GDA Consultancy

Security Needs Assessment
BREEAM HEA-06

Establishing Security Requirements
Based on Threat & Risk Assessment
and
Crime Impact Statement

Great Northern Project
GNW Developments Limited
Manchester

GDA-GNW- TARA-SNA report Vn 1.3 Final
18th November 2022
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Terrorist Vulnerability Assessment
Physical Security Counter Measures
Explosion & Ballistic Testing
Training & Procedures

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Table of Contents

1.0 Introduction 3

1.1 Security Consultees – GMP Crime and Counter Terrorism 3

1.2 Qualifications of Report Author: 3

1.3 Great Northern Warehouse Development – Site Details and Proposed Redevelopment. 4

1.3 Existing Neighbourhood and Environment 6

2.0 Protective Security Principles & Design Impact 7

2.1 Threat and Risk Assessment Process 7

3.0 Threats 8

3.1 Assessing the Threat of Terrorist Attack in Manchester 8

3.1.1 Threat from Irish Republican Terrorist Groups 8

3.1.2 Islamist Terrorism 8

3.1.3 Summary of Potential Terrorist Threats 9

3.2 Risk to Property from Terrorist Bombing 10

3.2.1 Terrorist Bomb Threat (VBIED) 10

3.2.1.1 CPNI Recommended Blast Protection – Glazing 11

3.2.2 Façade Recommendation to Counter Effects of VBIED Threat: 11

3.2.3 Crime Impact Statement - Caveat for Accessible Glazing 12

3.3 Vehicle as a Weapon Attack 13

3.3.1 Vehicle as Weapon (VAW) Threat 13

3.3.1.1 Risk of VAW Attack Against the Great Northern Development site. 14

3.3.2 Recommended Risk Mitigation Measures – Vehicle as Weapon Threat 14

3.4 Explosive Belts - Placed Charges 15

3.4.1 Recommended Risk Mitigation Measures – Explosive Belts and Placed Charges 15

3.5 Marauding Armed Attack 16

3.5.1 Recommended Risk Mitigation Measures – Marauding Armed Attack 16

3.6 Fire as a Weapon 16

3.6.1 Recommended Risk Mitigation Measures – Fire as A Weapon 16

3.7 Threats in The Mail and Courier Deliveries 17

3.7.1 Recommendation Risk Mitigation Measures – Mail/Courier Delivered Threats 17

4.0 Crime Impact Assessment 18

4.1 Crime Prevention and Operational Strategy 18

4.2 Operational Security Plan 18

4.3 Cycle Store – Crime Mitigation 19

4.3.1 Security Measures for Cycle Store 20

5.0 Security of Loading Bay 21

5.1 Security Measures for Loading Bay 21

6.0 Security within Public Terrace at Level 02 22

6.1 Recommendations for Security of Public Terraces 22

6.2 Recommended Level of Security Staff 22

7.0 Security Within Residences 23

7.1 Residential Entrances – Unmanned 23

7.2 Concierge Entrance 23

8.0 Security Within Car Parks 24

9.0 Security Control Room – Role in Emergency 25

Recommendations for Security Control Room Design and Operation 25

10.0 Summary 26

Annex A: Record of Consultation with Greater Manchester Police CTSA 27

Document reference	Version	Author	Purpose
GDA-GNW-TARA-SNA report dated 15/11/2022	1.1 draft	S Trundle GDA	Internal review
GDA-GNW-TARA-SNA report dated 17/11/2022	1.2	S Trundle GDA	Report issued for Client review
GDA-GNW-TARA-SNA report dated 18/11/2022	1.3	S Trundle GDA	Final

1.0 Introduction

Grendon Design Agency (GDA) was appointed by GNW Developments Limited to undertake a security focused threat and risk assessment review of the proposed redevelopment of the Great Northern Warehouse project and associated retail and residential elements in support of the BREEAM HEA 06 award for effective and appropriate security incorporated within the design and operation of the site.

1.1 Security Consultees – GMP Crime and Counter Terrorism

In undertaking the security and crime assessment for this project we have consulted with the Greater Manchester Police, Counter Terrorism Security Advisor (CTSA) Simon P McNulty.

A Crime Impact Statement was prepared by David Maher, consultant to the Greater Manchester Police with the following title and reference:

Crime Impact Statement (draft)
Apartments, Retail, Offices and Leisure
GNW Developments Limited
Version A dated 26/08/2022
Ref: 2015/1104/CIS/03
Author: David Maher
david.maher@gmp.police.uk

The advice contained within the Crime Impact Statement and additional counter terrorism advice received from the CTSA form the central elements of the security strategy for this development.

The Crime Impact Statement report contains general advice and recommendations in sections 3.3 and 3.4 by the CTSA Simon P McNulty and these recommendations together with the notes from the additional meeting held on the 28th October 2022 summarises the counter terrorism protective design strategy for this project. The minutes of 28th October meeting are included in Annex A of this report.

1.2 Qualifications of Report Author:

In accordance with the advice of the Center for Protection of National Infrastructure (CPNI) which is the advisory body on national security and provides CTSA officer training and briefing,

"a person providing advice in relation to security and blast mitigation should 'be able to demonstrate that they have the training and experience to meet the appropriate RSES competences or career experience demonstrated by involvement in previous projects" (CPNI document EBP 01/14: April 2014).*

*RSES = Register of Security Engineering Specialists

The author of this report, Simon Trundle, Managing Director of GDA has provided blast advice to government and commercial projects in the United Kingdom for more than 35 years. As manager of the national ComBlast explosion testing program, Simon has been instrumental in developing protective standards related to injury mitigation from glazing subjected to blast loading. Beginning his career in Northern Ireland working on designing blast protection measures for Police and Military facilities, Simon established Grendon Design Agency Limited (GDA) in 1992 to support property developers and clients by helping to define appropriate risk-based security measures.

- Simon Trundle is registered as a Suitably Qualified Security Specialist (SQSS) under the SABRE Assessors and Professionals register (register number SLC-027-001) in respect of BREEAM HEA06. A copy of the necessary registration certificate is included with this report.
- GDA have provided blast protection advice on multiple government projects within the United Kingdom including HM Treasury, HMRC, Supreme Court, Thames House, MoD Main Building and the Parliamentary Estate.
- Simon Trundle is the writer and producer of the national Police training DVD "Be Safe Not Shattered'. This DVD program is used to advise property developers and government departments on appropriate levels of blast protection related to glazed facades.
- Simon Trundle contributed to CPNI EBP 01/14: Guidance Note: Measures to Improve the Blast Resistance of Glazing'.
- Previous experience demonstrates competence in understanding blast loadings on structures.
- Simon Trundle was chair of EN standards committee that developed current standards on blast and ballistic testing and certification of windows, doors, curtainwall and shutters (committee reference CEN TC33 TG1&2 AH3).
- Advised government departments on physical security protection systems to resist forced entry, building invasion and small arms attack.

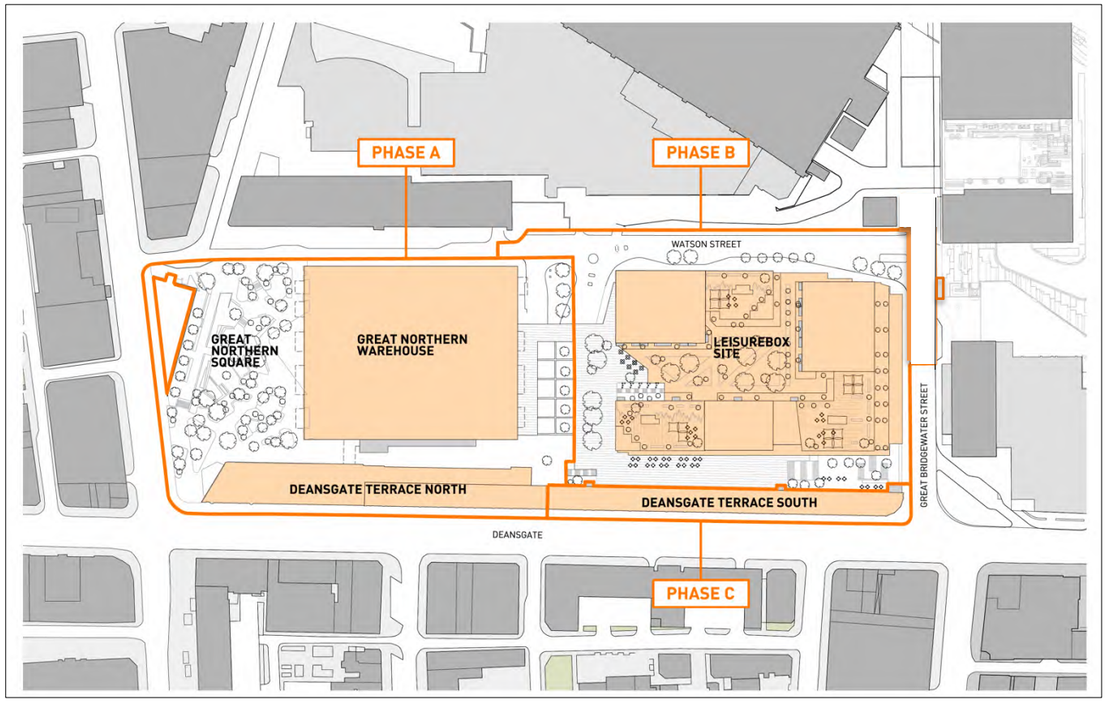
GDA have conducted similar threat assessment studies, including blast design advice, on a multitude of commercial projects within the United Kingdom including the following:

- Salford Quay development including BBC headquarters
- BBC Birmingham Mailbox midlands HQ.
- BBC Glasgow
- JPMC Glasgow
- Landsec Oxford City Center including retail, residential and parking.
- Cardiff Central Square development including BBC Wales headquarters.

In addition to the above GDA have provided security consultancy services on multiple projects within the City of London including 1 & 2 London Wall, 100 Bishopsgate, 1 XXXX Street, 10 Fenchurch Street, the Broadgate Estate, 20 Fenchurch Street, Heron Tower, Heron Plaza, various TFL properties across London, Ministry of Defense Headquarters, The Old War Office and Admiralty Arch redevelopments in Whitehall and multiple commercial office and retail developments throughout the United Kingdom and internationally.

1.3 Great Northern Development – Site Details and Proposed Redevelopment

The project involves the phased redevelopment of the Great Northern Warehouse, Deansgate Terrace and creation of the Leisure Box elements generally comprising of the following works:



P1: Construction Phase

Phase A:

- Refurbishment, restoration, and re-use of the Grade II* Listed Great Northern Warehouse to provide additional restaurant and / or retail units and office space on upper three floors and associated storage.
- Refurbishment, restoration and extension of the Grade II Listed Deansgate Terrace and Goods Yard Entrance to form ground floor retail or restaurants and commercial offices above.
- Reconfiguration of Great Northern Square and the introduction of additional public realm with associated hard and soft landscaping.

Phase B: Leisure Box Site

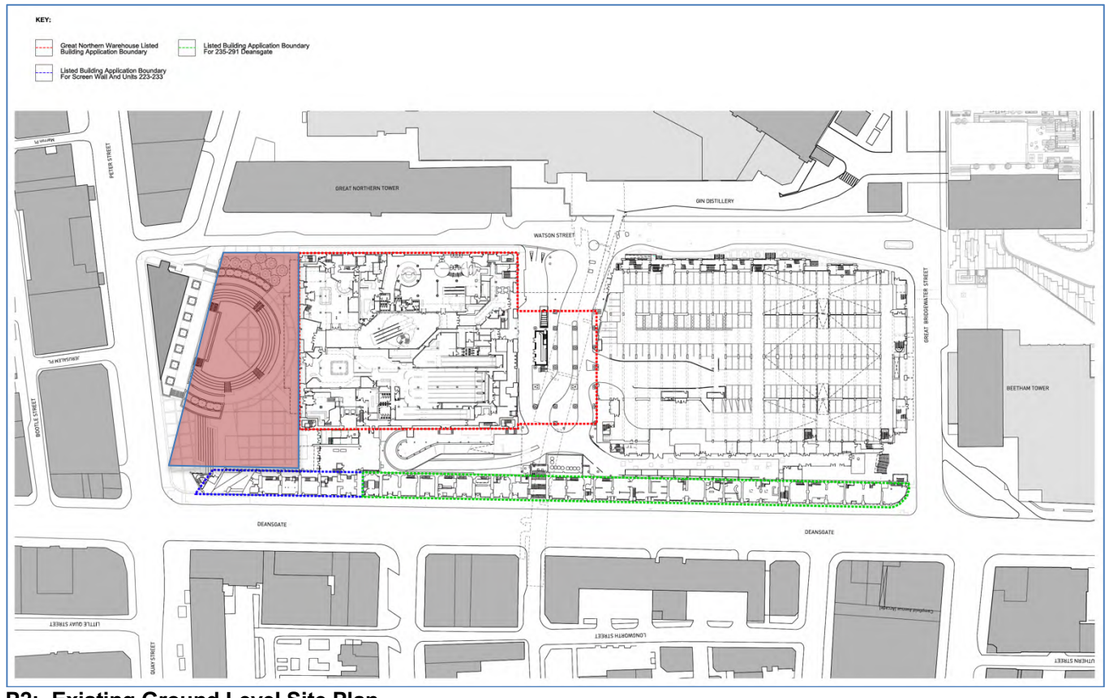
- Demolition of the existing cinema and surrounding elements and structures prior to conversion, reconfiguration and extension of existing car parking facility to provide 929 parking spaces, 753 cycle parking spaces and associated plant.
- Construction of three residential buildings to provide 746 no. apartments above the retained car park comprising 16, 27 and 34 storeys, in addition to external alterations, restoration.

Phase C: Deansgate Terrace South

- Restoration and extension of Deansgate Terrace South to provide ground floor retail with offices above.

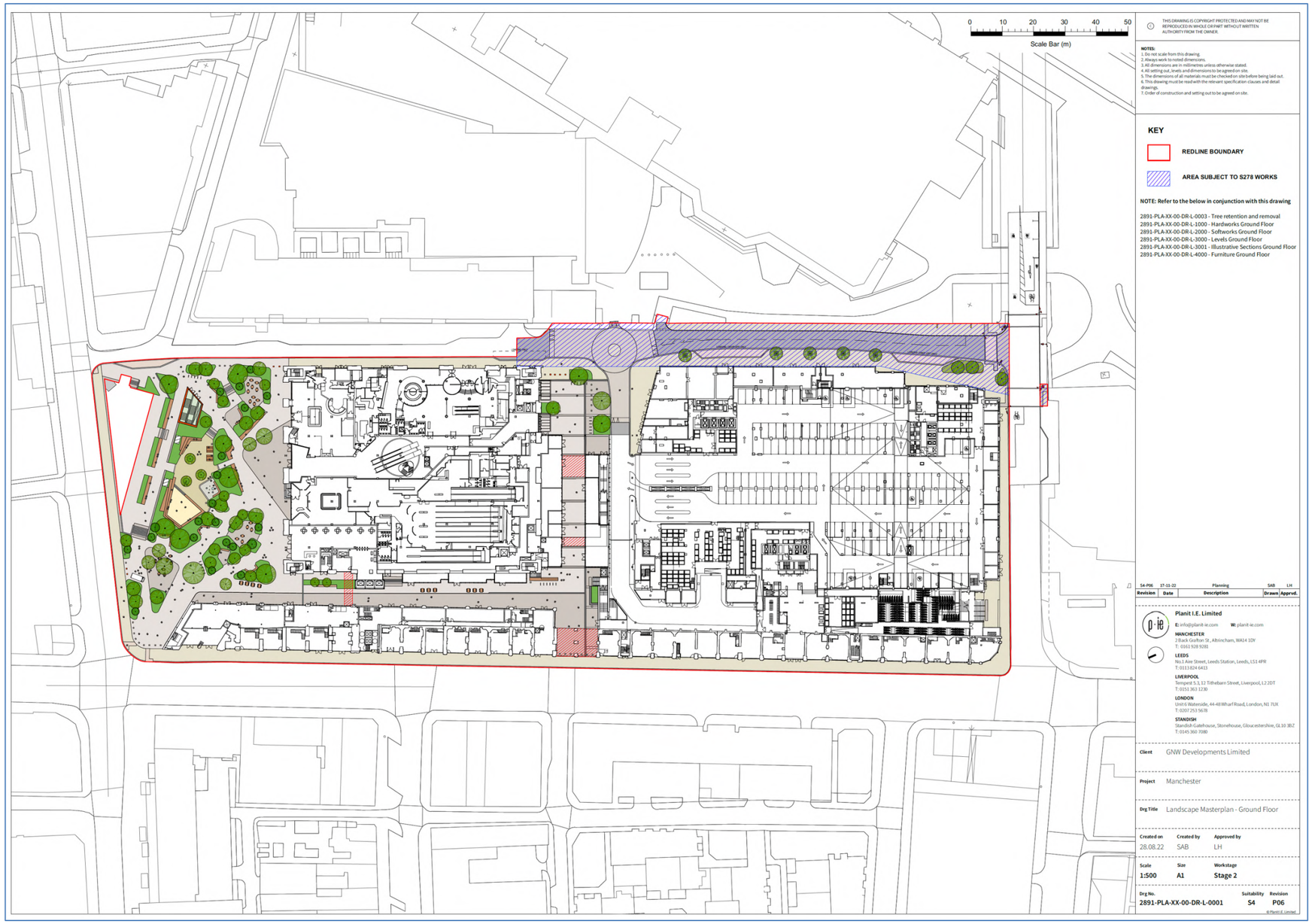
The following images are extracted from Simpson Haugh Architects drawings and reports and were used in discussion with the GMP CTSA.

Whilst the design may evolve during the later RIBA design stages, the recommendations outlined within this report are unlikely to change as they are based on the geographical location of the development and principles of protective security and design relative to threats and risks associated with retail and commercial office developments in the City of Manchester.



P2: Existing Ground Level Site Plan.

The existing site offers limited public realm with the main focus being on Great Northern Square to the north side of the warehouse.



P3: Proposed Ground Site Plan.

The introduction of extended public realm along the west and south of the Great Northern Warehouse building and improved public space at level 3 of the Leisure Box will substantially increase the footfall to the site and therefore security measures within the public realm need to be effective in deterring crime and protecting all users. The separation of the car park access from the warehouse provides an opportunity to expand the public landscape in an east-west axis with an entrance off Deansgate as well as from Watson Street

1.3 Visual Survey of Existing Neighbourhood and Environment



P4: Existing site layout

Existing public access to the GNW site is relatively restricted in terms of accessibility to public realm space limited primarily to Great Northern Square to the bottom left of this image (north elevation).

The car park ramps and plant areas deny access between the warehouse and Deansgate terrace.

Further to the west of the site there are primarily service areas alongside the Leisure-box, which itself contains the main car parking space and the Odeon cinema.

There are limited points of connection between Deansgate Terrace and the warehouse site with a set of steps leading to the Odeon cinema and through to the warehouse.

The removal of the vehicle ramps and structures to the west of the warehouse will create a north-south pedestrian route (yellow arrow) connecting to the rear of the Deansgate Terrace structures and providing improved connectivity to the leisure-box (Phase B of the redevelopment of the site). The east elevation of the warehouse is mainly sterile in terms of lack of retail units with reduced footfall as a result.

Internally the warehouse offers a ten-pin bowling and casino with a range of food and beverage tenants throughout the warehouse structure including retail fronting onto Great Northern Square. The warehouse forms a north-south connection to the Odeon cinema and multi-storey car park.

The redevelopment of Great Northern site will itself bring many improvements to the general area including increased retail outlets along the perimeter of the warehouse as well as increased public spaces at ground floor and level 3 within the Leisure-box.



P5: Existing car park and service entrance

The entrance to the car park is currently considered a risk area for criminal activity because of the dark overall space. The proposed redevelopment of this space will help to improve natural and artificial lighting, general visual layout and improved connectivity between Watson Street and Deansgate. This provides a better environment and increased opportunities for effective surveillance. The proposed Security Control Room is located immediately adjacent to this are inside the warehouse on the right.

With the planned investment in opening up the site and incorporating appropriate physical, electronic and operational security measures within the design, it should be possible to improve the security environment by deterring criminal behaviour.

2.0 Protective Security Principles & Design Impact

There are no mandatory or legal requirements for a commercial development to have to incorporate counter terrorism related blast hardening into the structure or façade unless such measures are justified by specific threats to the site.

To specify high levels of terrorism protection criteria would radically alter the design of the proposed structures and building form and this is not justified in this instance either by the GMP CTSA or the threat and risk assessment outlined within this report.

We have under agreement with the CTSA identified practical security principles which will reduce the impact of a terrorist attack on site occupants while at the same time providing protection against more common threats such as theft from property, general criminal activity and public disorder.

The Centre for the Protection of National Infrastructure [CPNI] issues advice on best practice through a network of Counter Terrorism Security Advisors (CTSA) based within the national Police authorities.

The key advice offered by the Greater Manchester Police CTSA and CPNI covers the following areas:

1. Protecting persons in public areas of the site from vehicle impact (accidental or deliberate 'vehicle as weapon' attack)
2. Monitoring public spaces within the site boundary to detect and/or gather evidence of criminal activity.
3. Maintaining control of vehicle movement and deliveries within the site.
4. Protecting building occupants and members of the public from flying glass injuries in an explosion.

The aim of this report is to identify appropriate security measures relevant to the degree of risk associated with the locality and nature of the development.

2.1 Threat and Risk Assessment Process

Any recommendation for enhancing security needs to be justified based on an understanding of risk.

All too often a series of threats and worst-case scenario are listed within security reviews and immediately a solution is recommended to counter the threat without considering the likelihood of the threat occurring in the first instance.

Risk is a function of threats exploiting vulnerabilities to obtain, damage or destroy assets. Thus, threats may exist, but if there are no vulnerabilities, there is little/no risk. Similarly, you can have a vulnerability, but if there is no threat, there is little or no risk.

Risk can be summarised in the following formula:

Asset + Threat + Vulnerability = Risk

Accurately assessing threats and identifying vulnerabilities is critical to understanding the risk to assets. The level of risk inherent to the property and occupants can only be considered when the following process has been completed:

Review of asset

Identify potential or actual threat(s)

Consider probability of specific threat(s) occurring

Assess potential severity/impact of threat occurring

= level of risk

The severity of risk needs to be identified on a sliding scale from low to extremely high whilst also considering the question of probability of the event occurring in the first instance.

We have summarised the threat and risk assessment process in the following table which is used throughout this report to identify risk against each known threat.

Table 1: Risk Matrix: Probability, Impact & Risk

0 - 5 = Low Risk 6 - 10 = Moderate Risk 11 - 15 = High Risk 16 - 25 = Extremely High Risk		Severity of potential impact/injury				
		Insignificant damage to property or minor injury 1	Slight damage to property and injury 2	Injury likely and moderate damage to property/business 3	Significant injury risk and severe damage to property/business 4	Fatalities and catastrophic damage to property/business 5
Likelihood of the hazard occurring	Almost certain 5	5	10	15	20	25
	Will probably occur 4	4	8	12	16	20
	Possibly occur 3	3	6	9	12	15
	Remote possibility 2	2	4	6	8	10
	Extremely unlikely 1	1	2	3	4	5

The risk matrix illustrated in Table 1 can be used to consider almost any threat to the property whether from common criminal activity or extreme events such as terrorist bombings.

Each threat identified within this report receives an initial risk score. We then outline recommended security measures that contribute to lowering the risk score to moderate or low risk where possible.

3.0 Threats

The following section considers the threats posed to the Great Northern development. Unless otherwise stated, the threats outlined within this report apply to both the retail and commercial office as well as the residential elements of the proposed design.

Several of the security measures listed within this document are repeated under different headings due to the fact that these security measures are required to defeat not just one threat but a range of perceived threats.

3.1 Assessing the Threat of Terrorist Attack in Manchester

The government uses a national threat rating system to classify the threat from terrorist attack as follows:

CRITICAL: an attack is highly likely in the near future.

SEVERE: an attack is highly likely.

SUBSTANTIAL: an attack is likely.

MODERATE: an attack is possible but not likely.

LOW: an attack is highly unlikely.

The current threat level as of November 2022 is stated as 'SUBSTANTIAL' in terms of terrorism in general within the United Kingdom but increases to 'SEVERE in relation to terrorism threats within Northern Ireland.

The security agencies do not advise on the nature of the specific threat that justifies the SUBSTANTIAL rating i.e. whether it is a potential vehicle bombing threat, marauding armed attack or vehicle targeted against pedestrians. The threat rating is therefore a wide-ranging classification that recognises the overall attack potential based on the determination of different terrorist organisations to attack the UK.

3.1.1 Threat from Irish Republican Terrorist Groups

The Security Service advise that 'active' Dissident Irish Republican terrorist groups who do not accept the Good Friday Agreement lack the technology and support necessary to launch a UK mainland bombing campaign but that this could change in the future.

The threat from terrorism within the United Kingdom over the past 40 years primarily originated within Irish Republican organisations focused on attacks with explosives and small arms. Several large and small explosive and incendiary devices were set off on the UK mainland in the period between 1970 and 1999 when PIRA/IRA entered into a ceasefire.

The IRA campaign on the United Kingdom mainland included 128 attacks with explosive or incendiary devices in the 1990s. The four largest IRA vehicle borne improvised explosive devices (VBIED) contained homemade explosives with the TNT equivalent of between 600kg – 1,000kg.

Manchester suffered the effects of a large-scale IRA terrorist bombing within the Arndale district which caused injuries and extensive damage to property but thankfully no deaths. The tactic of bombing commercial targets on the mainland UK using large-scale truck bombs lead to the Government starting direct negotiations with the Provisional Irish republican Army (PIRA) that ultimately led to the Belfast Agreement

The London St Mary Axe and Bishopsgate districts were attacked using vehicle borne improvised explosive devices (VBIED) in 1992 and again in 1993 with subsequent attacks in Docklands near Canary Wharf and Manchester city centre in 1996. These four major VBIED attacks accounted for business losses approaching two billion pounds.

The financial losses were accrued as a result of not just the physical damage caused to property in the vicinity of the explosion but also business disruption costs for companies and individuals affected by the initial blast.

The death toll in the four major vehicle bombings was remarkably low because of warnings given in advance with a total of 6 persons killed in the four major truck bombings. This low death rate was as a result of PIRA being motivated to cause as much commercial loss as possible but not necessarily deaths as a high death toll would have resulted in even greater clampdown by Security Forces in Northern Ireland.

Since the cessation of the PIRA armed campaign in 1999 there have been a total of 6 attacks carried out in the UK by dissident elements within the Irish Republican movement. These included a bomb on Hammersmith Bridge (2000), attack against Mi6 headquarters at Vauxhall (2000), VBIED attack against BBC Television Center (2001), sorting office bombing in Colindale (2001) and a small VBIED car bomb at Ealing (2001). The arrest of a three-man IRA team in November 2001 is believed to have disrupted the terrorist cell that carried out all of the post Belfast Agreement attacks on the UK mainland.

Dissident Irish Republican groups who do not support the Belfast Agreement continue to consider their members to be on 'active service' in Northern Ireland and these dissident groups are responsible for recent gun and explosive attacks against members of the Police and Prison Services.

There have been more recent attacks (March 5th 2019) using threat devices delivered in the mail to a number of transport hubs in the UK originating from an address in the Republic of Ireland. These devices were of low technology and designed more to frighten than to cause significant blast damage. The attacks were amateur in nature not least because the address in one instance read 'London Waterloo Station Approach, London, SE1 85W'.

The view of the Security Services is that the current threat from Irish Republican terrorist groups on the UK mainland is MODERATE i.e. an attack is possible but not likely.

3.1.2 Islamist Terrorism

The United Kingdom faces a SUBSTANTIAL threat from domestic and foreign-based Islamic fundamentalist terrorist groups who frequently deploy the tactic of suicide bombing within crowded spaces or marauding armed attack.

The 7th of July 2005 bombing of the London Underground showed how a few determined individuals willing to commit to suicide attacks, can wreak havoc in a crowded space. This event heralded a new threat from Islamic fundamentalist groups who support Jihad or 'holy war' against who they perceive as enemies of Islam. The attempted repeat attack on the 25th July 2005, considered to have failed due to poor quality of explosives, showed that there are others who are willing to commit suicide attacks for their cause.

Since the 2005 London Underground attacks there have been other forms of attacks including a vehicle borne improvised explosive devices [VBIED] attack at Glasgow Airport which followed the attempted bombing of the Tiger-Tiger nightclub using two (VBIED). The Tiger-Tiger attack involved a second VBIED device located at a potential assembly point for Police and Emergency Services dealing with the first vehicle threat.

Individuals or groups loosely affiliated to or supportive of Al Qaida ideology undertook the 2005 attacks.

The Security Services supported by the Police and other agencies have disrupted multiple attacks in the intervening years since 2005, some of which were targeted against shopping centres, nightclubs and crowded places.

The emergence of the Islamic State in Iraq and Syria (ISIS) heralded an even more violent ideology than Al Qaida. ISIS have directly or indirectly supported a range of terrorist attacks in the UK, France, Belgium and Germany in recent years resulting in more than 250 deaths and in excess of 600 injured across Europe.

The Nice attack where a vehicle was used as a weapon (VAW) was followed by subsequent 'vehicle as weapon attacks' in Berlin, Jerusalem, Melbourne, London, Stockholm, Barcelona and Cambrials in Spain and New York. All of these attacks have two things in common, the method used was a vehicle and the targets were crowded public spaces.

In the case of Westminster Bridge and London Bridge - Borough Market attacks, the initial VAW attack was followed by a marauding bladed weapons attack and this mix of weapons is likely to be used again in the future.

The Manchester Arena attack took considerably planning and preparation and was based on homemade explosives contained within a suicide backpack. This attack was targeted against a location where large numbers of people were confined within a relatively small space as they exited a concert.

ISIS are inspiring followers to develop anti-personnel explosive devices but they apparently do not see the need for undertaking large scale vehicle bombings within cities which tend to require longer term planning and therefore increases the risk of detection by the Police and security agencies. This is not to say that the vehicle bomb threat has passed altogether in the UK and therefore CPNI and the CTSA network continue to advise developers and property owners on the need to consider the impact of a vehicle borne improvised explosive device (VBIED) attack against their premises or locality and take appropriate steps.

Other terrorist threats include the use of fire as a weapon where either a false alarm activation empties a building to create a mass target for a vehicle as weapon attack or indeed to trap persons within a building where they are at risk from fire.

Since the loss of territory in Syria and Iraq, ISIS are offering more online training in the manufacture of explosives designed for anti-personnel attack within public spaces and public transport. At the same time ISIS are encouraging followers to consider the VAW and bladed weapon attacks for immediate deployment once a target has been selected.

The concern is that while the world was dealing with the Covid19 pandemic, the various terrorist groups have been concentrating on training and potentially detailed planning for future attacks.

3.1.3 Summary of Potential Terrorist Threats

The threat from Fundamentalist Islamic terrorism is constantly changing both in method and frequency.

The Security Services advise a general state of alert applies across the United Kingdom that implies an attack is likely to occur. The terrorist threat could emerge as any of the following:

1. Vehicle borne improvised explosive device (VBIED) - external and internal.
2. Vehicles as weapons i.e. vehicle ramming attacks against crowded spaces (VAW).
3. Suicide vests and placed charges within public spaces.
4. Marauding terrorist attack using bladed weapon or firearms attack against individuals and crowded locations (MTA).
5. Use of Fire as a weapon.

The explosive and firearms attacks are generally considered to be less frequent than unsophisticated attacks such as marauding bladed weapons attacks, vehicles used against pedestrians and incendiary devices. Therefore, low technology, high impact attacks are likely to feature more often in future terrorist attacks.

3.2 Risk to Property from Terrorist Bombing

Each of the 5 key terrorist threats identified in section 3.1.3 need to be considered in terms of likelihood and potential impact in order to determine the actual level of risk.

Each threat is considered in terms of a likelihood (probability) score expressed from 1 – 5 with a corresponding severity of impact score (multiplier) to achieve a risk value.

3.2.1 Terrorist Bomb Threat (VBIED)

We would normally consider the threat of a VBIED detonation in this specific area of Manchester as a **'possibly occurring'** event (scoring 3 on probability scale). The Police CTSA does not consider there is a specific terrorist VBIED threat against the Great Northern development site but should such an attack arise within the general area, measures need to be taken to minimise risk of injury and structural damage.

The primary factor in terms of protecting occupants against serious injury in a VBIED explosion is the response of the external façade and glazing in particular when subjected to blast impact. The impact of a VBIED attack can be significantly reduced depending on the type of glass used within the external façade.

We have calculated the blast pressure loading for a VBIED attack at short range standoff from the Great Northern Manchester warehouse site at 80 metres distance (to nearest elevation of Manchester Central Convention centre).

A VBIED threat device containing 200kg TNT detonating at 80 metres will generate the following blast pressure loadings:

20.36 kPa reflected pressure

249 kPa-msec reflected impulse

A smaller VBIED device containing 100kg TNT will result in the following blast loading:

15 kPa reflected pressure

155 kPa-msec reflected impulse.

The higher blast load from the 200kg device would cause shattering of 4mm plain annealed float or 6mm heat strengthened glass within a radius of 80 – 120 metres. The severity of impact score from failure of annealed float glass is likely to between 12- 15 i.e. High Risk.

		Severity of potential impact/injury				
		Insignificant damage to property or minor injury 1	Slight damage to property and injury 2	Injury likely and moderate damage to property/business 3	Significant injury risk and severe damage to property/business 4	Fatalities and catastrophic damage to property/business 5
Likelihood of the hazard occurring	Almost certain 5	5	10	15	20	25
	Will probably occur 4	4	8	12	16	20
	Possibly occur 3	3	6	9	12	15
	Remote possibility 2	2	4	6	8	10
	Extremely unlikely 1	1	2	3	4	5

We can calculate the response of different glass types to see if the risk of injury can be mitigated to Low or Medium risk.

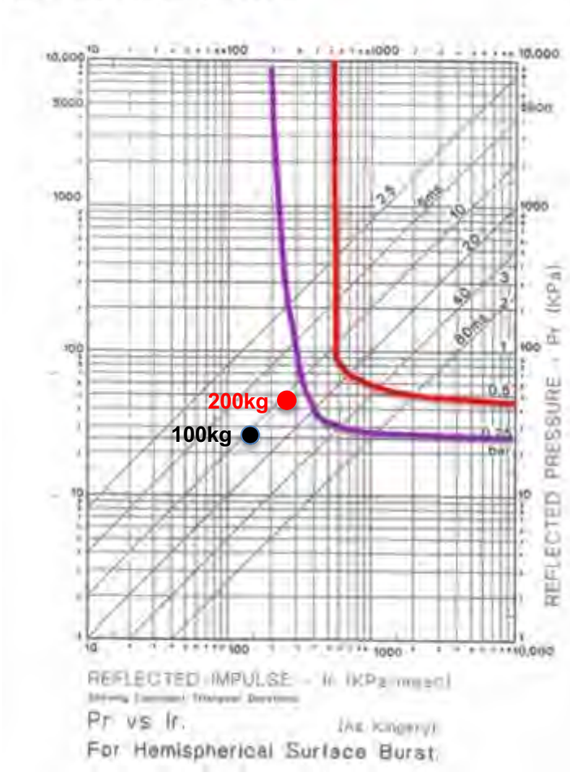
Option 1: Toughened-Toughened Insulated Glass Response

An insulated glass unit containing 6mm toughened glass on both the outer and inner pane will reduce the risk of injury to a score of 9 (Moderate risk). However, in an explosion toughened glass can produce multiple individual fragments or clusters of glass fragments that can fall from the facade resulting in injury to persons passing below. There is the additional risk of spontaneous nickel sulphide failure resulting in glass falling from the façade onto the pavement and for this reason we do not recommend toughened-toughened as the preferred design option.

Option 2: Toughened Inner Glass in Combination with Laminate Outer

If we change the outer pane of glass to a laminate the performance of the façade is greatly improved in terms of blast injury mitigation and reduction in hazard for pedestrians within the area. The following pressure-impulse chart shows the performance of an insulated glass unit containing 6mm toughened strengthened glass in the inner pane and 8.76mm laminate in the outer pane. This specification would immediately reduce the severity of potential impact/injury score from a high of 12 to 6 within the moderate risk range.

Chart 1: Pressure Impulse Plot



Values are expressed in kilopascals (kPa) for peak pressure and kilopascal-milliseconds for impulse which is pressure translated as force over time, in (1/1000 of second = 1 millisecond).

Pressure and impulse values to the right of the RED line means breaching of the façade will result with large areas of laminated glass torn from the frame resulting in high hazard to occupants.

The PURPLE line represents the approximate onset of tearing of the PVB membrane with increasing levels of damage the further the pressure-impulse values approach the red line.

Pressure and impulse points plotted to the left of the purple line represent light cracking or no break

Both the 200kg and 100kg VBIED threats are predicted to produce a Low Hazard response from an insulated glass unit containing 8.76mm laminate and 6mm toughened safety glass. The actual specification in terms of the thickness and make-up of the insulated glass units will be decided

by multiple factors such as, for example, the size of panes, wind load, acoustic requirements, safety impact and solar control but in terms of blast protection the interlayer thickness should not be less than 0.76mm.

Option 3: Laminate – Laminate DGU

The use of laminated safety glass in both panes of the insulated façade will ensure the response to either VBIED threats will be in the Extremely Low Risk range scoring 3 and thus may be worth considering in respect of additional benefits such as improved acoustic performance of the façade and increased protection against UV degradation. The use of double laminate would reduce the risk of injury to 3 on the severity scale, offering a very high degree of protection to occupants.

Listed Building Constraints

The Great Northern Warehouse building along with portions of the Deansgate terrace are Listed structures and as such any intervention in terms of changes to the structure or façade need to be approved by the Listed Buildings Officer.

Recognising the fact that the original steel windows within the warehouse façade form part of the listing reduces the options available for protecting occupants against flying glass. The existing windows are single glazed or unglazed frames (within the car park levels). The relatively small pane sizes of these window panes would allow use of toughened safety glass to offer a degree of blast resistance. Where the glass needs to be retained for listed reasons and the glass is likely to be non-toughened float glass, the application of bomb blast window film is an alternative way of mitigating the injury to occupants from a VBIED attack.

3.2.1.1 CPNI Recommended Blast Protection – Glazing

We will now demonstrate how the recommended glass specification (options 2 or 3) aligns with the latest advice from the Center for Protection of National Infrastructure (CPNI).

The Center for Protection of National Infrastructure (CPNI) have prepared an advisory note (CPNI EBP 01/14: April 2014) outlining measures to improve the blast resistance of glazing to reduce the risk of injury to occupants and protect the interior of the building in the event of a VBIED detonation in the general area.

The measures covered within this guidance note can be broken down into two broad categories; 'mitigation measures' and 'protection measures'.

Quoting from the CPNI guidance:

> *Mitigation Measures-*
>
> *These are measures used where the potential for flying glass must be reduced but it is not practical to use protection measures because: it is not possible to replace windows because the building is listed or leased; the building is not considered a likely target but the potential for flying glass caused by the blast from an explosion at some distance needs to be reduced. In such situations the installation of the following measures can be considered:*
>
> - *Anti-shatter film, ASF) (sometimes referred to as Anti-Fragmentation Film) and Bomb Blast Net Curtains (BBNC) where appropriate.*
> - *Laminated glass in normal window frames.*
>
> *Protection Measures-*
>
> *These are used where specified levels of protection is required and where it is possible to replace the existing windows, incorporate secondary window systems or influence new construction design. In these cases, the building owner will need to agree the threat (charge mass and range or pressure and impulse) and the acceptable hazard level with the glazing designer.*
>
> *In such situations the following measures are recommended:*
>
> - *Blast resistant glazing in blast enhanced frames*
> - *Secondary windows*
> - *Blast resistant fixed-point glazing*

The underlined statements are by this report author and refers to the opinion agreed with the CTSA that there is no specific blast threat against the Great Northern development and therefore no justification to proceed to full blast protective design.

Our recommendation, based on CPNI advice CPNI EBP 01/14: April 2014, is to incorporate Mitigation Measures i.e. glazing protection measures based on either of the following:

- *Anti-shatter film (ASF) (sometimes referred to as anti-fragmentation film) and bomb blast net curtains (BBNC).*
- Laminated glass in normal window frames.

The option to use window film (ASF) and bomb blast net curtains (BBNC) is not recommended for new glazing because the ASF film typically needs to be replaced every 10 – 12 years and it is easily damaged in use. In addition, BBNC net curtains are an old technology that impacts upon the daylight levels and the curtains require cleaning on an annual basis.

Laminated safety glass is, on the other hand, a material that offers a 25+ year lifespan and is commonly used to substantially reduces fragmentation in an explosion while also offering additional benefits such as improved acoustic performance.

3.2.2 Façade Recommendation to Counter Effects of VBIED Threat:

Using the JASPAR methodology, the upgrade of the glass specification within the façade as recommended is considered as being:

- **J**ustified by the threats related to terrorism
- Achievable without impacting the design
- **S**ustainable - due to life span of laminated glass (+25 years),
- **P**ractical and simple to incorporate,
- **A**ffordable especially because of additional benefits obtained by incorporating laminated glass such as approved acoustic performance and protection of furnishings against UV degradation,
- **R**easonable based on level of injury mitigation achieved.

Considering the low risk profile for the Great Northern development there is no justification for specific blast resistance to be incorporated into the external façade frame or structure but there are measures that can be taken to mitigate risk as follows:

1. Designing the structural frame to British Standard-EN1991 /Eurocode 1 will provide the inherent resistance against progressive collapse within the structural frame and remove the risk of progressive collapse from the project.
2. Based on the explosion effects analysis and risk assessment our recommended minimum glass specification for the project outer façade is as follows:
    a. 6mm toughened glass inner pane combined with;
    b. Laminated safety outer pane containing a minimum of 0.76mm PVB interlayer.

The specification of laminated glass should also extend to all internal glazing within ground floor retail units including balconies, screens/elevator housing overlooking crowded spaces.

The above minimum glass thickness, type and interlayer thickness recommendation is based on security and blast mitigation only and thickness of interlayer and glass may need to increase due to environmental or acoustic requirements.

3.2.3 Crime Impact Statement - Caveat for Accessible Glazing

The Crime Impact Statement report prepared for the Great Northern development by David Maher of the Greater Manchester Police contains advice that states:

Section 4.3 Glazing - Glazing to a height of 2400mm (or if otherwise accessible) must incorporate at least one pane of glass with a 1.5mm PVB interlayer (e.g. 7.52mm laminated glass), or a glass rated as P4A under EN356.

This requirement increases the PVB thickness recommendation from 0.76mm to 1.52mm PVB thickness for all glazing adjacent to pedestrian areas and at ground floor within the residential units.

In section 4.2 of the same report it recommends that ground floor and easily-accessible opening lights (escape requirements permitting), must be key-lockable, and have fixed/lockable opening restrictors (not releasable from the outside) limited to 100mm.

The above crime prevention recommendations do not alter the glazing specification for the upper floors which remains at a minimum of 8.76mm laminate in at least one pane.

3.3 Vehicle as a Weapon Attack

The frequency and effectiveness of attacks where the vehicle is the weapon has dramatically increased since July 2016 when a truck was used to attack pedestrians in Nice, France.

The Nice attack and subsequent attacks in Berlin, Jerusalem, Melbourne, London, Stockholm, Barcelona and Cambrials in Spain and New York City which led to classification of a new threat as 'Vehicle as a Weapon' (VAW). This form of attack is primarily targeted against pedestrians and crowded public spaces to maximise the number of people that can be killed or injured.

CPNI and the national CTSA network advise developers to consider protecting crowded areas around and inside their buildings using impact rated vehicle barriers and landscape design measures that prevent vehicles encroaching into public crowded spaces. Some local Planning Departments on the other hand are averse to having obstacles on the pavement and normally only support such measures when there is a specific threat against the property supported by the view of the Police CTSA.

The most recent VAW attack on London Bridge showed that that the attackers sought out locations that provided long run up distance with potential to hit multiple pedestrian targets while travelling forward in a relatively straight line to maintain speed. CCTV evidence from the London Bridge attack showed the vehicle was driven on and off the bridge pavement at several locations to avoid traffic diversion signs and small sign posts. This pattern of movement was also seen in attacks in Barcelona and in New York where drivers avoided obstacles that could slow down or damage their vehicle or reduce their straight-line speed.

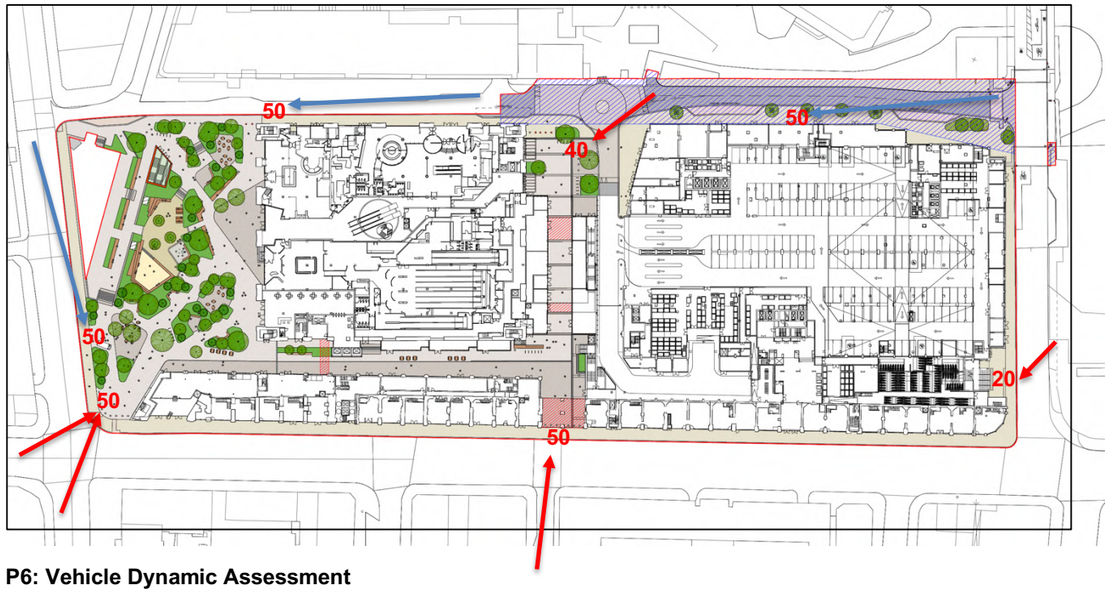
There are several locations within the immediate area of GNW that have vehicle bollards in place to protect crowded pavements and entrances. The Great Northern Square is enclosed behind a series of black steel bollards set into the pavement but few of these are actually rated against a specific vehicle mass and impact speed in accordance with BS PAS68 or IWA14 standards.

British Standard PAS 68 was developed by CPNI to test products such as bollards, planters and rising wedge barriers against a variety of different vehicle types and speed of impact. BS PAS 68 was followed by the international working agreement IWA14 standard which is very similar in testing and certification. The most common level of protection assessed for vulnerable locations is for the hostile vehicle mitigation (HVM) measures to resist a 7.5t vehicle mass impacting at 50mph, although each site needs to be assessed by means of a vehicle dynamic assessment to determine maximum impact speed against the protected perimeter line.

The risk of accidental vehicle impact against structures is addressed separately within BS EN 1991 Eurocode 1 which requires there to be multiple load path capacity within the structural frame. The proposed residential towers on the GNW development land within the public car park and will therefore be designed to resist accidental or deliberate impact and remain standing without suffering progressive collapse even if suffering loss of a support column.

3.3.1 Vehicle as Weapon (VAW) Threat

The Watson Street elevation of the GNW site has an upstand section beneath the glazing that acts as a barrier against vehicle intrusion and negates the need for bollards or other protective measures along this elevation. The same applies to Great Bridgewater Street. The highest pedestrian density is within the Great Northern Square and to a lesser extent, the wide pavement space adjacent to the car park entrance.



P6: Vehicle Dynamic Assessment

The above plan shows the areas of potential vulnerability located on the boundary of the GNW site together with the assessed speed of approach for vehicles.

The red arrows indicate a direct head on attack against any protective measures whereas the blue arrows indicate a lesser oblique impact.

The terminal impact speed for the majority of the attack locations on the perimeter of the GNW could potentially reach 50mph. The acute turn-in angles on Watson Street and Great Bridgewater Street help to reduce the straight-line impact speed to 40mph in the case of the public pavement on the south of the GNW and 20mph at the steps leading from Great Bridgewater Street to the upper deck area (achieved using a 4-wheel drive vehicle).

When considering a vehicle attack the local direction of traffic flow is not considered because if a terrorist wants to exploit a vulnerability they will drive up a one-way street or cross the flow of traffic to impact the target.

The terminal speeds indicated on the above plan can be summarised as follows in respect of bollard and street furniture rating according to BS PAS 68.

1: The Great Northern Square needs to be protected against a 7.5t vehicle travelling at 50mph.

2: The Great Northern Warehouse south-east corner (adjacent to the entrance to the car park) needs to be protected against a 7.5t vehicle impacting at 40mph.

3: The stairs on the corner of Deansgate and Great Bridgewater Street need to be protected against a slower vehicle approach speed of 20mph.

The remainder of the boundary is primarily approached at an oblique angle and this aligned with the fact that these locations are considered low footfall zones and do not require specific hostile vehicle protection measures. On these lower risk elevations, a non-rated planter or other object

such as a tree could redirect the hostile vehicle back onto the highway. Mature trees with a girth of 300mm+ should be capable of stopping and disabling a vehicle at 30mph.

3.3.1.1 Risk of VAW Attack Against the Great Northern Development site.

The overall risk of a deliberate vehicle ramming attack against the GNW development is considered at worst case to 'possibly occur' based on statistical evidence of such attacks within the UK.

The impact on persons within the site could be severe resulting in a risk score of between 12 - 15 within the high-risk score range which means this risk score needs to be addressed to reduce the potential threat.

0 - 5 = Low Risk 6 - 10 = Moderate Risk 11 - 15 = High Risk 16 - 25 = Unacceptable Risk		Severity of potential impact/injury				
		Insignificant damage to property or minor injury 1	Slight damage to property and injury 2	Injury likely and moderate damage to property/business 3	Significant injury risk and severe damage to property/business 4	Fatalities and catastrophic damage to property/business 5
Likelihood of the hazard occurring	Almost certain 5	5	10	15	20	25
	Will probably occur 4	4	8	12	16	20
	Possibly occur 3	3	6	9	12	15
	Remote possibility 2	2	4	6	8	10
	Extremely unlikely 1	1	2	3	4	5

It is necessary to prevent unauthorised vehicle access onto the Great Northern Square and the wide pavement adjacent to the car park entrance by incorporating BS PAS68 rated barriers at a maximum spacing between barrier elements of 1200mm.

3.3.2 Recommended Risk Mitigation Measures – Vehicle as Weapon Threat

The proposal is that HVM measures to BS PAS68 are located as follows:

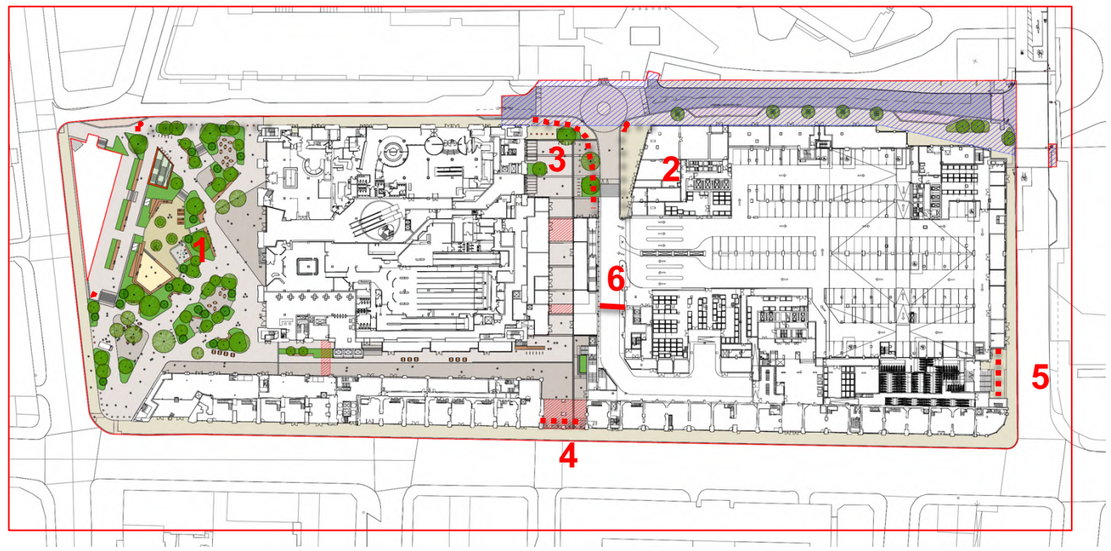
1. The HVM measures shall include bollards, planters and other street furniture tested to 7.5t @ 50mph impact rating according to BS PAS68 to the perimeter of Great Northern Square.
2. HVM measures for the Leisurebox building on the edge of pavement on corner of Watson Street and the access road to the car park.
3. HVM measures on Watson Street at the wide pavement section adjacent to the GNW building.
4. HVM measures at the Deansgate Terrace entrance to ensure maximum passage width is 1200mm.
5. HVM measures at the bottom of the wide steps on Great Bridgewater Street leading up to the terrace level L2.
6. HVM bi-fold gate or similar rated barrier to secure entrance to Loading Bay area.

Bespoke designs can be acceptable where a change of design of HVM elements is needed to ensure that the design is acceptable to the City Planning department. These bespoke designs will need to offer sufficient mass to prevent collapse or displacement under the defined vehicle impact. For guidance, a planter unit that replaces one of more fixed bollards needs to have a mass equivalent to 750kg per metre run.
In any event, the maximum clear spacing between HVM objects and also the adjoining structure must not exceed 1200mm in accordance with BS PAS68 and IWA 14 protective standards.

Emergency vehicles may require access to the ground level on all sides of the Great Northern Warehouse and for this reason some of the HVM measures will need to be automated (rise/lower) or manually removed to allow vehicle access in an emergency or for servicing/maintenance purposes.

Any such 'active' measures must be designed to the relevant BS PAS68 standard and controlled from within the Security Control Room.

P7: Location of Proposed HVM measures



3.4 Explosive Belts - Placed Charges

The threat from small explosive charges and/or suicide attacks using explosive belts was realised in the United Kingdom with the 7th July attack on the London Underground and more recently the Manchester Arena attack. There were many previous attacks by Irish Republican terrorists using placed charges on rail tracks, in shopping centres and mail sorting offices but none of these attacks involved a suicide vest.

In the case of the 2017 Manchester Arena attack, the device was carried in a backpack which was detonated by the suicide bomber in the middle of a crowd of people leaving a concert venue.

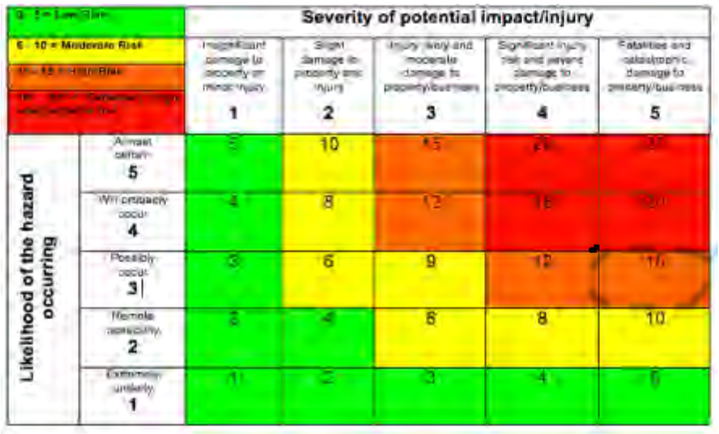
There was a repeat attack on the London Underground at Parsons Green in September 2017. This attack was based on home-made explosives that failed to detonate, but if the charge had initiated correctly would have caused a very high number of fatalities. In this incident the device was abandoned on the train as a container rather than designed to be used as a suicide vest/backpack.

The threat device size used in similar studies is equivalent to 10kg TNT commercial explosives which could equate to 15kg of home-made explosives such as TATP or ammonium nitrate.

The common factor in all of these attacks is that they were deliberately targeted against crowded spaces.

The Police CTSA national network advises that the risk of a future attack cannot be ignored within crowded spaces including markets and entertainment and exhibition spaces and the probability therefore is assessed as 3 (possibly occur).

The impact on persons within the immediate area could be catastrophic albeit that damage to the structure may be relatively moderate. This results in a high-risk score of 15.



The threat from suicide or placed devices is primarily to people rather than causing structural collapse of framed buildings. There is unlikely to be any risk of progressive building collapse based on a 10kg TNT person worn device detonated within one of the many crowded spaces within the GNW development.

3.4.1 Recommended Risk Mitigation Measures – Explosive Belts and Placed Charges

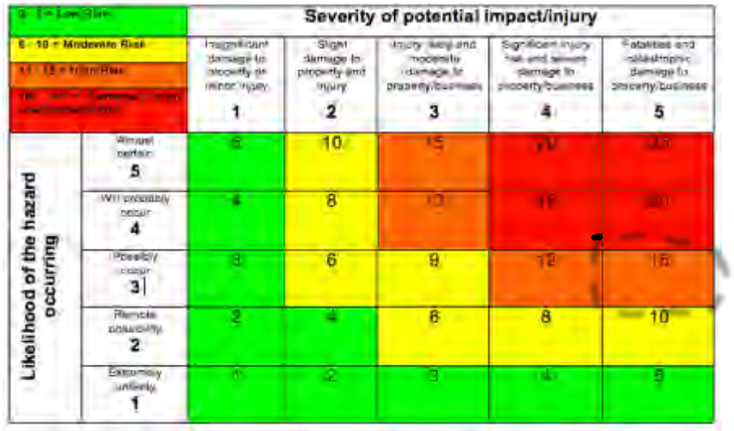
The following recommended security measures are proposed in respect of the threat of person worn or placed explosive devices within the ground floor public concourse area.

1. Manage security of the site including public spaces using a combination of electronic security measures (CCTV and access control), LPS1175 SR2 (B3) rated security doors to back of house areas and deploying counter terrorism trained security staff.
2. All internal glazed screens should contain laminated glass to reduce the risk of glass scatter and fragmentation injury in an explosion.
3. Security staff are required to conduct regular security surveillance and patrols of public spaces to detect suspect individuals and devices.
4. Practice procedures and roles in the management of evacuation of public spaces, retail units and commercial office areas.
5. First aid trained Security and Building Management staff to be available on site 24/7.
6. First aid kits to contain tourniquets and staff trained in their use.
7. Defibrillator machines to be available on-site with personnel trained in use.

3.5 Marauding Armed Attack

Terrorist organisations such as ISIS recognise the benefit of conducting low technology marauding armed attacks using bladed weapons (and firearms if available) against crowded pedestrian areas.

The threat from a marauding style armed attack is increasing in frequency to the extent that such attacks will continue to possibly occur (3) in the United Kingdom. The impact on individuals caught up in an attack will needless to say be severe or catastrophic scoring (5) on the impact scale and resulting in a risk score of 15 which is at the upper end of the high-risk classification. Damage to property is not usually a factor in a marauding attack.



Preventing a marauding attack is not always possible because the attacker's intent can remain concealed until the moment the attack commences. For this reason, the response to this type of threat must include practising the immediate evacuation of members of the public from the area.

The main aim of the security measures should be to limit the extent of trespass by the attacker(s) and to inform tenants and members of the public of the threat.

3.5.1 Recommended Risk Mitigation Measures – Marauding Armed Attack

There are number of practical measures that need to be taken to reduce the impact of a marauding attack within the site which include:

1. Incorporate elevator over-ride facility to allow remote shut down of elevators in an emergency to prevent access by an attacker to the upper floors (applicable to residential towers and elevators within GNW).
2. Install security rated doors to back of house and fire escape core doors at ground floor to prevent unauthorised access (LPS 1175 SR2-B3 security rating). This recommendation is supported within the Crime Impact Statement section 4.1).
3. Provide a refuge or escape route for reception lobby personnel to withdraw to in the event of an attack (applies to residential lobby).
4. Install a site-wide public-address system to be able to communicate across the GNW estate in an emergency.
5. Develop security led evacuation plans and procedures based on 'Run, Hide Tell'.
6. Incorporate active CCTV surveillance monitoring throughout ground floor areas in particular and all publicly accessible spaces to help detect and track a marauding threat.
7. Prevent unauthorised access into evacuation cores and control access from within the escape stair cores to office floors or residences. This can be achieved by incorporating manual or electronic lock release systems on the escape side or access control measures on the stair core side to allow commercial office tenants to use the stair cores for vertical travel between floor. In the event of a marauding attack the access control from within the escape stair cores should be disabled (secure) to prevent unauthorised entry using a stolen access card.
8. Remove automatic door release 'break glass' activation points from public spaces and use 'second knock' confirmation system before release of fire escape doors. Use manual push bar release for final exit doors with auto-latch capability (door closer) to maintain security of premises.

The above measures will help to reduce the risk and limit the impact of a marauding attack.

3.6 Fire as a Weapon

There is an emerging threat of terrorists or criminals using fire as a weapon or means of gaining entry to a site.

'Fire as a weapon' is where a terrorist will deploy an incendiary device designed to result in mass evacuation of the site with the aim of potentially creating a target for a vehicle or marauding attack once the occupants exit the premises.

Criminals can also exploit false or actual fire alarm activations as a way of gaining entry through fire exits doors that typically fail safe (locks release) in a fire alarm activation.

The fact that the ground floor space within the GNW is a north-south thoroughfare means that persons can escape from the area in at least two separate directions.

It is critical that a security presence is maintained at all times within the ground floor space of the GNW to observe crowd behaviour and respond immediately to a fire alert within the area.

3.6.1 Recommended Risk Mitigation Measures – Fire as A Weapon

1. Ensure use of non-flammable materials throughout public spaces and ensure retail tenants remove waste materials on a regular basis rather than allow combustible materials to accumulate within publicly accessible locations.
2. Doors at ground floor level that lead to back of house areas or circulation stairs/goods elevators should be LPS1175 B3 SR2 security rated and designed to remain secure following an alarm activation.
3. To prevent unauthorised access and limit extent of trespass, all service routes leading from the loading bay need to incorporate access controlled interlocked pairs of doors in a tiger-trap arrangement to reduce the risk of tailgating and unauthorised access.
4. Secure the final fire exit doors (LPS1175 B3 SR2) with mechanical auto-latching locking systems to prevent unauthorised entry in a fire emergency.
5. Toilet facilities open to the public (including ACC WC) to be designed key secured service panels (BS PAS24 rated locking) and no accessible cavities.
6. Fire evacuation systems to operate on 'double knock' basis where a single break glass activation does not result in auto-release of doors (with Fire officer's consent).

3.7 Threats in The Mail and Courier Deliveries

There is a potential risk of radical environmental or similar organisations targeting commercial tenants due to their business activities, with threats delivered through the mail and courier delivery system.

The nature of the threat depends on the type of businesses occupying the premises and it is not possible to identify specific probability of risk other than to say as a rule the threat of a mail delivered item containing explosives or chemical-biological substances is present in the UK but is generally considered as a remote possibility scoring 2 on the probability scale.

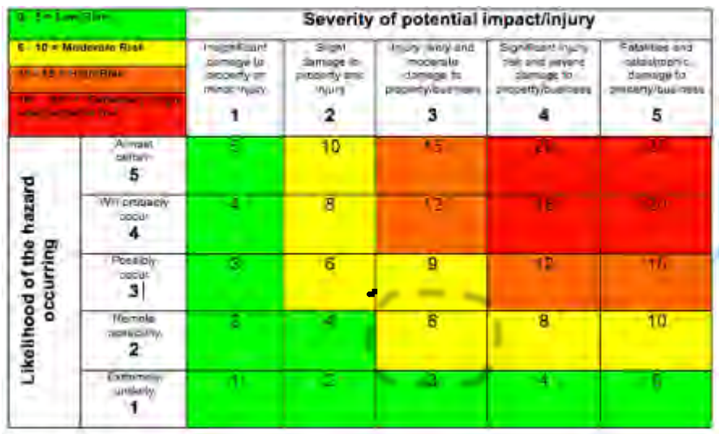
Threats typically include packages containing explosives (very rare), blades or trigger mechanisms, designed to injure the person opening the package, white powder or aggressive chemical substances sometimes accompanied with a warning of infection to cause distress to the person opening the package.

Malicious devices sent in the mail have been targeted against animal research facilities or companies investing in or providing service to such institutions as well as companies involved in the fossil fuel industry.

In May 2019 blast/incendiary devices were sent from the Republic of Ireland to transport hubs in London. According to recently available records, there are more than a hundred suspect devices received in the mail or courier delivery system within the United Kingdom each year. Thankfully the majority of these are false alarms.

There is no reason to believe that the commercial tenants within the GNW building will be targeted in this manner but there is the possibility that a future tenant could be a target for protest because of their business activities.

The impact of a mail delivered threat is dependent on the nature of the device and the technical capability of the sender. The impact is likely to be limited to the person who opens and triggers the device although an explosive device may impact several persons especially if it detonates within an open plan office. The impact could be severe in terms of individuals but is likely to be slight in terms of the building which scores 3 on the impact scale scoring a total risk value of 6 in the Moderate Risk range.



The only way to prevent the opening of a threat device by the targeted recipient is to scan the mail or courier delivered item for threats as near as possible to the point of entry/receipt.

X-ray scanning of mail and courier deliveries may therefore need to be introduced at the request of tenants.

Commercial office tenants can opt for remote scanning of deliveries before mail is delivered to their offices or alternatively the Building Manager can provide in-house mail scanning services from a back of house location where a threat device can be detected using an x-ray scanning machine.

The type of threats that can be detected in a modern scanning machine include explosives, anti-personnel devices, blades and biological or chemical substances.

3.7.1 Recommendation Risk Mitigation Measures – Mail/Courier Delivered Threats

The following recommendations are only considered necessary following an assessment of commercial office tenant business activities and any associated risks.

1. The mail sorting room should be capable of serving all tenants, however, individual tenants may choose to manage their own mail handling.
2. We recommend that space is allocated for a potential future mail sorting room with an x-ray scanning room perhaps combined with a courier reception in a location preferably where pressure venting can occur in the event of an internal explosion i.e. venting into atmosphere or large loading dock space.
3. The x-ray machine can be a simplified cabinet unit that is used to scan suspect mail items such as https://www.scanna-msc.com/uk/products/security-x-rays/scanmax-15 or alternatively a larger scanning unit such as provided by Scanna or other manufacturers https://www.scanna-msc.com/uk/products/security-x-rays/rapiscan-618xrh
4. Courier access to the mail room will require an audio-visual communication unit at ground floor, connected to the mail room or Building Manager's office for release of the courier entrance door.
5. The mail handling facility should be designed in accordance with PAS 97 standard. This standard was developed by CPNI and covers physical construction, training and operational guidance.
6. Guidance on managing risks in the mail is available from CPNI https://www.cpni.gov.uk/security-campaigns/mail-screening-matters-0

4.0 Crime Impact Assessment

A draft Crime Impact Statement (CIS) has been prepared by David Maher of the Greater Manchester Police document reference 2015/1104/CIS/03 dated 26/08/2022.

This document contains information on the crime profile for the general area which in turn informs the GMP recommendations for reducing the risk of crime within the GNW redevelopment.

The Crime Impact Statement provides advice on architectural design features for designing out crime and this document should be referred to throughout later RIBA stages.

The CIS report assessed the development against the principles of Crime prevention Through Environmental Design (CPTED) in order to reduce the opportunities for crime and the fear of crime.

The CIS report Executive Summary states –

> *The layout of the proposed scheme is considered acceptable, as long as the issues discussed in more detail within section 3.3 of this report are addressed, namely:*
>
> - *Robust control of access in/and around the buildings*
> - *Secure cycle store provision*
> - *Ground floor external material protection against graffiti*
> - *Pedestrian access into the multi-storey car park*

The recommendations listed within section 3.3 of the CIS report are referenced under the relevant sections of this report and particularly in section 4.2 Operational Security Plan

The CIS report includes general advice from a counter terrorism perspective. A more detailed discussion has since been undertaken with the Counter Terrorism Security Advisor Simon McNulty from which site-specific protective measures were agreed and these are now addressed within this report and summarised in Annex A of this document.

4.1 Crime Prevention and Operational Strategy

The development needs to incorporate crime reduction measures appropriate for city centre residential, retail and commercial office developments. The crime prevention strategy cannot rely on only physical hardening or CCTV but must be based on a series of security disciplines working together to form a comprehensive security strategy.

An effective security strategy should be based on the following crime prevention capabilities.

Deter – provide physical and electronic security measures, coupled with good management practices that might provide a serious deterrent to criminal activity.

Detect – provide alarm and visual detection systems with verification to provide timely detection of an intrusion.

Delay – incorporate physical security measures that delay intrusion for a sufficient length of time to allow a response force to attend.

4.2 Operational Security Plan

The Building Manager, acting on behalf of the property owner, needs to consider the safety of members of the public and tenant's staff whilst on the premises, especially within crowded spaces such as public thoroughfares.

This requires an operational security plan that is based on the following elements working together:

1. **Human Resources:**
    a. Invest in training of front of house staff to recognise criminal behaviour and potential terrorist surveillance/ behaviour.
    b. Training should be extended to retail tenants to ensure they understand their role in reducing the threat of crime to their premises and to the estate.
    c. Ensure sufficient numbers of SIA trained security staff are present within publicly accessible spaces.
2. **Physical:**
    a. Doors and shutters leading to back of house areas along the line of demarcation between public and non-public (back of house) areas need to be LPS1175 B3 (SR2) security rated to prevent unauthorised access.
    b. Doors leading to communal entrances (offices or ground floor entrance to residential towers) should be certified to LPS1175 B3 (SR2) security standard, self-closing and secured by a multi-point electronic lock and capable of being operated via an electronic access-control systems. The locking requirement must form part of the original LPS1175 door certification.
    c. Plant room doors should be based on 44mm solid core door leafs with 3 hinges, a morticed sash lock to BS3621/18621 to allow the rooms to be secured when not in use.
    d. External escape only doors should be certified to LPS1175 B3 (SR2) security rating and fitted with self-closing auto-latching devices upon closing.
    e. Doors to the cycle store should be certified to LPS1175 B3 (SR2) (also applies to steel gates and frame). These doors/gates should be self-closing and auto latching upon closure and be accessible using a programmable fob allowing secure entry and exit.
    f. All opening windows, accessible from pavement level, must be compliant with and certified to BS PAS24. Additional requirements for windows include the use of laminated glass in any vision panels based on a 1.52mm PVB interlayer for pavement level retail glazing and P4A rated glass to EN356 for non-retail glazing up to 2400mm above pavement (side entrance screens etc).
3. **Electronic:**
    a. Install panic alarms at reception desks and interaction points with members of the public for staff to be able to summon assistance in the event of aggressive behaviour etc.

b. Deploy site-wide CCTV surveillance to deter crime and have the ability to track an evolving threat.

   i. The CCTV scheme will need to provide in-depth coverage of publicly accessible internal and external spaces.

   ii. The CCTV system is to be permanently viewed by trained CCTV operatives within the site Security Control Room with alarm activation triggering relevant CCTV image display as primary display image within the control room.

   iii. CCTV systems should extend to all office entrance lobby spaces, elevator interiors and on-floor elevator lobbies as part of the Landlord's system.

   iv. CCTV recording capacity should allow for 30 days storage of images before over-writing.

   v. Maintaining CCTV coverage of the interior crowded spaces is vital for identifying and responding to a security or life safety threat. It is inevitable that retail areas could attract a risk of theft and retail tenants may decide to install their own anti-theft measures and CCTV systems in addition to the Landlord's common area CCTV coverage.

   vi. CCTV systems minimum acceptable image standard requires a resolution of 720x576 pixels at a real time frame rate of 25 frames per second (applies to both camera and digital video recording systems).

   vii. Identification: In CCTV locations where cameras cover entrances or locations of particular interest, the system should be capable of identifying an individual i.e. the image must capture no less than 120% of the field of view (at least from top of individuals head to their knees).

c. Access control systems to all primary points of entry should be operable by swipe card or fob and not numeric keypads. The following doors should operate on access control:

   i. All external doors where staff or tenants require regular access.

   ii. Doors on the security line between public and tenanted spaces

   iii. Any internal doors to obvious high risk or controlled areas (e.g. hazardous chemical and general storage/server and telecommunications rooms/ staff locker rooms).

   iv. Cycle store.

4. Alarms

a. A monitored alarm system should be installed to cover all buildings linked to contacts on all external doors/shutters.

b. PIR detectors covering all ground floor (pavement) areas with windows.

c. Alarm signals can be responded within the Security Control Room without the need for an external alarm receiving center (ARC) unless this is a requirement of insurance by retail/office tenants and in this case an external connection to the ARC is to be established (at tenant's expense) in addition to the connection to the site Security Control Room.

5. Lighting

a. External lighting must be provided to pedestrian routes within the site in accordance with BS 5489.

b. Dusk 'til dawn lights, operated by photoelectric cell/daylight sensor, should be installed above all external doors (manual over-ride is permissible).

c. Metal halide (or bulbs with a comparable 'white' light output) should be used as these offer superior colour rendition over alternatives such as high or low pressure sodium bulbs.

6. **Communication:**

The ability to communicate a threat to occupants of the site via a voice addressable alert system is crucial for managing a development of this size.

a. We recommend that a voice-addressable alarm system is installed and operated from within the Security Control Room with staff trained to communicate the nature and location of any threat within the site or general locality.

   i. The ability to direct staff in how to respond to a threat is critical e.g. commence lockdown of entrances to protect against external marauding attack or evacuate the premises in response to threats within the premises.

7. **Staff Training**

a. Staff training will need to be completed and exercises undertaken before the redeveloped site opens to members of the public. Suitable training will be advised by GMP including online 'ACT Awareness' e-learning counter terrorism awareness course.

b. All security staff, including tenant and landlord door staff, to be licenced and accredited by the Security Industry Authority (SIA).

c. Retail and entertainment venue tenants will be required to operate under the same SIA licence conditions and undertake ACT Awareness e-learning training to protect their business and be active members of the estate security plan.

d. It is understood that several of the existing tenants will remain operational during the redevelopment/construction phase (ten-pin alley and casino plus retail units on Deansgate). For this reason, security staff will need to remain on site and operate from a temporary security control room which has all the necessary alarm panels and retained security systems while the new Security Control Room is being developed.

4.3 Cycle Store – Crime Mitigation

One of the most common security risks, in terms of criminals gaining access to a building interior, is the vulnerability of cyclist entrances. Opportunist thieves can normally gain entry through dedicated cyclist entrances by timing their entry to when a cyclist enters or exits the building.

There have been incidences of assault on persons within changing rooms, theft of belongings and bicycle theft (as well as theft from elsewhere within the premises) when intruders have gained access through the cyclist entrance.

4.3.1 Security Measures for Cycle Store

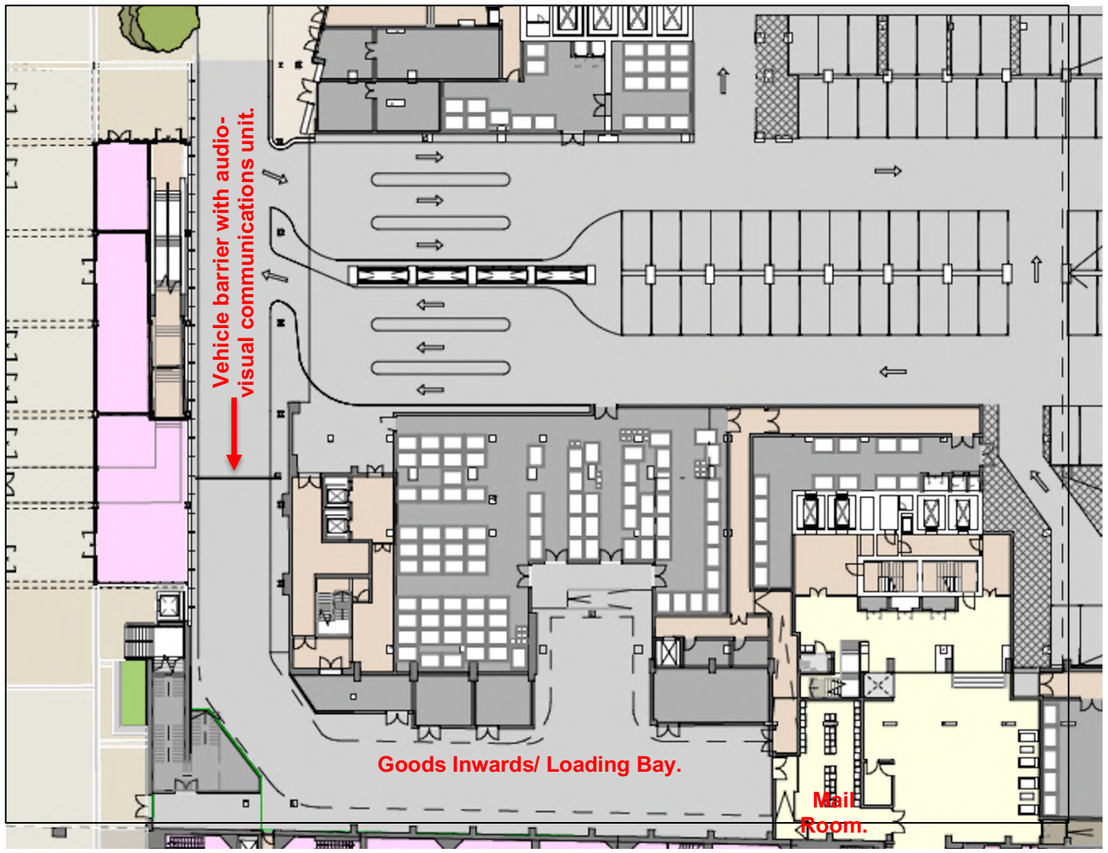
1. The outer door/gate leading to cycle storage areas must comply with LPS1175 B3 (SR2) security standard.
2. Cyclists will need to be issued with an access token to gain entry to the cycle store and any in particular to any locker or changing areas.
3. Doors within the cycle store space that lead into the building interior will need to be security rated to LPS1175 B3 (SR2) standard and fitted with access control systems or key secured locks to prevent intrusion from within the cycle store.
4. A panic alarm needs to be fitted to any male/female changing spaces.
5. Personal equipment lockers will need to be provided for each cyclist (lockable).
6. Cyclists will be expected to secure their own bike to the storage racks provided.
7. CCTV coverage to extend to the cycle entrance/exit routes.

The above recommendations apply to all residential and/or commercial tenant cycle storage areas.

5.0 Security of Loading Bay

The loading bay area requires supervision from a dedicated Dockmaster's office. The Dockmaster's office will normally issue work and access permits and coordinate receipt/dispatch of goods including scheduling deliveries to avoid congestion particularly when the commercial offices and residential units are being fitted out initially.

The GNW redevelopment plan includes a centralised goods inwards space accessed along a shared vehicle route to the Leisurebox car park.



P8: Goods Inwards Area Plan

Courier and post deliveries will be scheduled through the loading bay with the adjoining mail room servicing the residences.

Commercial office mail deliveries may also be processed through the mail room in agreement with tenants or alternatively deliveries could be received at office reception. Tenants on Deansgate Terrace will continue to receive deliveries from edge of pavement as at present.

Waste storage facilities are located within this area with waste from the GNW commercial office tenants transported to this centralised waste handling facility. Waste storage bins are located inside the premises to remove the need for external storage bins.

5.1 Security Measures for Loading Bay

1. The vehicle entrance to the goods inwards area needs to be controlled via a dedicated vehicle barrier equipped with an audio-visual communications unit linked to the goods inwards area Dockmaster's Office during normal business hours and to the Security Control Room during out of hours. The CTSA and GMP Crime Impact Assessor advise that this location is protected by a BS PAS68 rated vehicle barrier such as a high speed bi-fold gate. Our assessment indicates that this barrier should be designed to resist 7.5t @ 30mph.

2. All doors leading off this space to either the building interior or waste collection/access points within the car park all need to be security rated to LPS1175 B3 (SR2) and access controlled.

3. All remaining doors to plant spaces to be mechanically locked with keys issued via the Security Control Room or Building Manager's office.

4. All goods elevators need to be destination controlled and use overseen by Dockmaster staff.

    a. Elevator control panel only active when valid pass is presented and then only provides access to the intended destination floor.

5. Vehicle movements within the loading bay will need to be supervised by the Dockmaster staff. Vehicles will need to manoeuvre to reverse direction of travel so they are able to exit safely onto Watson Street.

6. Dockmaster staff will need to receive security awareness training, especially in the control of access to the premises to minimise the risk of trespass via the Goods Inwards Loading Bay.

6.0 Security within Public Terrace at Level 02

The public terrace space at L2 attracts a degree of risk to users and the adjoining properties.

Risks associated with public spaces include the following:

- Theft of personal belongings.
- Theft from adjoining retail units.
- Anti-social behaviour.
- Urban explorers taking advantage of elevated viewing area to access the building façade.
- Terrorist targeting crowded spaces.

Each of these threats needs to be considered within the building security operation plan if risks associated with the increased public realm are to be effectively mitigated.



P9: Public Terrace L2.

The terrace space shown above contains extensive planting and seating areas to encourage use of the space potentially as an external dining location. The terrace can be accessed via the retained existing steps from Great Bridgewater Street and also from within the site via stairs leading from ground floor (indicated bottom left) or across the bridge link from the GNW.

The multiple access routes mean that controlling access to this this space is difficult and requires security measures in place to deter criminal activity.

6.1 Recommendations for Security of Public Terraces

The following security measures are required to deter threats and mitigate risks within publicly accessible terraces and landscaped areas with the GNW development.

1. All seating and low-level planting should be no higher than 1000mm and tree canopies shall be no lower than 2m from the ground in accordance with the Crime Impact Statement recommendations (see section 4.7 of CIS).
2. Loose surface materials should be avoided in publicly accessible spaces to avoid items being used as missiles and thrown onto ground level in particular.
3. Planting should be avoided that could aid climbing of the adjoining structures.
4. Extensive CCTV coverage and artificial lighting is required to deter criminal behaviour.
5. Consider limiting access to the terrace area during inclement weather and also out of hours (subject to planning consent) through use of lockable security gates at points of entry. Without control of entry there is a risk of rough sleeping and anti-social behaviour within the terrace level.
6. To deter the threat of self-harm or suicide, all barriers overlooking drops should be a minimum of 1.8m in height and designed to avoid climbing aids.
7. Access to the upper level residents garden to be controlled by security gates of a minimum 2m height fitted with an access-controlled locking mechanism and self-closing device.

6.2 Recommended Level of Security Staff

It is critical that SIA licenced and trained security staff play a part in maintaining security throughout the site. This particularly applies to security within public spaces with the security team provided with communications and back-up from a 24/7 Security Control room.

We consider the minimum number of security officers required during daylight hours is 5 as below:

1. Security officer located at Great Northern Square/entrance to GNW.
2. 2 Security officers patrolling at ground level externally.
3. 2 security officers located within Security Control Room.

Security staff will need to be provided with training in behaviour management and self-harm detection.

An operational plan will need to be developed and staff training undertaken before the L2 terrace in particular is opened to the public.

7.0 Security Within Residences

The Crime Impact Statement refers to theft from residences and the following security measures are required to reduce the risk of crime within the residential towers and entrance areas.

7.1 Residential Entrances – Unmanned

There are a series of entrances for access to the residential towers that are unmanned and therefore potentially vulnerable to unauthorised entry with criminal intent. These entrances need to be protected such that unauthorised entry is difficult and intruders are defeated by a combination of physical barriers (doors or gates) and electronic alarms.

The GMP recommend the following security measures for residential towers:

1. An outer door may be fitted into the building façade and these doors may operate either on an open access basis to an internal weather lobby where a second security door is located or alternatively the outer door itself may be the security barrier to unauthorised entry (referred to as the 'secure door').
    a. Whenever the outer door is an uncontrolled type, there is a risk that the internal lobby could be used for rough sleeping or concealment by criminal lying in wait. To protect against these risks, it is recommended any unlocked outer doors are under CCTV surveillance and notices are displayed stating that the area is under CCTV surveillance and public access if not permitted.
2. The secure door, either within the outer facade or as a secondary security door leading to the elevator lobby must be security rated to LPS1175 B3 (SR2).
    a. Secure doors shall be self-closing and auto-latching on a multi-point locking system that is certified as part of the door system tested to LPS1175.
3. Secure doors should be access controlled from the exterior but can operate via a push button release on the interior.
4. Entry of visitors or service personnel needs to be controlled. Visitors should be able to communicate with the resident using an audio/visual entry system mounted on the outside of the 'secure door' in the lobby.
    a. Visitors can call the relevant apartment and the resident then provides remote release of the secure door to allow access to the lobby and elevators.
    b. Food delivery drivers will need to be informed of the particular entrance to use either as part of the order information or via an external display advertising residential block name and unique residence numbers (e.g. North tower, residences N1 – N78). Alternatively, all food deliveries can be directed to the concierge desk in the main Deansgate facing entrance for collection by residents.
5. Ideally post boxes should be lockable and located in the outer lobby or within the central post handling office adjacent to the concierge's entrance.

Because there is a risk that residents may respond to a call by automatically releasing the outer secure door without checking the visitor's credentials and this means that security measures need to extend to the residential doors.

6. Apartment entrance doors shall be compliant with and certified to BS PAS 24, STS 201 or LPS1175 B3 (SR2). It is advisable that doors do not have a fixed sidelight unless this is to a similar security standard and instead apartment doors are fitted with viewing devices.
7. Doors to storage/meter rooms within entrance lobbies should have 44mm solid core leafs and fitted with 3 hinges, a morticed sash lock to BS3621/18621 to allow rooms to be secured when not in use.

7.2 Concierge Entrance

The concierge entrance is located off Deansgate Terrace. This entrance is required to be staffed on a 24hour basis to avoid having to use a security lobby and access control measures as outlined in section 7.1.

The following security measures are recommended for this location:

1. Concierge desk to be fitted with a panic alarm button to summon assistance if required. The panic alarm shall be responded to from the Security Control Room.
2. All doors within the concierge lobby leading to back-of-house areas shall be key locked or access controlled to prevent unauthorised access.
3. Elevators within the concierge lobby should be access controlled with residents using fobs to activate the floor levels. Concierge staff can activate the elevators for visitors.
4. Concierge lobby to be under CCTV surveillance including:
    a. Main entrance doors.
    b. Concierge desk.
    c. Elevator lobbies.
    d. CCTV within elevator cabs.

8.0 Security Within Car Parks

The Crime Impact Statement (CIS) highlighted specific concerns around the car park and specifically the number and location of emergency or pedestrian entrances.

David Maher, author of the CIS) stated the following:

"The proposals provide the opportunity to address and reduce the number of pedestrian open access points into the multi-storey car park around the 'leisure box'. Currently there are several locations providing direct and unfettered access from street level into the car parking areas. The existing car park is well managed with patrols and CCTV monitoring however this does not deter an opportunist from committing crime and anti-social behaviour within the car par, this M.O is reflected in the crime analysis" (page 20 section 3.2.1)

"The car parking has been well laid out, avoiding potential hiding spaces for intruders. This report recommends careful consideration to review and reduce the number of existing open pedestrian access routes into the car park at street level" (page 20, section 3.2).

The above concerns can be addressed either by reducing the number of street entry points or alternatively security these entrances as follows:

1. All entrance doors to comply with LPS1175 B3 (SR2) security classification.

2. Install external and internal CCTV cameras at each entrance to the car park (including emergency entrances) to capture facial recognition image of persons entering or exiting the car park.

3. Consider incorporating an access control system at the pedestrian entrance(s) using a bar-code scanner to release the door (bar-code printed on the parking ticket).

4. Secure the LPS1175 B3 (SR2) emergency escape doors with manual push bar multi-point hardware (approved to LPS1175 certification of door) and fit an audible alarm with activation alert to the Security Control Room.

5. Display warning notice that opening the door triggers an alarm and CCTV coverage captures individual using a fire escape door for non-fire emergencies.

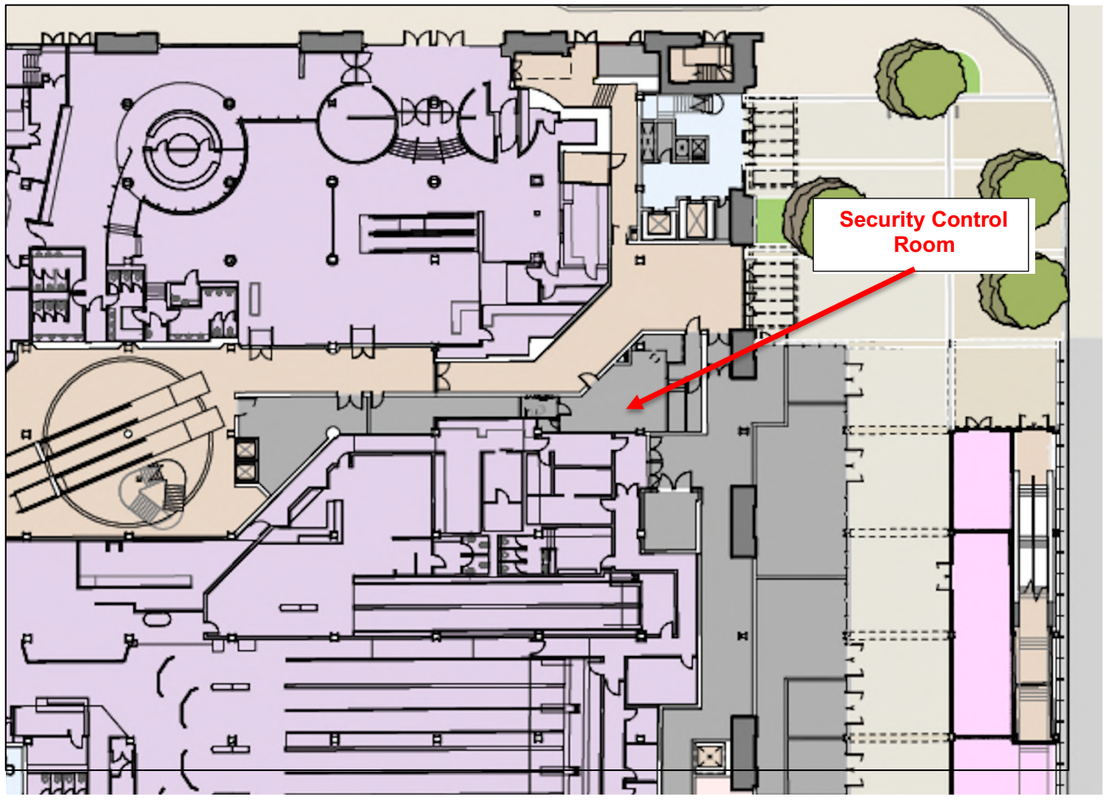
6. Ensure the emergency escape doors are fitted with closure devices and are auto-latching after exiting.

The above measures help to mitigate the risks indicated in the CIS and together with the existing CCTV coverage (maintained post redevelopment) can help achieve a 'Park Mark' certification if desired (https://parkmark.co.uk/).

9.0 Security Control Room – Role in Emergency

It will not be possible to effectively manage the Great Northern Development without incorporating a dedicated Security Control Room within which security staff can effectively monitor and control security systems as follows:

- CCTV systems
- Respond to alarm activations on a 24hour basis
- Dispatch security or support staff to investigate incidents.
- Request Police and Emergency Services assistance in response to a security incident or threat to life safety



P10: Security Control Room location

The SCR is the primary location for monitoring and responding to equipment malfunction alarms, fire and security alarms.

The SCR should be located so that staff are within close proximity of the ground floor to minimise delay in responding to a security or life safety event.

The SCR should contain a minimum of 2 workstations including a supervisor position with a video wall displaying critical CCTV images, fire alarm panels and BMS monitoring. The minimum effective size of the combined SCR is 24m^2. The separate equipment room for CCTV racks should be no smaller than 10m^2.

In the event of a fire or similar incident affecting the safe operation of the Security Control Room within the GNW building, a back-up control room with CCTV monitoring should be located elsewhere within the estate combined. One such location would be within the Dockmaster's office within the loading bay or at another remote location. It is important that security incidents and equipment/life safety alarms can be monitored from this back-up location.

Recommendations for Security Control Room Design and Operation

The proposed location for the Security Control Room (SCR) at the ground floor of the Great Northern Warehouse building is considered appropriate insofar as it is a location that benefits from easy access to the main circulation spaces in the GNW building as well as having external access to respond to events outside of the GNW building.

The SCR will need to have a separate space allocation for equipment racks. These equipment racks will contain CCTV digital image storage drives, with capacity for archive images storage for a minimum 30 day, as well as additional rack space for the access-control and alarm systems.

1. The SCR shall incorporate an addressable building wide public-address system to advise tenants of threats within the building or general area.

2. Activation of any lock down measures, including control of elevators, should be undertaken from within the SCR.

3. The SCR is the preferred location for responding to BMS and Fire Alarm activation working in support of or combined as a joint SCR-Fire Command Center.

4. Environmental control systems within the SCR should be capable of maintaining a climate-controlled working environment to ensure staff remain alert while monitoring CCTV images and responding to alarm activations.

5. The CCTV systems should be designed in accordance with:

    - BS EN 62676-1-1 - Video Surveillance Systems.
    - BS EN 62676-4 standard on requirements for the selection, planning, installation, commissioning, maintaining and testing of CCTV systems.

    Ergonomics and control room layout shall comply with ISO 11064: BS 5979.

10.0 Summary

The recommendations included within this report are supported by the Greater Manchester Police Counter Terrorism Security Advisors (CTSA) and incorporates the crime reduction advice contained within the Crime Impact Statement ref 2015/1104/CIS/03.

We believe that the proposed security measures will ensure the development complies with current best practice from the Greater Manchester Police and national CPNI guidance.

Adopting the security recommendations within this report will provide a positive marketing tool to prospective residential, office and retail tenants.

Security recommendations must not conflict with fire and life safety regulations. Any conflict arising in later RIBA design stages that will require an alternative security solution shall be discussed with the SABRE registered Suitably Qualified Security Specialist (SQSS) authorised individual.

This report is submitted as evidence of a comprehensive security plan developed by a Suitably Qualified Security Specialist (SQSS) licenced consultant as required in accordance with BREEAM HEA06.

Report concludes:



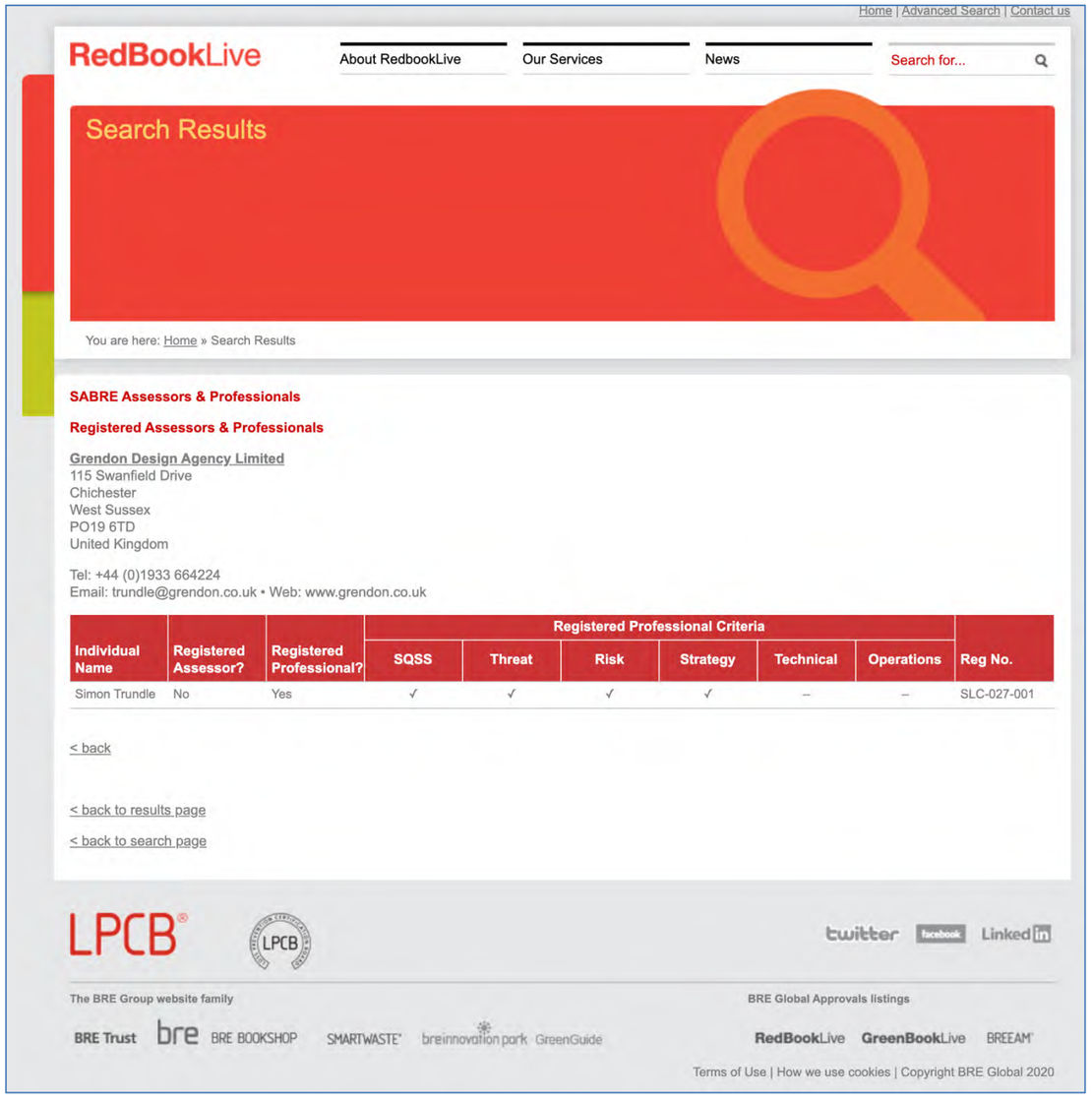
Simon Trundle

SABRE registered Suitably Qualified Security Specialist (SQSS)

Grendon Design Agency Limited

18th November 2022

Document version GDA-GNW-TARA-SNA report Vn 1.3.



Annex A: Record of Consultation with Greater Manchester Police CTSA

The following is a record of a meeting held with Simon McNulty Counter Terrorism Security Advisor, Greater Manchester Police on Friday 28th October 2022.

1: HVM

The design includes a protective HVM line on the perimeter of the Great Northern site to protect crowded spaces from vehicle as a weapon attack and also to capture standoff against VBIED threats.

The HVM line will comply with BS PAS68 for any fixed or movable bollards and where the planners require alternatives such as planters or seating, these will be designed to provide sufficient mass and embedment into the pavement to provide equal vehicle impact protection.,

The Vehicle Dynamic Assessment indicates some locations on the perimeter where vehicle speed could be less than 50mph but in order to provide a uniform design and level of protection all HVM measures will be designed to resist a 7.5t vehicle at 50mph impact speed. The shared entrance roadway into the car park and loading bay will be separated after the car park access using a PAS68 rated security barrier to ensure only approved vehicles can access the back of house loading bay area. HVM measures will be applied to any pedestrian site access that exceeds 1200mm in width and the maximum space between HVM measures and also adjoining structures will not exceed 1200mm in accordance with BS PAS68 design requirements.

Any active HVM measures required for service or emergency vehicle access into the protected space will be controlled from the on-site 24-7 security control room.

2: Marauding Weapon Attack

The layout of the site means that the greatest concentration of members of the public will be within the demise of the Great Northern Warehouse but in addition to this there are food and beverage outlets scattered across the site. The Great Northern Warehouse is a listed structure and there are limitations on what can be altered especially within the facade but in any case, there are multiple escape routes within this building to allow emergency egress in the event of a marauding attack. The remainder of the site comprises of open plaza spaces at ground and first floor level which again offer multiple routes to escape. Tenants within the retail, food and beverage outlets will be expected to be active contributors to the overall site security and training will be provided to tenants as part of the site induction process to ensure they understand how to communicate in an emergency etc.

3: VBIED and PBIED Effects and Injury Mitigation

In compliance with CPNI security advice, the external facades will incorporate laminated safety glass on at least one pane of the insulated glass units to mitigate risks of injury from flying glass in a VBIED or PBIED attack. The minimum interlayer thickness shall be 0.76mm with the additional upgrade in interlayer thickness for all street/pavement level glazing to 1.52mm PVB in accordance with the advice given within the Crime Impact Statement report. The response to VBIED threats will include both evacuation off site and invacuation within secure locations on site. An evacuation-invac procedures document will be created and updated throughout the partial and complete occupation stages of the site. Fire and life safety marshals, tenants and landlord security staff will undergo training in the emergency response to VBIED and PBIED threats. Members of the public will be advised to evacuate off site and not assemble rather than be taken into back of house areas.

4: Fire as a Weapon Attack.

The threat of using a false fire alarm or incendiary attack to draw people out of a property where they can be a target for a VAW attack has been considered and the operational plan will be to disperse rather than assemble at fire evacuation points and the on-site security team will monitor and direct members of the public out of the area of risk (fire alarm activation zone). An operational emergency response procedures document will capture the response to each separate threat and training will be given to fire and life safety marshals and security staff.

5: CCTV and Access Control Measures

The external CCTV surveillance will extend to all building entrances and publicly accessible spaces as well as boundaries between public and back of house areas and the CCTV images will be monitored on a 24-7 basis from within the on-site Security Control Room.

All secondary residential entrances will incorporate access control measures and the main reception lobby will be manned by security 24-7. Food and parcel deliveries to the residences will be processed at a central goods inwards office located adjacent to the main entrance and tenants will be required to come down to collect deliveries in person rather than allow delivery personnel access to the residential floors.

6: Security Staff

A dedicated on-site 24-7 security team will manage security from within the security control room supported by external security patrols. Security staff will be SIA licences and trained and the intention is for security staff to undergo ACT awareness training.

7: Construction Planning and Security

As I explained at our meeting, it is likely that the development will be phased opening in that the Great Northern Warehouse and public realm will be the first phase to open while the residential towers and associated construction follows on later. The operational security plan will take account of the phased development and ensure that HVM measures (both temporary and permanent) are in place to protect members of the public on site.