the same location as the well but this feature is not shown on later plans.

• It is **recommended** that further documentary research and an archaeological investigation of the well be undertaken prior to any development of the parade ground.

Stone Shed c. 1890

Bavin (1990 [February]: 5.1.03) mentions a stone shed (<1906) in her discussion of the southern knoll prioritised sites but this feature does not appear on any plans. A plan dated to 1890, 1905 or 1920 shows a shed on the southern knoll and describes it as a \pm stone breakers shedø(Unknown nd [c.1890/1905/1920]) and an 1897 plan also shows the structure but does not describe its function (Unknown 1897). An undated plan (probably c.1900) shows the structure designated \pm shedøwith three water closets attached to its western end (Metropolitan Water Supply Sewerage and Drainage nd [c.1900]) and in a Government Electrical Engineerøs Plan (1919) the shed is still present. In a 1948 aerial photograph a structure is visible at this location (Landgate 1948) and conforms to the boundaries shown in plans viewed, but a plan dated to 1987 (Building Management Authority of Western Australia 1987) shows no structure in this location.

• It is **recommended** that if any sub surface disturbance is planned at this location during the proposed development, further documentary research and possibly archaeological excavation is undertaken to determine whether evidence for the shed exists and to explore its function.

Drains/Tunnels

As discussed in Bavin and confirmed by the GIS model numerous drains and tunnels intersect the Parade Ground beneath the current surface. Although only the main drains and sewers are shown in Bavings construction plans it is noted that others exist, some of which may be relatively shallow (1990 [February]: 4.4.01).

• It is **recommended** that archaeological monitoring of areas associated with drainage is undertaken as part of the development of the Parade ground to determine the extent and location of drains and tunnels.

CONCLUSIONS AND RECOMMENDATIONS

This report has summarised potential archaeological features discussed in Bavin (1990 [February]) and the excavations done to date within the Parade Ground development area at the Fremantle Prison (Bavin 1990 [June]). On the basis of the GIS Predictive Model (2008) presented here and in light of

- the extent of excavations completed in 1990
- evident discrepancies identified in the location of some of the features
- the possible disturbance and/or destruction of archaeological features/deposits during the proposed development

further documentary research and archaeological excavation of a number of features is recommended prior to any sub surface disturbance of the parade ground.

The extent of proposed archaeological excavations will be dependent on the nature of DHWøs proposed development plans; notably on its intention to disturb the existing ground and below ground surface of the Parade Ground. Archaeological excavation should be undertaken to determine the nature and extent of a number of potentially significant features to ensure they are not adversely affected by any development of the Fremantle Prison Parade Ground. These include:

- Well in front of the South Main Cell Block (c.1858)
- Wooden Division (c.1856)
- Stone Shed (c.1890)
- Proposed Metalled Roads (c.1862)
- Parade Area (incl. Officers Shelter Shed c.1908) & Grass and Shrubs (c.1862)
- Incinerator and associated rubbish deposits (c.1900)

We recommend a program of test excavations to confirm the presence/absence of features, and where they exist, larger scale open area archaeological excavations are recommended to expose these historical features. Open area excavations, as opposed to 1 x 1 metre squares or small trenches, should allow for discrepancies in plan accuracy.



Figure 3. Proposed areas for archaeological excavation based on potentially significant archaeological features

FURTHER RESEARCH

During the course of this research numerous discrepancies were noted in accession information for Fremantle Prison documentary sources. Much of Bavinøs 1990 work refers to Public Works Department (PWD) numbers and Battye Library accession numbers. Following updating of these collections these numbers are no longer in use and this has made locating some of the material problematic. It is recommended that, due to the high level of significance of the Fremantle Prison site, and its pending World Heritage Listing, a full audit and update of the sources relating to the site be undertaken by a qualified historian in consultation with a historical archaeologist. Original digital copies of documents should be obtained where possible and held at the Prison research room.

Historical plans of the prison were found to be highly variable in their level of accuracy during the course of this research. As recommended above, prior to any archaeological excavations features earmarked for investigation should be researched comprehensively using available documentary sources. To reduce the possibility of missing potential archaeological features available sources should be cross checked prior to planning excavations.

MANAGEMENT OF ARCHAEOLOGICAL MATERIAL/FEATURES

In the event that significant archaeological material or features are encountered at the Fremantle Prison appropriate measures must be put in place to;

- 1) deal with the features appropriately and in a timely manner i.e. interpretation and display or protection from future deterioration
- 2) properly accession and store any movable artefacts

To achieve these goals it is recommended that the Department of Housing and Works liaise with conservation staff from the Western Australian Museum where appropriate, designate an appropriate storage facility for materials, and recognise the potential for continued costs for the maintenance and conservation of archaeological features.

SUMMARY OF RECOMMENDATIONS

- It is **recommended** that further documentary research to confirm the depth of drains is required. Archaeological excavation at some stage may still be recommended.
- It is **recommended** that archaeological excavations be undertaken prior to any ground disturbance work on the Parade Ground to confirm the presence or absence of remains associated with the wooden division.
- It is **recommended** that developments should be designed to avoid impacting the cisterns (south) or any associated infrastructure.
- It is **recommended** that archaeological excavations be undertaken prior to the work on the Parade Ground to confirm the presence or absence of the metalled road outlined above. These will need to investigate a larger area than in 1990.
- It is **recommended** that further research is required to locate additional information on the extent and nature of the garden.

- It is **recommended** that excavations are conducted to test for archaeological evidence for the incinerator.
- It is **recommended** that further documentary research and an archaeological investigation of the well be undertaken prior to any development of the parade ground.
- It is **recommended** that if any sub surface disturbance is planned at the location of the stone shed during the proposed development, further documentary research and possibly archaeological excavation is undertaken to determine whether evidence for the shed exists and to explore its function.
- It is **recommended** that archaeological monitoring of areas associated with drainage is undertaken as part of the development of the Parade ground to determine the extent and location of drains and tunnels.
- It is **recommended** that a full audit and update of the sources relating to the Fremantle Prison complex be undertaken by a qualified historian in consultation with a historical archaeologist.
- Excavation of the 1950 Laundry and Ablution Block may contribute to an understanding of the evolution of Prison infrastructure during its 154 year history and can be undertaken at the request of DHW.

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