

University of Sydney
Chau Chak Wing Museum
Crime Prevention Through
Environmental Design Report

CPTED 02

Issue 2 | 30 March 2017

This report takes into account the particular instructions and requirements of our client.

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Job number

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1 Executive summary

This report has been produced in response to the Secretary's Environmental Assessment Requirements (SEARs) Application Number SSD 7894 on behalf of The University of Sydney in support of the State Significant Development (SSD) Application.

This report assesses Crime Prevention Through Environmental Design impacts of the proposed works.

1.1 Methodology

In preparing this report, Arup has undertaken the following:

- Review of CPTED theory and how this can be typically applied to Gallery facilities;
- Perform a review of the current architectural designs, and relevant reports, with an emphasis on the external site wide areas;
- Collection and analysis of local and state crime statistics, obtained from open sources such as the Bureau of Crime Statistics and Research (BOCSAR), in order to better understand the external security environment;
- Conduct a CPTED review and detail the CPTED strategies, findings and recommendations.

1.2 Recommendations

Recommendations made herein aim to enhance the preventative crime characteristics of the campus by:

- Increasing the perception of risk to criminals by increasing the presence of deter, detect, delay and response characteristics;
- Increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended by the offender in order for the offence to be successful;
- Reducing the potential rewards of crime by minimising, removing and concealing rewards; and
- Advertising the proper use of space, and making it clear on the types of people permitted throughout the campus under various operating conditions.

The campus and proposed development provides very good CPTED measures/characteristics, particularly in regards to natural surveillance due to the extensive use of glazing and high permeability between spaces. However, Section 9 of this report details a list of recommendations that can further enhance the CPTED and security aspects of the project and subsequently the Gallery.

2 Introduction

2.1 Overview

Arup has been commissioned to provide an assessment of opportunities where Crime Prevention through Environmental Design (CPTED) may be incorporated into the designs for the University of Sydney (UoS) Chau Chak Wing Museum (CCW Museum).

2.2 Aim of this report

This report has been prepared to meet the SEARs requirements for the SSDA process. The report will outline CPTED principles and provide recommendations for reducing the likelihood of opportunistic crime.

2.3 Methodology

In preparing this report, Arup has undertaken the following:

- Review of CPTED theory and how this can be typically applied to arts and cultural facilities;
- Perform a review of the current architectural designs, and relevant reports, with an emphasis on the external site wide areas;
- Collection and analysis of local and state crime statistics, obtained from open sources such as the Bureau of Crime Statistics and Research (BOCSAR), in order to better understand the external security environment; and
- Conduct a CPTED review and detail the CPTED strategies, findings and recommendations.

2.4 Recommendations

Recommendations made herein aim to enhance the preventative crime characteristics of the campus by:

- Increasing the perception of risk to criminals by increasing the presence of deter, detect, delay and response characteristics;
- Increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended by the offender in order for the offence to be successful;
- Reducing the potential rewards of crime by minimising, removing and concealing rewards; and
- Advertising the proper use of space, and making it clear on the types of people permitted throughout the campus under various operating conditions.

3 Site and Project Descriptions

3.1 The Site and Surrounds

The development site is located to the northeast of the University's grounds adjacent to the Parramatta Rd entrance, within the area currently used as the Fisher Tennis Courts site.

Parramatta Rd runs in an approximate east to west alignment and borders the site to the north. University Place that runs in a north south direction is located to the west, beyond which is the University's main Quadrangle Building. University Avenue borders the site to the south, with Victoria Park located beyond the University grounds to the east.

The main portion of the site consists of three tennis courts, to the north of which is a small weatherboard tennis pavilion building. An area of lawn is located to the east of the site.

The northern boundary between the University campus and Parramatta Rd features a retaining wall above which is a linear garden bed containing significant trees. Ground conditions of the area consist of a sloped garden bed.

The development site is bound on all sides by trees of varying significance.



Figure 1: Areal View of Site

3.2 The Project

The proposal comprises the construction of the new Chau Chak Wing Museum in the north eastern sector of the Camperdown campus. The proposed museum will comprise a new five level building (maximum of three storeys above ground) with central void and will include:

- Entry foyer and museum shop
- Gallery space
- CERC (Collections Education Research & Conservation Facility) space
- Collection storage and workshop areas
- Staff offices, facilities and boardroom
- Study rooms and schools education area
- A 130 seat Auditorium
- Café and terrace facilities
- Loading dock
- Plant rooms

The proposed works also include associated earthworks, tree removal, landscape works and augmentation to existing infrastructure and services.

4 Policy context

4.1 Overview

As a major development within the City of Sydney (CoS) and the state of NSW, the requirements detailed in the sections that follow have been considered in the UoS CCW Museum project.

4.2 Local council requirements

The CCW Museum development should meet the security and crime prevention requirements of the Safe City Strategy. As the project is a development within the CoS, meeting the requirements outlined in the Safe City Strategy would be considered best practice.

The City of Sydney Safe City Strategy is a multi-faceted strategy, combining a number of different types of approaches to crime prevention based on ‘best practice’. The key objectives of the strategy are to:

- Reduce crime and anti-social behaviour – including addressing domestic and non-domestic assaults, targeting steal from motor vehicle offences, reducing steal from person offences, reducing fraud, tackling victimisation of international students and visitors and providing crime prevention information to residents and business;
- Tackle complex crime and safety issues in areas of public housing – including delivering the Creating a Safer Community Project aimed at addressing fear of crime and social exclusion, Council representation at relevant forums and creating a Public Housing Liaison Officer position;
- Improve the look and feel of the built environment – by delivering good urban design, on-going CPTED Protocol Referral with NSW Police, extending the CCTV Street Safety Camera Network, initiating community safety audits, rapid graffiti removal, delivering high quality cleansing services, improved street lighting and the reactivation of laneways and public parks;
- Deliver primary prevention and early intervention initiatives – including increasing opportunities for recreation and learning and investing in programs which increase the chances of vulnerable children and young people and their families at key transition points in life;
- Target risk factors associated with offending behaviours – including supporting ex-offenders to successfully reintegrate in to the community;
- Strengthen communities and increase opportunities for people to engage in legitimate activities – by recognising the specific needs and developing appropriate responses to key community groups including Aboriginal people, Culturally and Linguistically Diverse Communities (CALD), Older People, Gay, Lesbian, Bisexual and Transgender (GLBT) communities and Women; and

- Advocate to higher levels of Government for more resources aimed at crime prevention – in recognition that the City has an important role to play in ensuring that Federal and State Government continue to support initiatives aimed at reducing and preventing crime at the local level.

4.3 SSDA requirements

The requirements for the SSDA EIS which are stipulated by the Secretary of the Department of Planning and Environment and which are referred to as the “SEARs” have been addressed.

This report has been prepared in response to the SEARs for Chau Chak Wing Museum (SSD7894) item number three: Built Form and Urban Design in which the principles of CPTED are required to be addressed.

State Significant Development Applications (DA’s) within NSW typically require a crime prevention through environmental design assessment to be conducted. This is a requirement of the Environmental Planning and Assessment Act 1979, and further detailed in the following Guideline produced by the NSW Department of Urban Affairs and Planning:

- Crime Prevention and the Assessment of Development Applications - Guidelines under Section 79C of the Environmental Planning and Assessment Act 1979.

As detailed in the Guideline specified above, before a decision can be made on a development application, a consent authority must consider the application under Section 79C of the Environmental Planning and Assessment Act 1979. Included in Section 79C are subsections requiring the consent authority to consider:

- The likely impacts of that development, including the environmental impacts on the natural and built environments, and social and economic impacts on the locality; and
- The public interest.

Crime prevention falls under these subsections of 79C.

5 Underlying principles

5.1 Overview

Crime Prevention through Environmental Design (CPTED) is the use of design and space management principles in order to influence human behaviour. CPTED is a crime prevention strategy based on the proper planning, design and structure of cities, neighbourhoods, campus or individual sites to create an effective use of the built environment which can lead to a reduction in the fear and incidence of crime, as well as an improvement in quality of life.

The design of a particular space has to ensure that the intended activity can function properly, as well as directly support the control of behaviour, in order to reduce the opportunity for crime. The design of the campus should strive to incorporate the three overlaying CPTED strategies – Natural Access Control, Natural Surveillance and Territorial Reinforcement (Figure 1).

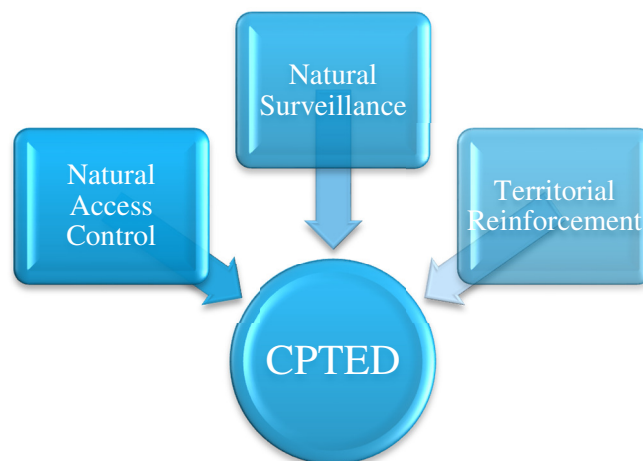


Figure 1. Crime Prevention through Environmental Design (CPTED)

5.2 Natural Access Control

Natural access control involves decreasing opportunities for crime by controlling access to a potential target and by creating a perception of risk to an offender. Physical and symbolic barriers can be used to attract, channel or restrict the movement of people.

Effective natural access control can be achieved by creating:

- Designed landscapes and physical locations e.g. footpaths that direct pedestrians into and throughout target areas;
- Public spaces which attract people into the area and discourage intruders;
- Restrict access to internal areas or high-risk areas like car parks or other rarely visited areas (e.g. by having doors, shrubs, fences and gates); and

- Selectively placed entrances and exits, fencing, lighting and landscaping to control the flow of access or to limit access.

Where practical, the intent of these natural access control measures should be incorporated into the CCW Museum designs, and on-going Campus operations.

5.3 Natural Surveillance

Natural surveillance is about creating environments that keep intruders under observation. It aims to provide opportunities for people engaged in their normal daily business to observe the space around them.

Natural surveillance means creating clear sightlines. It works by designing the placement of physical features, activities and people in such a way so that maximum visibility and positive interaction occurs among legitimate users of the space.

Quality surveillance can be achieved or improved by considering the following design principles:

- Streets and public spaces can be observed from nearby buildings;
- Clear sightlines exist between public and private places;
- Open plan and minimalist (clutter-free) designs;
- Effective lighting of public places is adopted;
- Spots that facilitate entrapment are eliminated;
- Attractive and well maintained landscaping, with proper light and clear sight lines, is used to prevent offenders finding a place to hide or entrap victims; and
- Activation of the space or surrounding areas that encourages regular and diverse use of the space.

Where practical, the intent of these natural surveillance measures should be incorporated into the CCW Museum designs, and on-going Campus operations.

5.4 Territoriality

Territoriality or territorial reinforcement is about clearly defining private space from semi-public and public space, and by attracting legitimate users to an area in order to create a sense of ownership. The created ownership shows that the owner has a vested interest in the location, which increases the actual and perceived risk of detection of offenders.

Fences, change in pavements, signs, lighting and landscaping can be used to define public, semi-public and private space. Care is necessary to ensure that territorial reinforcement is not achieved by making public spaces into private spaces, through gates and enclosures.

Territorial reinforcement can be achieved through:

- Design with a clear distinction between public and private spaces by using physical barriers (e.g. fences) and symbolic barriers (e.g. vegetation);
- Design that encourages people to gather in a public space and to feel some responsibility for its use and condition;
- Environmental markers (e.g. signage, walkways, pavers, lighting, bollards and fencing) which define intended use and ownership; and
- Regular maintenance of vegetation, infrastructure, and prompt removal of graffiti and vandalism.

Where practical, the intent of these territorial reinforcement measures should be incorporated into the CCW Museum designs, and Campus operations.

6 Crime profile

6.1 Overview

The University of Sydney Chau Chak Wing Museum project is located within the City of Sydney Local Government Area (LGA). It should be noted that the crime figures included in this section of the report were those crimes recorded by NSW Police. These figures do not necessarily represent all crimes committed in the Sydney LGA as not all crimes get reported to Police.

The offences listed below make up the most prevalent crimes that are relevant to the Chau Chak Wing Museum. Their five year trend is also included in order to identify if the security risks that they pose is likely to increase or decrease in the future. It is these offences that CPTED and other security measures employed within the CCW Museum are most likely to have to protect against.

While a snapshot of the crime profile has been included in this report to provide contextual understanding for the CPTED analysis and treatment measures identified, a more detailed assessment of the projects crime profile will be conducted in the Security Risk Management Report.

6.2 NSW crime profile

According to the Bureau of Crime Statistics and Research (BOCSAR), in the 24 months to June 2016, two of the 17 major offences showed a significant upward trend across NSW, nine were trending downward and the remaining six offences were stable. The offences trending upward were steal from retail store (up 6.3%) and fraud (up 1.7%).

The nine offences which showed a downward trend over the last 24 months were:

- Murder (down 32.1%);
- Robbery without a weapon (down 25.9%);
- Robbery with a firearm (down 41.7%);
- Robbery with a weapon not a firearm (down 22.2%);
- Break and enter dwelling (down 7.2%);
- Motor vehicle theft (down 12.6%);
- Steal from dwelling (down 6.6%);
- Steal from person (down 9.9%); and
- Malicious damage to property (down 3.2%).

Due to these trends, 12 major categories of crime in NSW are now at their lowest level in 20 years.

The 12 categories of crime at their lowest in 20 years are:

- Murder;
- Robbery without a weapon;
- Robbery with a firearm;
- Robbery with a weapon not a firearm;
- Break and enter dwelling;
- Break and enter non-dwelling;
- Motor vehicle theft;
- Steal from motor vehicle;
- Steal from retail store;
- Steal from dwelling;
- Steal from person; and
- Malicious damage to property.

Shootings are also at the lowest level in 20 years.

6.3 Local crime profile

The following is a list of the most prevalent crimes to occur in the City of Sydney LGA that are relevant to the CCW Museum, based on total number of offences. A ranking of how the City of Sydney LGA crime rates compares to the other 141 LGA's cannot be provided because its residential population does not accurately reflect the number of people present in the area each day.

Offence	Number
Fraud	6335
Other theft	3948
Assault - non-domestic violence related	3121
Malicious damage to property	2691
Steal from retail store	2185
Steal from person	1661
Offensive conduct	1126
Harassment, threatening behaviour and private nuisance	939
Prohibited and regulated weapons offences	702
Trespass	502

Source: BOCSAR

The top offences to occur within a Recreational setting within the Sydney LGA were:

Offence	Number
Steal from person	45
Assault - non-domestic violence related	15
Malicious damage to property	14
Sexual offences	9
Break and enter non-dwelling	9
Assault - domestic violence related	2
Steal from motor vehicle	2
Robbery	1
Motor vehicle theft	0

Source: BOCSAR

Note: Premises type data is not collected for all offence categories.

The terrorism based security risks relevant to the CCW Museum include the following:

- Person Borne Improvised Explosive Device (PBIED) / Placed IED;
- Vehicle Borne Improvised Explosive Device (VBIED);
- Hostile Vehicle Attack;
- Active Shooter;
- Melee Attack (including knife);
- Hostage / Siege Scenario; and
- Chemical / Biological / Radiological Attack (CBR).

6.4 Five year trend

As can be seen in the five year crime trend table below, seven of the ten most prevalent offences applicable to the CCW Museum have reduced in occurrence over the previous five year period. Out of the ten most prevalent offences, only trespass, fraud, and prohibited weapon offences have risen over this five year periods.

Based on these trends, the likelihood of the seven reducing offences occurring in the future should generally either remain the same as currently assessed, or reduce.

Trend information	2011	2012	2013	2014	2015	24mnth Trend	60mnth Trend
Prohibited and regulated weapons offences	568	525	555	646	702	8.67	23.59
Fraud	4208	5661	7274	6768	6335	-6.4	50.55
Harassment, threatening behaviour and private nuisance	973	1023	1025	950	939	-1.16	-3.49
Assault - non-domestic violence related	3772	3724	3576	3142	3121	-0.67	-17.26
Malicious damage to property	3599	3332	3343	2876	2691	-6.43	-25.23
Offensive conduct	1860	1682	1713	1318	1126	-14.57	-39.46
Other theft	5110	5379	4880	4692	3948	-15.86	-22.74
Steal from retail store	2290	2462	2276	2318	2185	-5.74	-4.59
Trespass	449	560	477	508	502	-1.18	11.8
Steal from person	2881	2736	2225	1887	1661	-11.98	-42.35

Source: BOCSAR

7 CPTED analysis

7.1 Overview

An analysis of some of the key factors that can impact on the CPTED characteristics of the CCW Museum are detailed below.

7.2 Vegetation and Landscaping Impacts

7.2.1 Overview

Vegetation can have both a positive and negative impact on crime rates, and therefore needs to be appropriately considered, selected, and be well maintained.

7.2.2 Negative Impact

Overgrown vegetation can negatively impact on natural surveillance by restricting sightlines, or by providing areas of concealment of people and actions.

Dense vegetation is regularly used by criminals to shield many of their activities, including target selection, examination of stolen goods, and disposal of unwanted goods. Dense vegetation have also been found to be a common characteristic of indecent assault sites.

7.2.3 Positive Impact

On the other hand, studies have found that crime has a strong negative association with tree cover, even after controlling for socioeconomic variables such as income, housing age, rural-ness, race, housing type, housing tenure, population density, and amount of protected or agricultural land. Research has found a 10% increase in tree cover would be associated with an 11.8% decrease in crime rate, all else equal.

Well-designed green space may decrease crime by attracting people to spend time outdoors. The presence of more people in public places makes it harder for criminals to go unnoticed, due to additional ‘eyes on the street’ (natural surveillance). Increased outdoor encounters also foster greater social networks and relationships. Having stronger social networks results in a lower likelihood of crime from within the community (territorial reinforcement).

The amount of vegetation in an area also influences the length of time people spend in that area. The more trees and grass present in an area, the longer people are likely to spend in that area.

Areas with well-maintained vegetation might also reduce crime, due to the “territorial marker” or a “cue to care,” signifying to criminals that the users of the area actively care about and are involved with their surroundings. The presumption is that when looking for a place to commit crime, a perpetrator would move on to a neighbourhood where cues suggest a weaker social organisation and

lesser neighbourhood involvement (Broken Window Theory). This theory suggests that neighbourhoods displaying visual cues of neglect or poor maintenance experience higher crime because these cues suggest to criminals a lack of effective law enforcement, and care by residents, while maintained neighbourhoods send the opposite cue.

7.3 Lighting Impacts

Improved street lighting may also cause a reduction in crime. Improved lighting leads to increased surveillance of potential offenders (both by improving visibility and by increasing the number of people on the street) and hence to increased deterrence of potential offenders. Improved lighting also signals community investment in the area and that the area is improving, leading to increased community pride, community cohesiveness, and informal social control.

A meta-analysis on the lighting-crime link has shown that improved lighting led to a significant 21% decrease in crime in experimental areas compared with comparable control areas. Furthermore, other studies have found that the financial savings from reduced crimes greatly exceeded the financial costs of the improved street lighting.

7.4 Mixed Use Activation

Mixed use activation of an area is an effective CPTED strategy that enhances the opportunity for natural surveillance, and encourages territorial reinforcement. A mixed use area increases the chance of the area being used, and lengthens the time that the area is used. Conversely, a single use area, such as a business park, tends to have high use during business hours on week days, but remains largely vacant on the weekends and outside of business hours. These low use times increase security risk, as criminals are less likely to be seen committing offences.

8 Design assessment

8.1 Campus Review

8.1.1 Natural Access Control

The site and surrounds provides strong natural access control barriers to facilitate movement through the space in defined pathways (Figure 2). Nominated paths of travel include the vehicular entry and road leading from Parramatta Road, and the pedestrian pathways following the same route.

Vegetation throughout the campus clearly delineate space and provide natural barriers, imposing a series of psychological deterrents while maintaining a welcoming and permeable space.

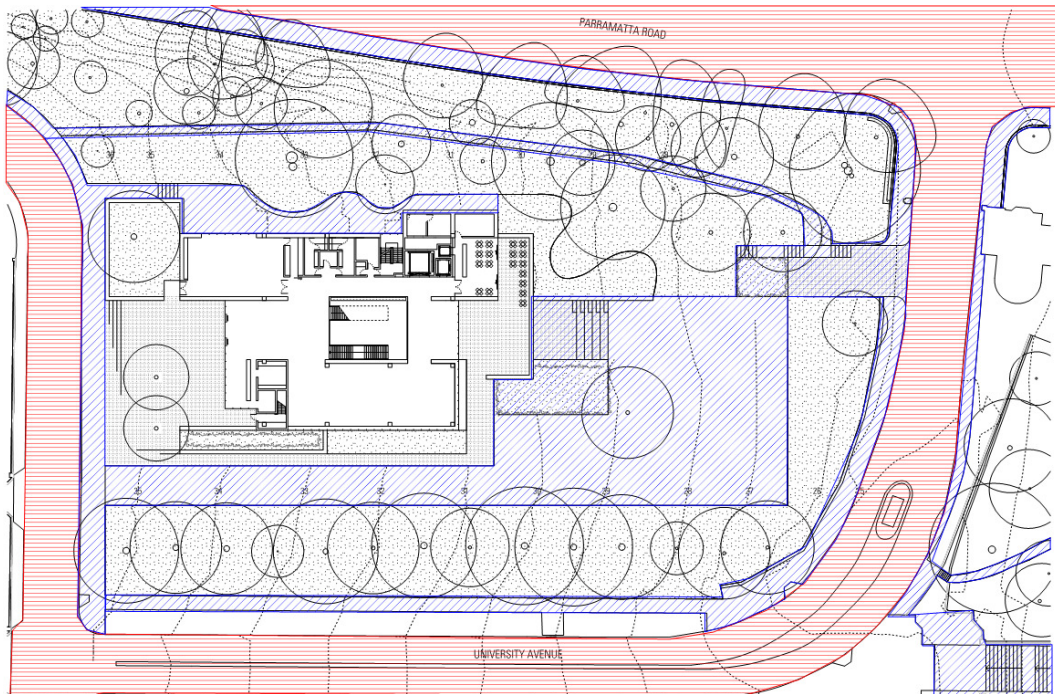


Figure 2. Campus Natural Access Control Features

8.1.2 Natural Surveillance

Natural surveillance for the campus is generally good, with numerous vantage points for staff and visitors (Figure 3). The location of the café provides significant natural surveillance of the road and courtyard area, as well as an overview of some of the pathway near Parramatta Road.

The roadway into the site and around further increases natural surveillance from passing vehicles, ensuring the nominated pedestrian pathways can be observed irregularly when traffic is passing by.

The pathway near Parramatta Road provides some level of natural surveillance to the less observable side of the Museum itself, however cannot be observed itself along the entire length of the path.

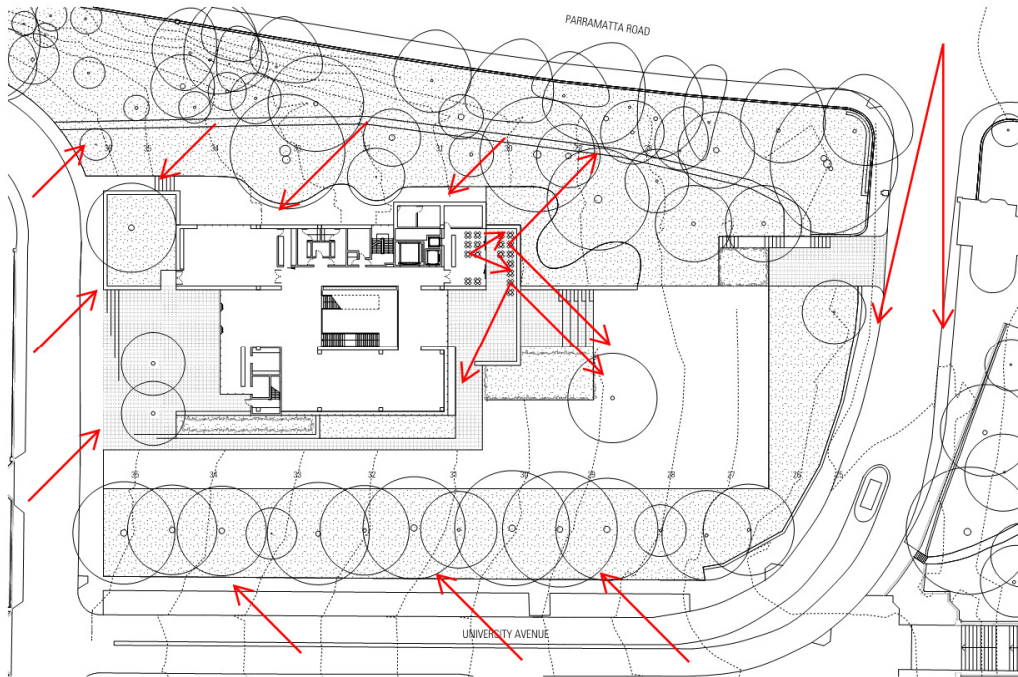


Figure 3. Campus Natural Surveillance

Considerations for the potential blind spots to the North of the building, and the vegetation around the nominated pathways include:

- Ensuring the areas are well lit;
- Ensuring the vegetation is well maintained.

8.1.3 Territoriality

Campus territoriality is good, with the high amount of vegetation and the presence of the Great Hall providing a feeling of care and respect for the environment (Figure 4). Vegetation in this area should be well maintained and the provision of bins and other receptacles as required may be necessary with the increased visitation to the space.

Encouragement of this area of the campus to be used for various activities is encouraged to ensure mixed use activation, reducing the opportunity for crime to occur.

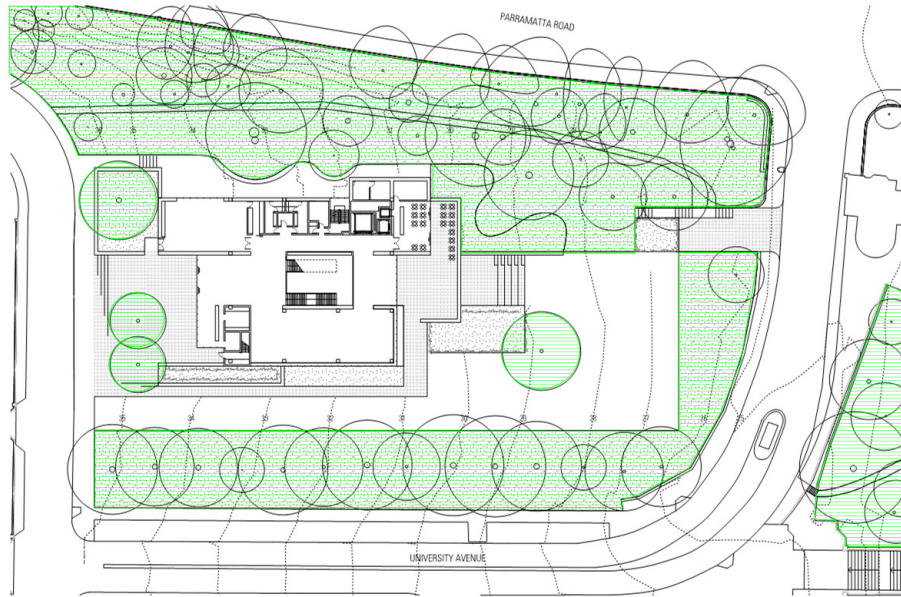


Figure 4. Campus Territoriality Features

8.2 Lower Level 2 Review

Lower Level 2 is primarily a store and operations area with associated loading dock and back of house equipment (Figure 5). The area does not have a dock master's office or associated control area, which due to the size of the building and expected traffic may be suitable.

Natural surveillance of the loading dock is good from the various loading and unloading areas, however the location of plant and equipment near the entrance ramp may be difficult to observe. While these areas will be used on a rare occasion, staff may feel unsafe in these areas.

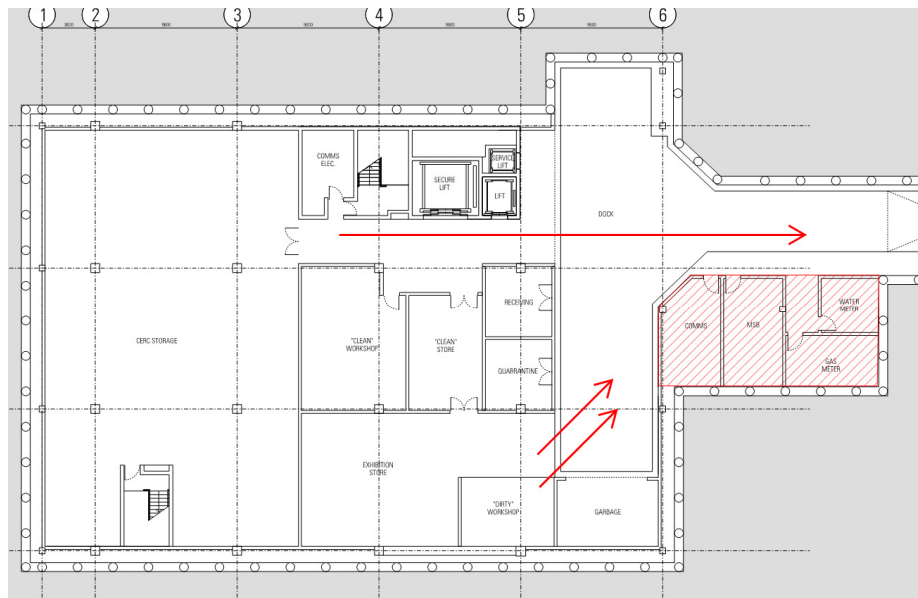


Figure 5. LL2 Natural Surveillance

8.3 Lower Level 1 Review

Lower Level 1 (Figure 6) provides several gallery spaces and access to the public. This level, due to the increased circulation of guests and staff, will be well surveilled. The segregation of plant and gallery spaces allows for natural access control to occur, with clearly defined pathways for guests to follow to reach the courtyard and gallery spaces.

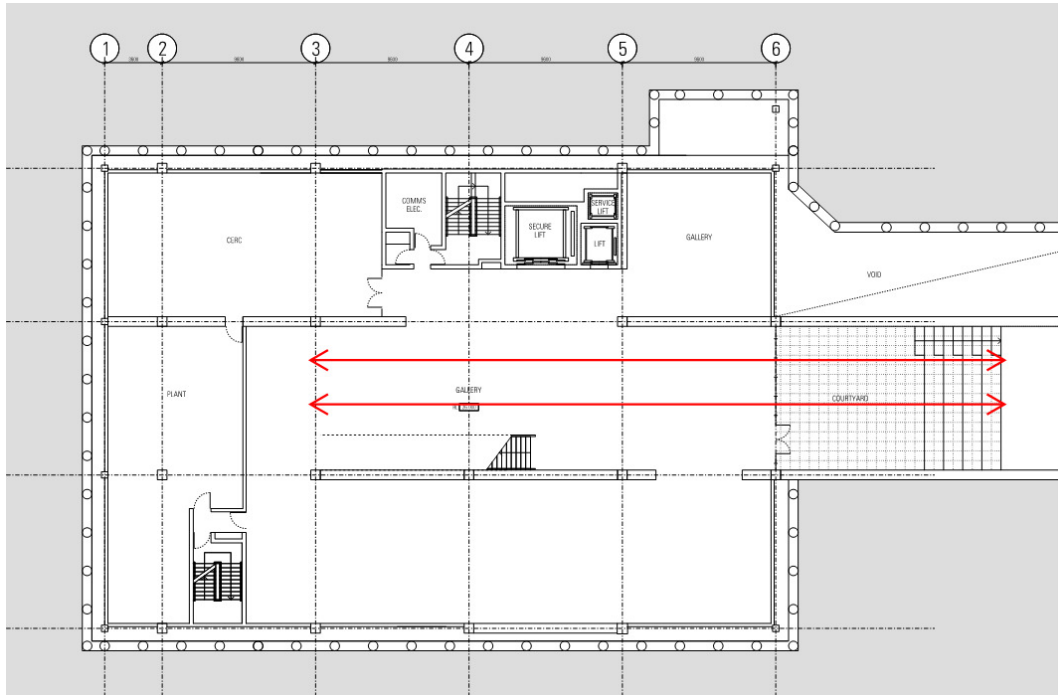


Figure 6. LL1 Natural Surveillance

8.4 Lower Ground Review

The Lower Ground floor provides gallery spaces, study areas, and a café for public access (Figure 7). The mixed use of this floor will provide strong circulation from guests and staff, increasing the natural surveillance and territoriality of the space. The voids above will allow staff and visitors from gallery and circulation spaces on the upper floors to observe individuals using the space below.

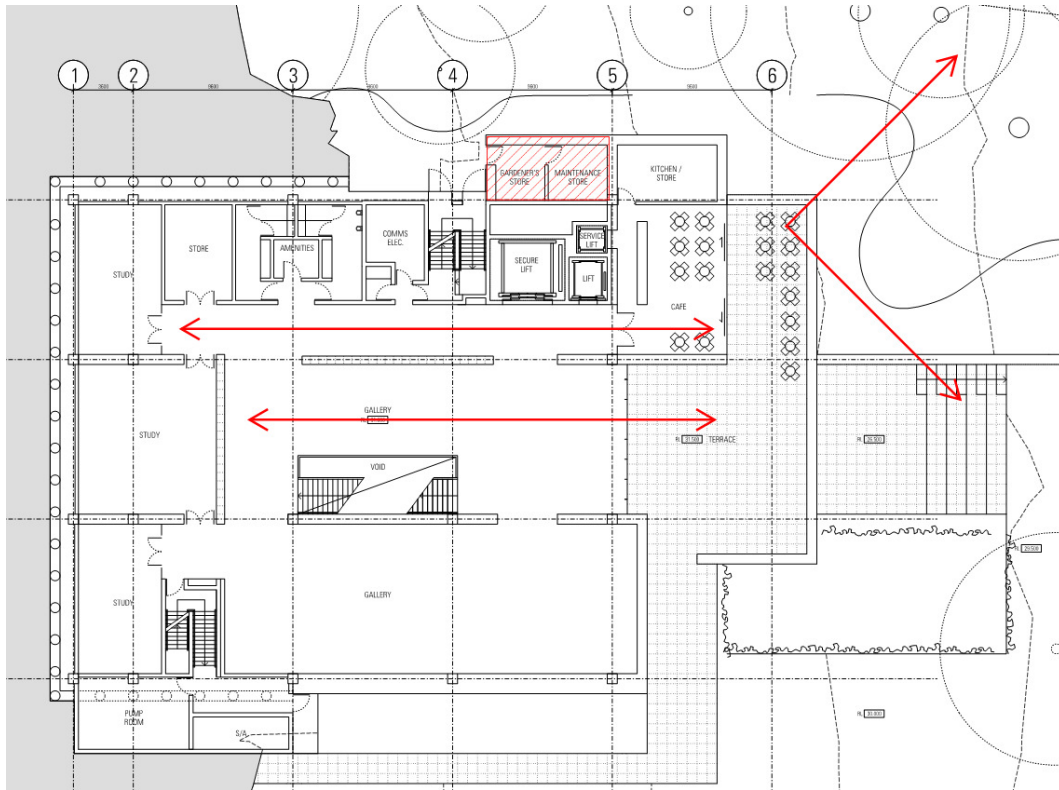


Figure 7. Lower Ground Natural Surveillance

Of particular concern are the outdoor areas to the north of the building, including the gardens and maintenance stores. These areas will not be well observed from those internal to the building, and external natural surveillance from nearby pathways is also limited. These areas should be treated appropriately with electronic surveillance and lighting measures.

8.5 Ground Review

The Ground floor is the main entrance to the gallery, including reception desk, and some gallery spaces and other public facilities such as an auditorium and shop (Figure 8).

The reception desk is well located to observe the entry to the Museum, and provides good control over the bag check area and store. Notably, the reception desk area has a significant blind spot of gallery and circulation spaces behind it, however this may be compensated for with electronic surveillance, or other staff members roaming the publically accessible space.

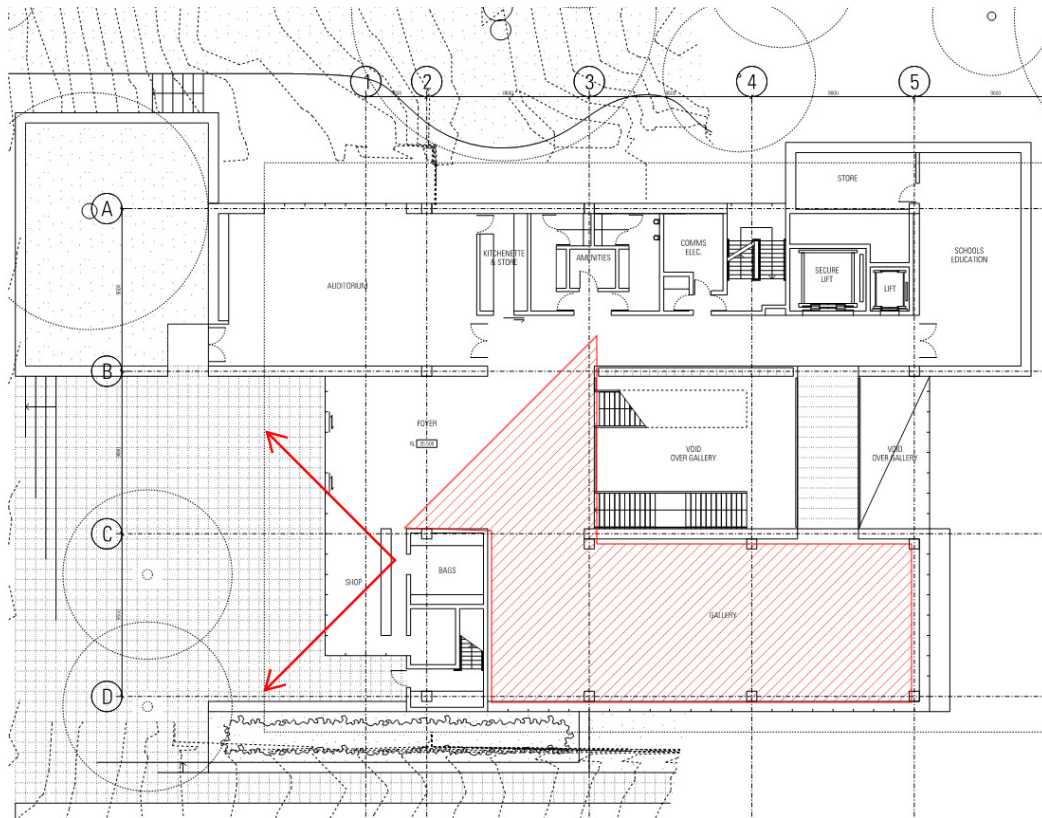


Figure 8. Ground Natural Surveillance

8.6 Upper Level Review

The Upper Level includes public circulation space and staff areas, including offices (Figure 9). Natural surveillance on this level is good, with clear lines of sight from the gallery space across the atrium area.

The mixed public and staff use of this space will encourage circulation and natural surveillance throughout.

The store area to the North of the building, adjacent to the gallery space may provide opportunity for concealment or entrapment. This area cannot be easily surveilled naturally.

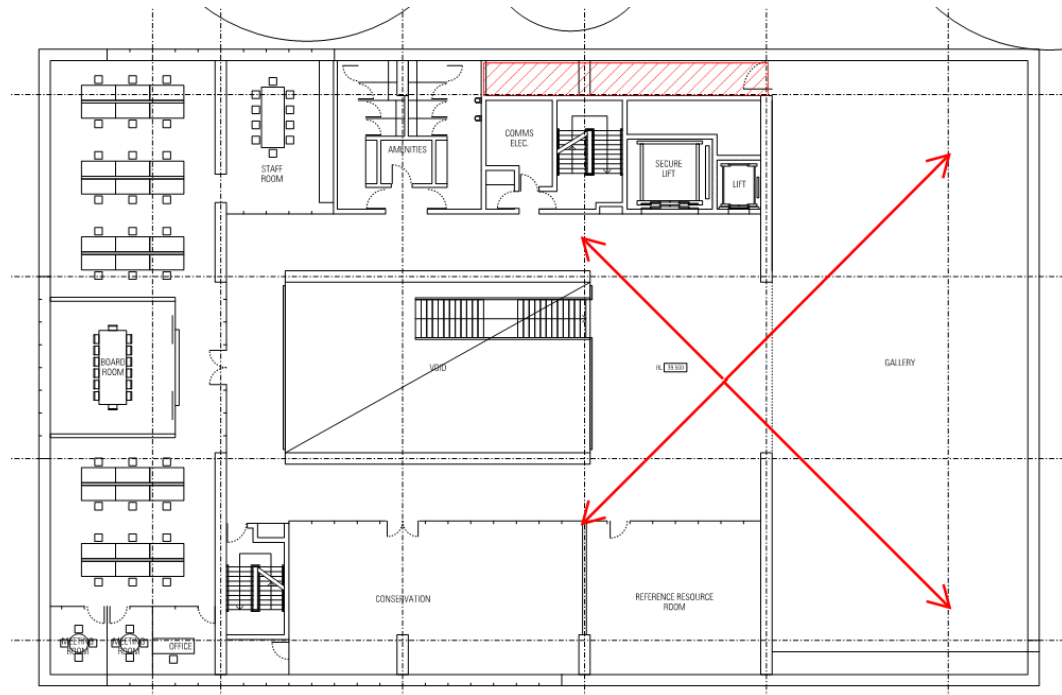


Figure 9. Upper Level Natural Surveillance

9 Recommendations

The campus and current building proposal provides very good CPTED characteristics. The following are recommended to be implemented into the campus design in order to further enhance the CPTED and security aspects of the site:

Natural Surveillance

- Use glazing where possible to facilitate natural surveillance;
- Minimise built structure where possible;
- Trees and vegetation should be well kempt and maintained to maximise natural surveillance throughout the campus;
- Trees and vegetation should be of low and high height, with clear view between these two canopy levels to facilitate natural surveillance;
- Lighting, particularly on the north side of the building and the northern walkway, may need to be improved;
- The reception desk could be relocated to provide more surveillance across the gallery entrance floor;
- The back of house areas (communications room, gas meter room) on the bottom floor could be reconfigured.

Natural Access Control

- Use of lighting, visual cues, clearly delineated footpaths, way-finding signage, and vegetation to reinforce desired walkways and movement routes.
- Make key locations and entry/exit points clearly identifiable;
- Use of physical barriers such as roller doors in the loading dock is recommended.

Territorial Reinforcement

- Vegetation immediately around the campus to be regularly maintained to assist natural and electronic surveillance, ensure proposed canopy and ground vegetation heights remain reasonably static, and to reduce areas of concealment/or concealment of suspicious packages.
- Regular maintenance of infrastructure, and prompt removal of graffiti and vandalism in order to maintain and enhance the territorial aspects of the campus;

- Area activation should be used where possible to draw a diverse and mixed use of people, functions, and activities to the area, creating a sense of ownership of the space;
- Removal of waste from the perimeter and surrounding environment;
- Environmental markers (e.g. signage, walkways, change in pavement style and type, lighting, bollards, fencing) which define intended use and ownership.