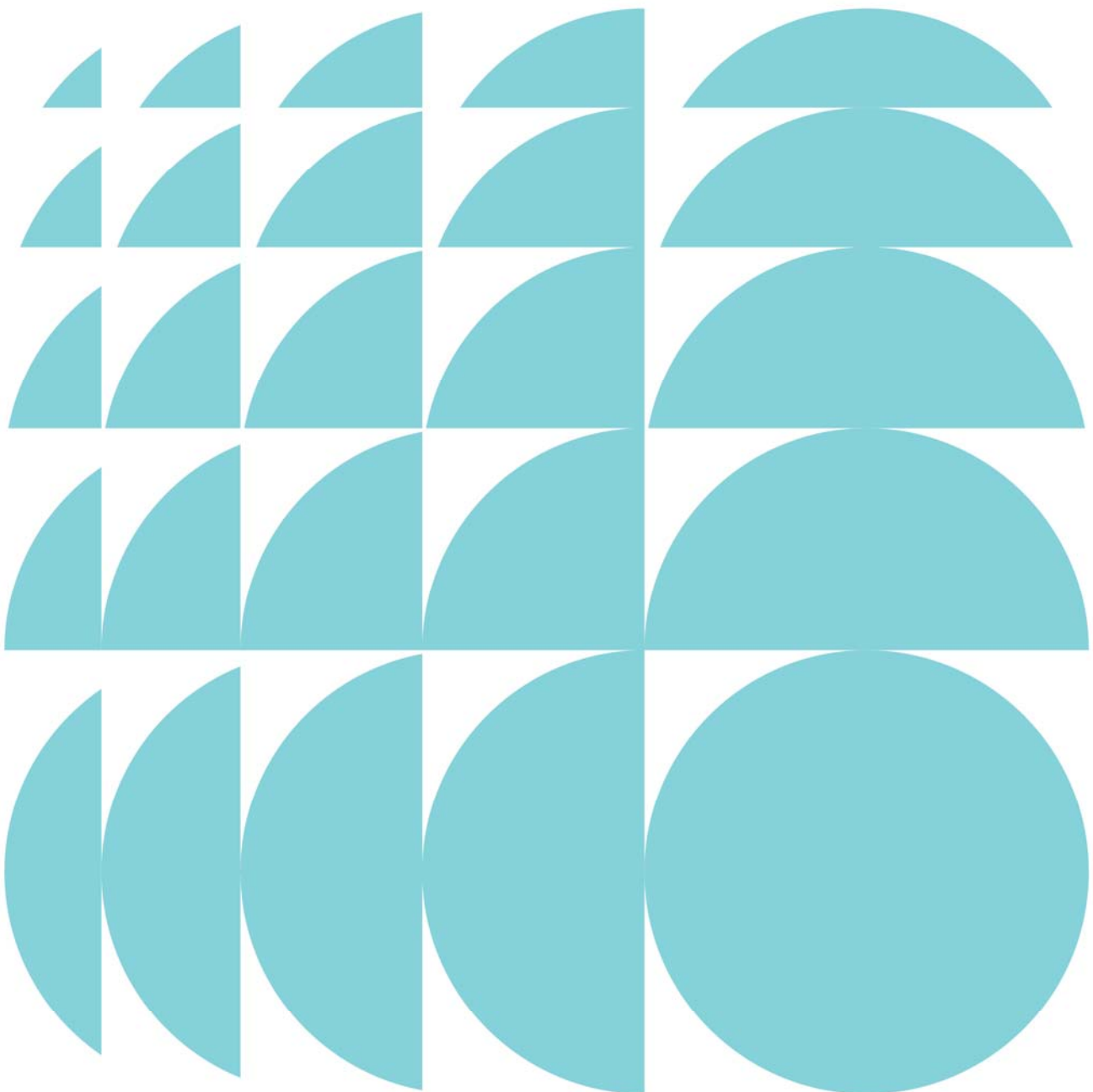


Ivanhoe Estate Masterplan
Concept Development Application

Submitted to NSW NSW Department of Planning and
Environment
On behalf of Aspire Consortium

12 December 2017 | 17156



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1.0 Introduction

This Crime Prevention Through Environmental Design (CPTED) Assessment has been undertaken to assess the potential opportunities for crime and the perceived fear of crime that may be associated with the proposed masterplan development at Ivanhoe Estate, Macquarie Park, as envisaged in the Environmental Impact Statement to which this report is appended.

CPTED is a situational crime prevention strategy that focuses on the design, planning and structure of the environment. This assessment aims to identify the potential opportunities of crime created by the proposed development by assessing the development in accordance with design and place management principles of CPTED.

Ethos Urban has prepared this assessment in accordance with the methods and resources of the NSW Police Force *Safer by Design Course*. This assessment has been prepared and reviewed by experienced CPTED professionals, following their completion of the NSW Police Force *Safer by Design Course*. The assessment uses qualitative and quantitative measures to analyse the physical and social environment in which the proposed development is located, and recommends actions to mitigate crime opportunity in accordance with the Australian and New Zealand Risk Management Standard AS/NZS 31000:2009.

In accordance with the NSW Department of Planning and Environment's guidelines (2001), the aim of the CPTED strategy is to influence the design of buildings and places by:

- increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture;
- increasing the effort required to commit a crime by increasing the time, energy or resources which need to be expended;
- reducing the potential rewards of crime by minimising, removing or concealing 'crime benefits'; and
- removing conditions that create confusion about required norms of behaviour.

Masterplan drawings prepared by Bates Smart have been reviewed as part of this assessment. The following tasks were undertaken in the preparation of this assessment:

- review of the *Safer By Design Manual* by the NSW Police Force;
- collection and analysis of local and NSW state crime statistics from the Bureau of Crime Statistics and Research (BOCSAR); and
- a crime risk assessment, in accordance with the current NSW policy and practice

A site inspection was undertaken on the 12 October 2017 between the hours 11.00am and 1.00pm to assess the current site conditions, situational crime prevention measures and perceived safety of the existing environment.

Furthermore, a meeting was held with NSW Police on 30 October 2017 to discuss the proposed Masterplan in the context of the CPTED principles and also to consider the implementation of specific CPTED feedback from NSW Police.

Lastly, it is noted that this assessment confirms that provided the recommendations of Section 6.1 are implemented, the proposed Masterplan satisfies the requirements of Part 15.1 of the Green Star Communities v1.1 – Submission Guidelines developed by the Green Building Council of Australia.

1.1 Disclaimer

CPTED strategies must work in conjunction with other crime prevention strategies and police operations. By using the recommendations contained in this assessment, a person must acknowledge that:

- there is no definitive measure of 'safety'. Therefore, this assessment cannot be used as proof of a definitive measure of safety.
- this assessment does not ensure complete safety for the community, and public and private property.
- assessment and recommendations are informed by information provided, with observations made at the time the document was prepared.
- this document does not guarantee that all risks have been identified, or that the area assessed will be free from criminal activity if recommendations are followed.
- this assessment has been undertaken on behalf of the applicant and does not represent the opinions and expertise of the NSW Police Force.

The principles of CPTED aim to minimise the opportunity for crime, but it is recognised that environmental design cannot definitively eliminate opportunities for crime, or prevent a determined perpetrator from committing such crimes.

2.0 The Site

The Ivanhoe Estate is located at the eastern corner of the Epping Road and Herring Road intersection (the Site). Located in the suburb of Macquarie Park and the Ryde Local Government Area (LGA). The Site is approximately 500m south-west of Macquarie Shopping Centre and Macquarie University Station (**Figures 1-2**). The Site is approximately 8.2 hectares in area and encompasses 17 lots. The legal description of the lots the comprise the Site are shown in **Table 1**.

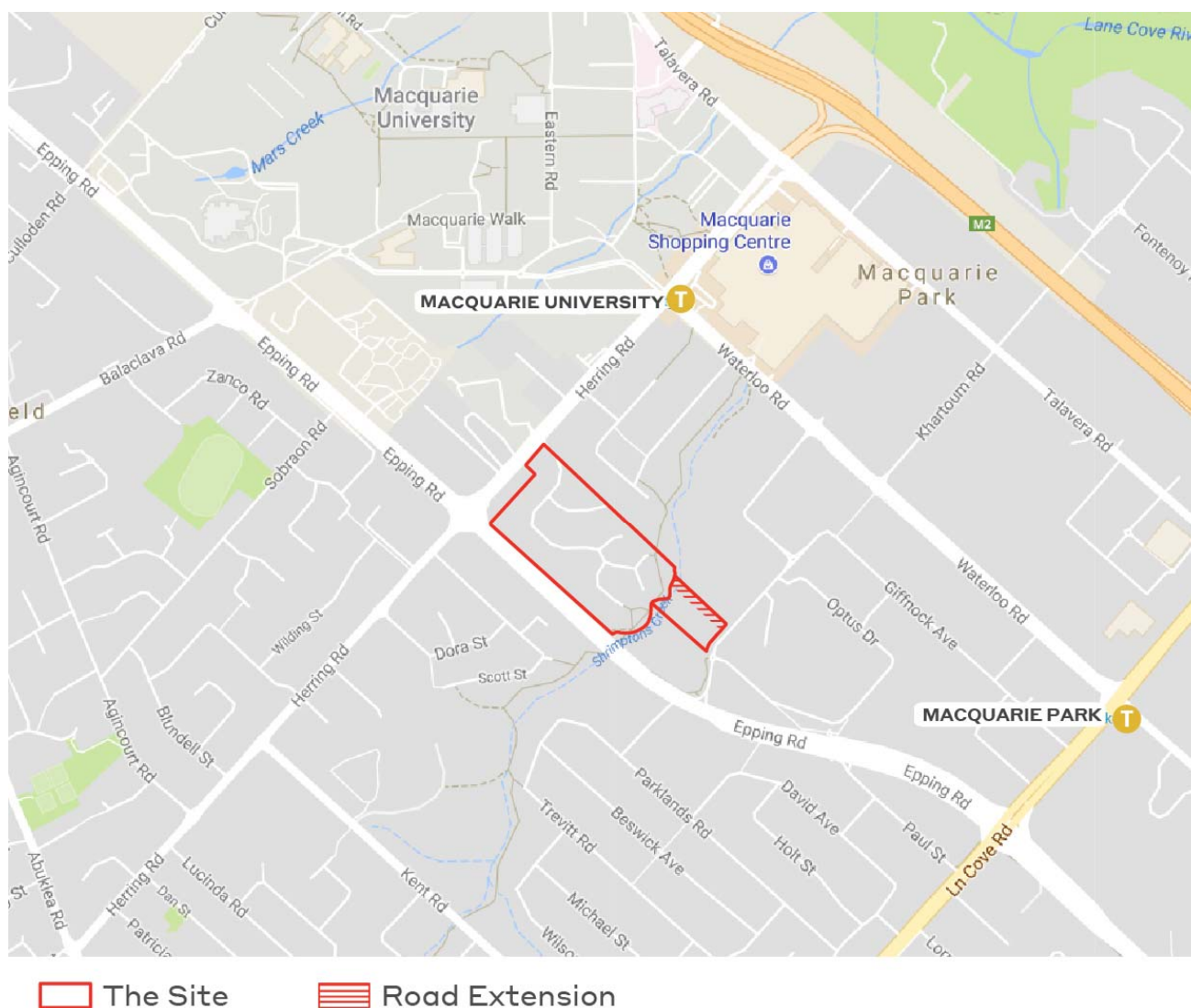


Figure 1 – Location Map

Source: Google, Ethos Urban



 The Site  To facilitate road extension to Lyonpark Road

Figure 2 – Aerial Photograph identifying the boundary of Ivanhoe Estate

Source: Nearmap, Ethos Urban

Table 1 - Legal Description of Lots that form Ivanhoe Estate

Lot	DP	Owner
5	740753	LAHC
6	861433	
7	861433	
8	861433	
9	861433	
10	861433	
11	861433	
12	861433	
13	861433	
14	861433	
15	861433	
16	861433	
17	861433	
18	861433 (internal road)	
19	861433 (internal road)	
20	861433 (internal road)	
100	1223787 (internal road)	
1	859537	Local Government Super

2.1 Existing Development

The existing Ivanhoe Estate comprises a 259 dwelling estate for the purposes of social housing. The dwellings are owned and managed by the NSW Land and Housing Corporation (LAHC). Dwelling typologies range from townhouses to residential apartments (see **Figure 3 & Figure 4**). Townhouses are generally 2 storeys in height, while the residential flat buildings are 4 storeys in height. The Site also includes significant vegetation along the south-east and south-west boundaries of the Site. Located within the vegetation along the south-east frontage of the Site are various elements of public recreation, including a skate-bowl and open grassed areas. Given the proposed new road link over Shrimptons Creek, the Site also includes part of 2-4 Lyonpark Road.

**Figure 3 – Townhouse dwellings located on the Site**

Source: Ethos Urban

**Figure 4 – Apartment buildings located on the Site**

Source: Ethos Urban



Figure 5 – Typical cul-de-sac within the Site

Source: Ethos Urban



Figure 6 – Skate bowl located adjacent to Shrimptons Creek boundary

Source: Ethos Urban



Figure 7 – Open grassed area along Shrimptons Creek boundary

Source: Ethos Urban



Figure 8 – Commercial building located at 2-4 Lyonpark Road

Source: Ethos Urban



Figure 9 – Pedestrian access connection Ivanhoe Estate and Epping Road

Source: Ethos Urban



Figure 10 – Recreational Space adjacent Shrimptons Creek

Source: Ethos Urban

2.1.1 Access

Access to the Site is provided by Ivanhoe Place, which connects to Herring Road at the north-west boundary. Ivanhoe Place is the only point of vehicle access to the Site and connects to the multiple cul-de-sacs throughout the Site. Pedestrian access is also provided by Ivanhoe Place, as well as multiple pedestrian paths that connect to the Site's perimeter. A pedestrian path connects Ivanhoe Estate to Epping Road, located approximately at the centre of the Site's Epping Road frontage. Pedestrian paths also follow the alignment of Shrimptons Creek and provide access to Ivanhoe Estate at the Site's south-east frontage.

2.1.2 Topography and Landscaping

The Site experiences a significant change of topography. The Site falls from its highest point at Herring Road (north-west frontage) to Shrimptons Creek (south-east frontage).

Significant vegetation is seen throughout the Site and is concentrated along the Site's south-east and south-west boundaries. Two ecologically significant plant community types exist on the Site, which are the Turpentine-Ironbark open forest and the Smooth-barked Apple-Turpentine-Blackbutt open forest.

2.2 Surrounding Development

Ivanhoe Estate is located within the Macquarie University Station Precinct, with surrounding development including both residential and commercial uses. Located between the Site's north-west frontage and Herring Road are multiple four-storey residential apartment buildings that are currently unoccupied, with access to this site restricted pending the approval of a new development. Immediately north-east of the Site are various medium density residential apartment buildings of approximately four-storeys.

South-east of the Site are multiple commercial office buildings ranging from 1-10 storeys, consistent with the business park typology of Macquarie Park. South-west of the Site is low-density residential development of a detached dwelling typology. Further north of the Site are high-density residential apartments, Macquarie University and Macquarie Shopping Centre, east of the Site are commercial buildings of Macquarie Park, while south and west of the Site is predominately low-density residential in character.

The riparian lands that surround Shrimptons Creek that is located along the Site's south-east boundary, continue beyond the Site in a north and south direction.



Figure 11 – Pedestrian underpass (Epping Road) adjacent the Site

Source: Ethos Urban



Figure 12 – High-density residential development located north-west of the Site

Source: Ethos Urban



Figure 13 – Vacant residential apartment buildings pending redevelopment, located north-west of the Site

Source: Ethos Urban



Figure 14 – Epping Road frontage to the Site

Source: Ethos Urban

2.3 Risk Assessment of Existing Site

A risk assessment of the Site in its existing context and form has been undertaken. Overall, the Crime Risk Rating is considered 'moderate'. The reasons for this are:

- The Site's location within an existing urban area;
- Minimal activity on the Site, as a result of vacating tenants;
- Visible evidence of graffiti within the Site;
- Visible evidence of litter and dumping within the Site, and;
- Multiple areas of unspecified use.

3.0 The Proposed Development

3.1 Secretary's Environmental Assessment Requirements (SEARs)

On 25 September 2017 the NSW Department of Planning and Environment issued the SEARs for the Ivanhoe Estate Redevelopment, Concept Development Application (SSD 8707). Key Issue 10 requires that CPTED principles are considered in the design. Accordingly, this CPTED report responds to key issue 10.

Furthermore key issue 19 requires consultation with NSW Police. In this regard a meeting was held with Ryde Local Area Command of NSW Police on 30 October 2017 to discuss the proposed Masterplan in the context of the CPTED principles. This report incorporates the comments by NSW Police in the engagement meeting. We note that detailed building design issues such as letterbox security and basement design will be addressed by subsequent stages of the Ivanhoe Estate Redevelopment and subsequent CPTED reports.

3.2 Proposal Description

The EIS to which this CPTED report is appended is submitted to the NSW Department of Planning and Environment in support of a State Significant Development Concept Approval for a large scale mixed-use development that incorporates the following works:

- A concept mixed-use development; including:
 - residential flat buildings comprising privately owned, social and affordable housing
 - seniors housing comprising residential care facilities and self-contained dwellings
 - a new high school
 - child care centres
 - minor retail development
 - community uses
- maximum building heights and GFA for each development block;
- public domain landscape concept, including parks, streets and pedestrian connections;
- provision of the Ivanhoe Estate Design Guidelines to guide the detailed design of the future buildings; and vehicular and intersection upgrades.

This application is specific to the Ivanhoe Estate Masterplan (the Masterplan), prepared by Bates Smart. A comprehensive description of the proposed development is included within the EIS to which this report is appended.

3.3 Access

Vehicle access to the proposed development remains from Herring Road, utilising the existing intersection which aligns with a roundabout. A new point of access is created by a proposed new road which connects to the Site's south-east boundary, bridging over Shrimptonss Creek and connecting to Lyonpark Road through the 2-4 Lyon Park Road site. A slip road is also proposed along the Site's frontage to Epping Road. The slip road permits vehicle to enter the Site from Epping Road but does not provide access to Epping Road to vehicles exiting the Site.

Pedestrian access is also afforded by the above-mentioned roads, as well as new pedestrian connections that afford access to Epping Road and Peach Tree Road. This is in addition to the pedestrian access created by paths that follow the alignment of Shrimptons Creek.

3.4 Car parking

Car parking will be provided within the basement levels of each buildings at later stages of the deveelopment. There are no at-grade car parking facilities proposed within the Masterplan, however some on-street car parking will be provided.

4.0 Nature of Recorded Crime

Crime statistics obtained from the NSW Bureau of Crime Statistics and Research (BOCSAR) represents criminal incidents recorded by NSW Police. A review of the local statistics for 2017 found that the most commonly occurring crimes relevant to CPTED within the Ryde LGA were:

- Assault – non-domestic violence related
- Assault – domestic violence related
- Break and enter of dwelling
- Steal from motor vehicle
- Steal from retail store
- Steal from dwelling
- Malicious damage to property

The frequency of the above crimes in the suburb of Macquarie Park, between 2014 and 2017 are detailed below.

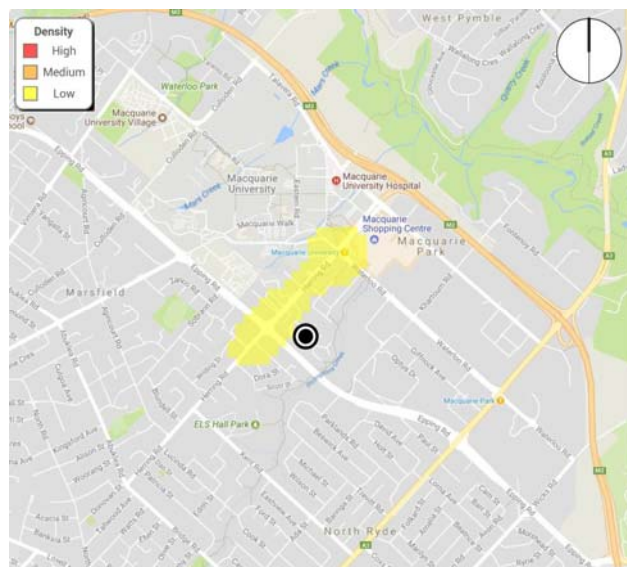
Table 2 - Statistics of recorded crime in Macquarie Park (suburb) between 2014 and 2017

Crime	Incidents 2013/2014 June	Incidents 2014/2015 June	Incidents 2015/2016 June	Incidents 2016/2017 June	2014-2017 Trend	2017 Rate per 100,00 Population
Assault – non-domestic violence related	27	27	42	31	Stable	Very Low
Assault –domestic violence related	11	12	21	11	Stable	Very Low
Break and enter – dwelling	31	24	54	20	Stable	Low
Steal from motor vehicle	43	27	55	35	Stable	Very Low
Steal from retail store	135	160	211	223	Increase	Moderate
Steal from dwelling	9	19	21	21	Increase	Low
Malicious damage to property	36	44	59	46	Stable	Very Low

Source: *Bureau of Crime Statistics and Research NSW, 2017*

As illustrated in **Figures 15-22**, The BOCSAR database indicates that the site is located within close proximity of a crime ‘hotspots’ for the following crimes relevant to CPTED.

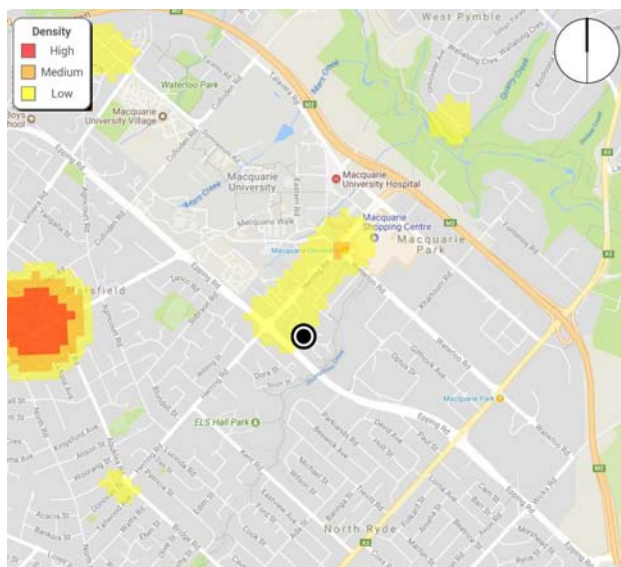
- Assault – non-domestic violence related
- Assault – domestic violence related
- Break and enter of dwelling
- Break and enter of non-dwelling
- Malicious Damage to Property
- Motor vehicle theft
- Steal from Dwelling
- Steal from motor vehicle



● The Site

Figure 15 – Assault – non-domestic related

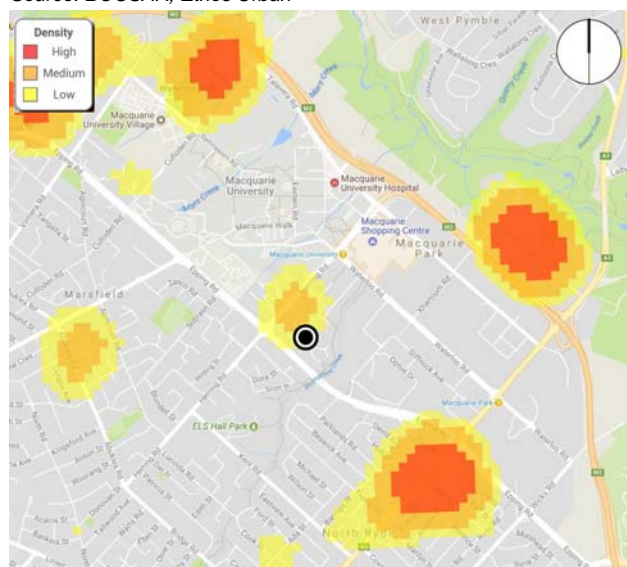
Source: BOCSAR, Ethos Urban



● The Site

Figure 16 – Assault –domestic related

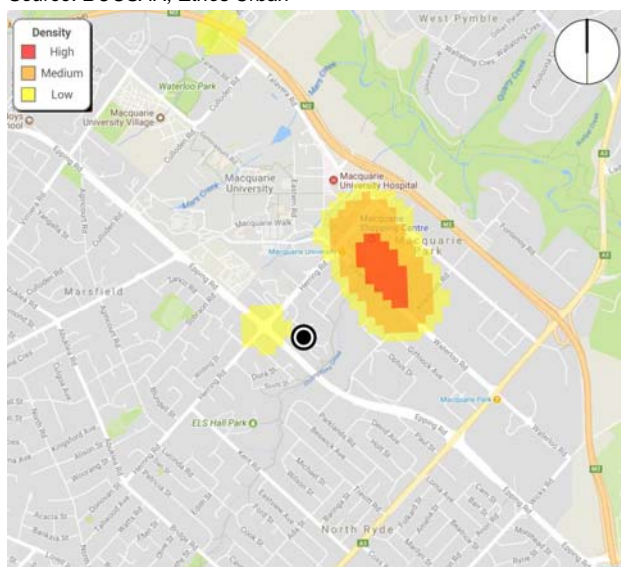
Source: BOCSAR, Ethos Urban



● The Site

Figure 17 – Break and Enter – Dwelling

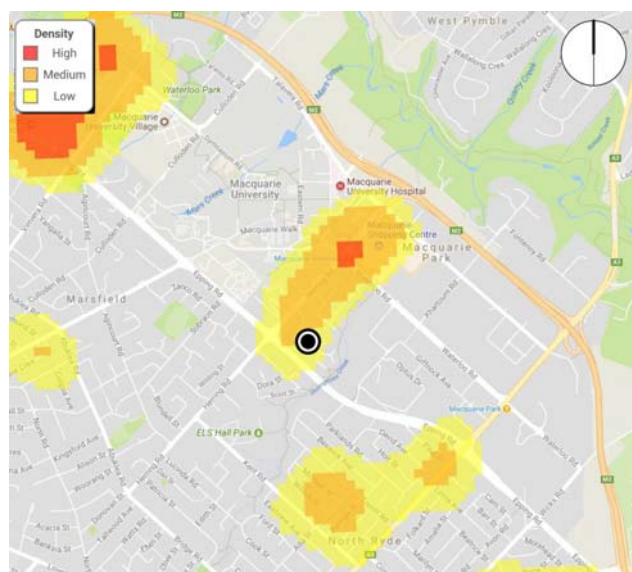
Source: BOCSAR, Ethos Urban



● The Site

Figure 18 – Break and Enter – Non-Dwelling

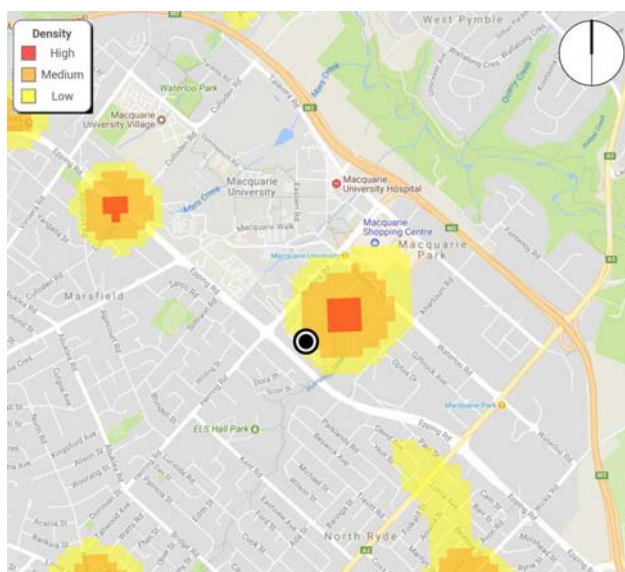
Source: BOCSAR, Ethos Urban



● The Site

Figure 19 – Malicious Damage to Property

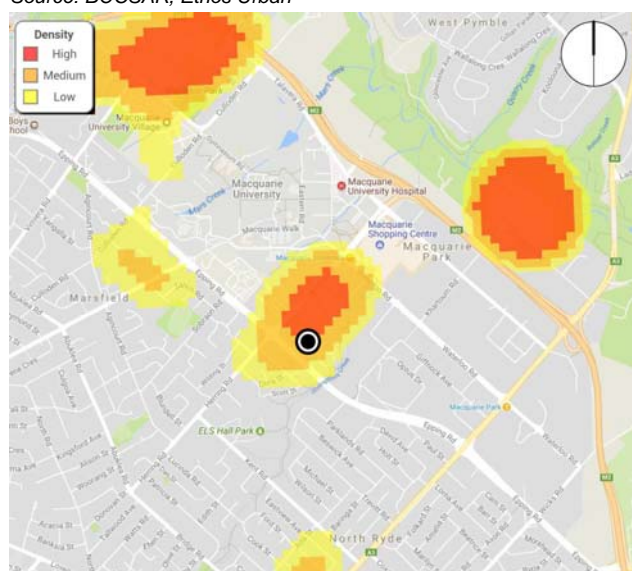
Source: BOCSAR, Ethos Urban



● The Site

Figure 20 – Motor Vehicle Theft

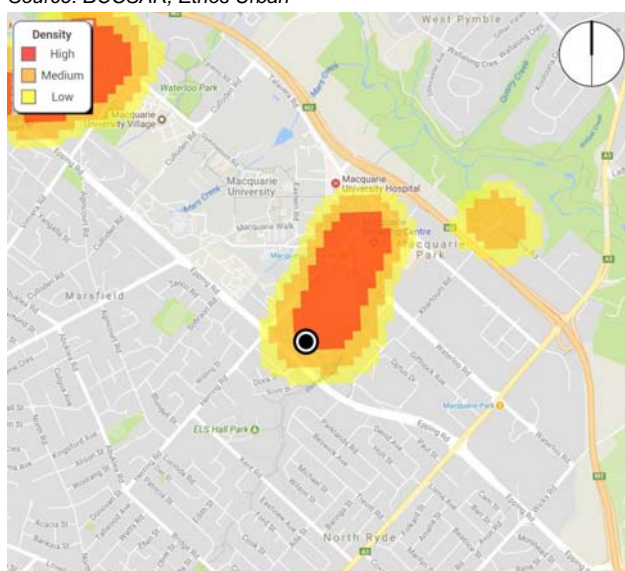
Source: BOCSAR, Ethos Urban



● The Site

Figure 21 – Steal from Dwelling

Source: BOCSAR, Ethos Urban



● The Site

Figure 22 – Steal from Motor Vehicle

Source: BOCSAR, Ethos Urban

Hotspots indicate areas of higher crime density (number of incidents per 50m by 50m) relative to crime concentrations across NSW. They are not adjusted for the number of residents and visitors in the area and thus may not reflect the risk of victimisation. In addition, we note that the BOCSAR statistics indicate that the majority of the Sydney and Paramatta CBDs are included within these hotspot areas. Given the Site's location in proximity to Macquarie Shopping Centre, Macquarie University and Macquarie University Station, the risk of victimisation is not considered to be high, relative to other similar activity centres in metropolitan Sydney.

It is noted however that the high density hotspots of Steal from Dwelling and Steal from Motor Vehicle extend to the site and immediate residential area to the north east. Building specific CPTED principles will be carefully considered to minimise opportunities for these crimes at the subsequent detailed building design stages of the redevelopment. However, application of CPTED principles at the masterplanning stage is also vital in creating an urban environment that reduces the opportunity for specific types of crime. In this instance, natural surveillance, technical surveillance, lighting, street activity and effective guardianship are considered key.

4.1 Crime Prevention Strategy

The City of Ryde Crime Prevention Plan July 2011 – July 2014 notes Macquarie Park as a hotspot for stealing/theft offences, and details crime reduction strategy that includes the following actions:

- Develop a coordinated approach to community ownership of Macquarie Park, including combining and aligning community education, street parties and situational prevention actions by Council and key partners.
- Officers are tasked to conduct High Visibility Policing through the Macquarie University and Macquarie Centre grounds and car parks.
- Shoplifting operations are conducted on a regular basis in conjunction with Loss Prevention Officers and Macquarie Centre security.
- Crime Prevention Officer and Volunteers in Policing attend major retailers and hand out crime prevention information to shoppers regarding stealing of handbags and wallets.
- Crime Prevention Officer and Volunteers in Policing attend car parks to conduct audits on vehicles with valuables found to be inside and a letter is posted to the registered owner regarding crime prevention information and instructions to not leave valuables in their vehicle.
- Once or twice per year Crime Prevention Officer has a stall at Macquarie Centre handing out general crime prevention information.
- Crime Prevention Officers attends Macquarie University, Dunmore Lang College and Robert Menzies College to provide a Crime Prevention talk to new students.

While these actions are focused on the Macquarie Centre and Macquarie University, the proposed development has the potential to facilitate multiple actions mentioned above. Further recommendations concurrent with this plan are detailed in Section 6 of this assessment.

5.0 Matters for Consideration

A potential perpetrator can take advantage of the environment, with access and the opportunity for concealment significantly affecting the safety and perceived safety of an environment. Given that steal from dwelling, break and enter and steal from motor vehicle offences are likely to be the main criminal offences affecting the users of the proposed development, the following is a critical assessment of the potential of the Masterplan design to create opportunities for such crimes, examining both positive and negative features.

The proposed development features a complex mix of uses. The proposal encompasses aspects of residential development, comprising of private, social and affordable housing, seniors housing and residential aged-care facilities, a school and child care facilities, with small-scale retail and community uses. For this reason, understanding the relationship of these uses is integral in forming recommendations for crime reduction. This context underpins an assessment of the proposed development in accordance with the CPTED principles.

It is important to note that in large developments that have a social housing component, “social interventions” (ie community policing, preventative initiatives, social engagement programs etc) are as important or sometimes more important than physical design interventions in minimising crime. A combination of both is considered the best strategy. Accordingly, social strategies are recommended to be comprehensively considered in the Social Impact Assessment report in close consultation with Frasers Property, NSW Land & Housing Corporation, Mission Australia and other partners and agencies.

5.1 Surveillance

Effective natural and incidental surveillance can reduce the opportunities for crime. The principle indicates that offenders are often deterred from committing a crime in areas with high levels of natural surveillance. The following design interventions benefit optimal natural surveillance:

- Clear sight lines between public and private places and maximising natural surveillance
- Appropriate lighting and effective guardianship of communal and/or public areas
- Minimal opportunity for offenders to conceal themselves or entrap victims

In a general sense the street pattern and block layout promotes clear sight lines, natural surveillance, ease of access and wayfinding. Importantly the proposed central location of the retail uses, plaza, village green and adjacent school creates a community hub and promotes human/social activity, a key component for a well-functioning community that has a strong sense of place and feeling of safety.

Opportunities for natural surveillance are generally benefited with the proposed development. The linear orientation of roads within the proposed development maximises sight lines. As all buildings within the proposed development will likely have apartments orientated towards the road, natural surveillance from dwellings to the surrounds is maximised. The organisation of non-residential uses also facilitates natural surveillance. Uses such as the school, aged care facility, retail components and public park are co-located, in turn creating an activity node within the Site, resulting in inter-dependent opportunities for natural surveillance created by their various times of occupancy and use.

The placement of apartments facing the Shrimptons Creek riparian corridor maximises natural surveillance and effective guardianship opportunities to this important local public recreation area and pedestrian connection.

However it is noted that natural surveillance is limited in the significantly vegetated edges of the site. Also, the existing and proposed pedestrian underpasses that follow the alignment of Shrimptons Creek and concealed by the above roads. Opportunities for natural surveillance created by surrounding uses are limited in these sections of the path. As such, technical surveillance is recommended in these areas to improve surveillance. Furthermore, all new landscaping and existing vegetation where appropriate should either be less than 1m in height or have a canopy above 2m in height in order to improve sight lines and minimise concealment opportunities. This is particularly important along the edges of pedestrian pathways.

Recommendations in this respect are provided at Section 6.0.

5.2 Lighting and Technical Supervision

Effective lighting and discrete technical supervision can reduce fear, increase community activity, improve visibility and increase the likelihood of offenders being detected. Lighting and technical supervision are integral in increasing the safety and perceived safety. All lighting provided within and around the development, including the through site links and laneway should ideally exceed the minimum Australian Lighting Standard AS/NZ 1158 for public streets, car parks and pedestrian areas, specifically addressing crime and fear reduction.

Exterior lighting may be challenged by the concentration of vegetation that is placed throughout the Site, and specifically along the Site's boundaries and along Shrimptons Creek. With the proposed development featuring multiple uses, 'black spots' may be created during times of inactive use. This is specifically relevant to the school and retail spaces which are unlikely to be illuminated outside of their operational hours.

Discrete technical supervision by way of closed-circuit television (CCTV) is also warranted within the proposed development and should respond to the various uses and activity. The placement of CCTV within various buildings and spaces throughout the Site should specifically focus on providing coverage to key access points, and areas that do not benefit from natural surveillance. For this reason, Discrete CCTV is considered appropriate in building entrances (including vehicle entrances), in places of public gathering and recreation, and pedestrian pathways that do not otherwise benefit from natural surveillance. However, as with a typical suburban neighbourhood, CCTV that monitors the entire site is not considered appropriate.

Recommendations in this respect are provided at Section 6.0.

5.3 Territorial Reinforcement

Territorial reinforcement involves the perceived ownership of public spaces. Users will be more inclined to visit areas that are maintained and to which they feel they have a vested interest in. A well-used and dynamic public space is made safer by natural surveillance. Designing with a clear transition between public and private spaces, and clear design cues indicating the intended use of space is critical. A well maintained public domain is critical in encouraging occupancy of space, both in the interior and exterior of the development.

Given the context of the proposed development, territorial reinforcement and associated effective guardianship will be critical in ensuring safety and crime reduction. Clear delineation between public land (ie roads to be dedicated to Council), community/communal land and private land is considered of high importance in this type of development. Clear delineation and territorial reinforcement of different land ownership and uses ensures that the ambiguity of spaces and confusion of use are minimised. This promotes a confidence in residents to take effective guardianship of spaces and reduces excuse making for offenders. Defined landscaping along these land ownership and use interfaces is recommended. Signage also assists in this respect to let residents and visitors better understand delineations.

However, the proposed development should in no way appear to be fortified, nor should there be an obvious division between the various leasing and ownership arrangements of dwellings. Critical to the creation of effective guardianship is social inclusion, which is disadvantaged by the obvious physical and visual division of residents based on their socio-economic status.

5.4 Environmental Maintenance

There is a strong association between environmental maintenance and the fear or perceived fear of crime. General image can greatly affect the individual's desire to enter and engage with space. Environmental maintenance and territorial reinforcement are co-dependent in achieving a safer space and are integral in achieving optimal natural surveillance. The maintenance of the built form, landscaping and lighting will assist in communicating care and the presence of effective guardianship. Routine maintenance is a strong indicator of area management and safety.

As the proposed development will include numerous stakeholders in its operation, the clear articulation of a management body is necessary. Management should enforce effective and thorough environmental maintenance procedures. As the proposed development includes a high concentration of significant vegetation, environmental maintenance procedures should ensure that this vegetation does not compromise other principles of CPTED such as access control and surveillance. This is specifically relevant in areas where multiple stakeholders are involved, such as the pedestrian underpasses. As these areas are the responsibility of Council, management of the proposed

development should ensure that their actions do not contradict the maintenance procedures of other parties. Consistency in the standard of upkeep throughout the entire Site and its immediate surrounds is critical.

Recommendations in this respect are provided at Section 6.0.

5.5 Activity and Space Management

Similar to environmental maintenance, there is a strong association between activity and space management, and the fear or perceived fear of crime. Unlike environmental maintenance, this principle endeavours to manage the more dynamic activity and use of space.

The effective management of activity and space within the proposed development is critical given the various uses that will occupy the Site. Some stakeholders, such as the school and aged care facility are likely to enforce their own management procedures, while the management of social housing dwellings may be universally applicable throughout the entire development. Critical to the holistic management of the Site is the formation of a management body, tasked to manage the interests and operational requirements of all stakeholders. Such a body should clearly specify the responsibilities of each stakeholder and the physical extents of their management responsibilities.

As effective guardianship plays such a critical role in the safety and perceived safety of the proposed development, the management body should specifically address social inclusion throughout the proposed development. While such programs may be facilitated by a group of stakeholders (such as Mission Australia or the NSW Land and Housing Corporation), they may involve the participation of other stakeholders. It is important that certain uses within the proposed development, such as aged care, schools and child care do not become isolated in their operation and actively participate in the community. Also, consideration of commercial tenancies throughout the proposed development requires consideration.

Recommendations in this respect are provided at Section 6.0.

5.6 Access Control

Access control strategies restrict, channel and encourage the movement of people and vehicles into and through designated areas. Unauthorised entry is reduced by physical and technical barriers, as they increase the effort required to commit a crime. The proposed development includes multiple types of access, these include:

- Primary – access to all public areas, including all streets, retail areas and the public parks.
- Secondary – access to semi-public areas, including building lobbies, the school, child care facilities and aged-care facilities.
- Vehicle – i.e access for vehicles for parking and loading within the proposed development, encompassing all the above uses.

As with territorial reinforcement, it is important to maintain that the proposed development be free of physical access control that appears to fortify the environment. Access control should not unnecessarily delineate the ownership of dwellings. While appearing to fortify the proposed development is considered inappropriate, areas within the proposed development such as the school and age-care facility may require provisions that increase access control. In areas of the proposed development that are freely accessible to the public, the consideration of other CPTED principles such as lighting and technical supervision may be required.

We note that detailed assessment of access control for the future buildings will occur at subsequent stages of the Ivanhoe Estate Redevelopment.

Recommendations in this respect are provided at Section 6.0.

5.7 Design, Definition and Designation Conflicts

The design of the proposed development reflects its purpose, and while perpetrators will often exploit areas with unclear spatial definition, the design of the proposed development generally benefits multiple principles of CPTED.

The Masterplan is benefited by the regular layout and orientation of roads and buildings, which benefits natural surveillance and wayfinding. The proposed development may be challenged by the high concentration of vegetation located along the Site's perimeter. Maintenance of this vegetation should occur to ensure that these areas do not undermine the principles of CPTED, including access control, natural surveillance, effective lighting and technical surveillance.

Conflict may occur between the various uses within the proposed development, therefore effective management of activity and space is required together with social interventions.

Recommendations in this respect are provided at Section 6.0.

6.0 Crime Risk Rating and Recommendation

The Crime Risk Rating considers the development as proposed in Masterplan prepared by Bates Smart within the site's environment.

Acknowledging the site context and the issues discussed in Sections 2, 4 and 5, the Crime Risk Assessment Rating of the proposed development is rated within the 'moderate' category. An assessment of the proposal using CPTED principles has found that, provided the actions recommended below are implemented the rating would remain within the 'moderate' category, and could potentially improve to the 'low' category in a future assessment.

This Crime Risk Rating incorporates the inevitable risk of crime associated with large scale mixed-use development. While the proposed development will likely increase the opportunities for crime, purely by the increase of use and occupancy of the site, our assessment finds that the design of the Masterplan is generally consistent with the principles of CPTED.

In informing the Conditions of Consent, recommendations to further improve the safety and security of the proposed development are detailed in Section 6.1.

It is noted that the assessment contained in this report confirms that provided the below recommendations are implemented, the proposed Masterplan satisfies the requirements of Part 15.1 of the Green Star Communities v1.1 – Submission Guidelines developed by the Green Building Council of Australia. In this regard, a crime risk assessment process has been undertaken and a design strategy has been adopted that incorporates designing out crime principles. Furthermore, the Masterplan design encourages natural surveillance of public areas from the internal street network and by the future placement of buildings. The recommendations provided below also aim to improve the end to end visibility of the pedestrian underpasses.

6.1 Recommendations

Surveillance

- In areas of dense vegetation, ensure sight lines along pedestrian paths are maintained. Ensure opportunities for natural surveillance are not reduced by an unmaintained environment along these paths.
- In the design of buildings, ensure opportunities for concealment are minimised by reducing alcoves and recesses throughout building exteriors.
- Ensure driveways and pedestrian pathways do not lead to concealed spaces.
- Where practically possible, ensure the distance of a driveway to a public road is minimised.
- The pedestrian entry/egress points to/from the site from Epping Road are recommended to be clearly defined and have a generous width, be appropriately lit and be provided with clear sight lines to ensure natural surveillance. Through landscaping or other means discourage the provision of formal (or informal) narrow and unobserved entry/egress points from Epping Road that could assist an offender entering and exiting the site unnoticed.
- All new landscaping and existing vegetation (where appropriate) should either be less than 1m in height or have a canopy above 2m in height. This is in order to improve sightlines and minimise concealment opportunities throughout the Ivanhoe Estate Redevelopment. This is particularly important along the edges of pedestrian pathways, and regular maintenance should occur to ensure vegetation does not encroach upon sightlines.

Lighting and Technical Supervision

- All lighting provided within and around the development, including the through site links and laneway should ideally exceed the minimum Australian Lighting Standard AS/NZ 1158 for public streets, car parks and pedestrian areas, specifically addressing crime and fear reduction.
- Consistent and uniform lighting is recommended throughout all public and ground level communal areas (where appropriate) within the proposed development. This lighting should also aim to minimise light pollution and light spill on to future residential building windows.

- In public and communal areas (where appropriate), and also along the creek corridor pathway lighting that maintains an average illuminance of between 20-30 Lux with an average uniformity level of 0.4 Uo is recommended.
- The public creek corridor pathway Epping Road underpass lighting is recommended to be upgraded to achieve an average level of illuminance between 50-60 Lux and an average uniformity of 0.5 Uo. This lighting should also be extended to the immediate approaches to the underpass. This recommendation also applies to the pathway underpass of the proposed bridge over Shrimptons Creek.
- Outdoor lighting is recommended to have an appropriate Colour Rendering Index (CRI) for accurate identification of colour. All outdoor lighting within the proposed development should comply with AS4282-1997. A lighting strategy should be prepared in this respect by a suitably qualified and experienced lighting consultant.
- A CCTV network is recommended to be implemented. We recommend that the CCTV network use a discrete style of camera (such as a small dome camera) that is integrated/attached to the street lighting or similar. This is to minimise the perception of inherent insecurity associated with large and prominent cameras that can have a negative social effect.
- The CCTV network at a minimum is recommended to cover the entrance/egress points of the site, public plaza and central retail hub area, front entrances of the future school, aged care facility, child care centre and residential buildings. Furthermore, it is recommended that the proponent and Council in partnership seek to extend the CCTV network to the creek corridor pathway and underpasses which will be in public ownership.
- Ensure that the CCTV infrastructure is consistently maintained and footage is stored for a minimum of 30 days.
- It is recommended that a security consultant with a Class 2A licence under the Security Industry Act 1997 is engaged to provide specific advice on placement, installation, monitoring and maintenance of the CCTV network.

Territorial Reinforcement

- Ensure the delineation of public land is clearly articulated through the design of landscaped environments and measures of territorial reinforcement do not appear to fortify the proposed development and the Site.
- Clear delineation between public land (ie roads to be dedicated to Council), community/communal land and private land is considered of high importance in this type of development. Defined landscaping along these land ownership boundaries and use interfaces is recommended.
- Appropriate signage (inc. wayfinding) is also recommended to assist in communicating to residents and visitors these ownership/use delineations.
- The site boundaries along Epping Road and Herring Road are recommended to be clearly defined to delineate the boundaries of the site, but not to create the sense of enclosure or access control. At the Shrimptons Creek parkland interface, similar delineation that provides a defined edge is suggested to clearly delineate between the future public creek corridor and the Site. The provision of subtle signage at site entry points to inform people they are entering private land could also assist in this regard.

Environmental Maintenance

- Ensure an effective and prompt response to environmental maintenance is clearly specified through a Plan of Management. Environmental Maintenance should acknowledge the principles of CPTED. The Plan of Management should ensure general building maintenance and cleanliness is maintained throughout the estate to ensure there is no visual indication that a unit or building is social, affordable or general market housing.
- A strategy to improve the visual appearance and ongoing maintenance/cleaning of the Epping Road underpass of the pathway is recommended to be prepared. This is recommended to include innovatively upgrading wall, floor and balustrading materials, finishes and colours. Murals/art work by local artists could also be explored to minimise unwanted graffiti and tagging, however there needs to be renewal of the murals/art work every 2-3 years given that more recent murals/art work are less prone to tagging, "throw-up" graffiti and other forms of vandalism.
- Regular maintenance and cleaning and rapid removal of graffiti and the repair of vandalism is crucial to the ongoing perception of safety of the pedestrian underpasses of the creek pathway and should be incorporated into a plan of management in consultation with Council.

Activity and Space Management

- Ensure the effective management of the proposed development is articulated through a Plan of Management.
- Ensure social engagement programs are priorities within management procedures prepared by NSW Land and Housing Corporation in consultation with Mission Australia and other agencies and partners.

Access Control

- Ensure that any access control does not appear to fortify the environment. Indeed, any fencing along internal street boundaries to terrace style units be visually attractive and low in height.

Design, Definition and Designation

- Ensure there is visual uniformity as far as possible between all proposed housing types, so a casual observer could not differentiate between a social or affordable housing unit and a general market housing unit.
- Recommend ground floor residential units for the future buildings to have individual entries as much as practicable. This increases activation of street frontages, natural surveillance and effective guardianship.