



The London Borough of Haringey (High Road West Phase A) Compulsory Purchase Order 2023

Proof of Evidence – Crowd Planning and Safety

October 10, 2023



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1. Introduction

Name, Qualifications and Experience

- 1.1. My name is Simon Ancliffe. I have 33 years commercial and consulting experience, of which 23 years are in crowd simulation, crowd dynamics and people movement. I am the founder of Movement Strategies, which is the leading consultancy worldwide in crowd dynamics and people movement with an unrivalled client list of iconic venues, places and events and the transport systems that serve them.
- 1.2. I have a degree in Chemistry with Advanced Quantum Mechanics (MA Oxon 1990). I am one of the most experienced consultants in crowd dynamics. Crowd dynamics is a relatively new discipline and until recently there were no university degrees in the subject.
- 1.3. In April 2000 I joined Legion Limited, a start-up company developing crowd micro-simulation¹ software and associated consultancy. Among other significant contributions to product development and consultancy methodologies I introduced the software into the rail industry, where it became the standard.
- 1.4. In 2002 I co-founded Crowd Dynamics Limited², a consultancy advising crowded places such as Mecca in the Kingdom of Saudi Arabia and Canary Wharf.
- 1.5. In 2005 I founded Evacuation Strategies Limited, which in 2008 changed its name to Movement Strategies Limited to more accurately reflect the application of crowd dynamics and people flow advice to all phases of venue operation (i.e., ingress, egress, circulation, emergency evacuation). Movement Strategies was acquired by the GHD Group in 2019, and now Movement Strategies is a trading name of Gutteridge Haskins and Davey Ltd. I continue to contribute to Movement Strategies' activities.
- 1.6. I led Movement Strategies to become the largest independent consultancy worldwide advising on crowd dynamics and people flow across sectors as diverse as stadiums and arenas, transport hubs, festivals, museums and heritage sites, education, healthcare and mega events such as the Olympics and World Cups. I led the industry in demonstrating that the application of crowd dynamics and people flow goes beyond crowd safety to include considerations of land use, visitor experience, risk, efficiency of design and operation, and commercial objectives.
- 1.7. Between 2006 and 2012 I led the crowd planning consultancy to the London 2012 Olympic and Paralympic Games, including the masterplan and detailed design for the Olympic Park. I also led the 'Operability' consultancy team combining crowd movement, transport, security, accessibility and demand forecasting disciplines. This group provided the specifications for an integrated design and concept of operations for the Games infrastructure including the Olympic Park, masterplan, venues, access routes, landscape and temporary event overlay. The purpose of this activity was to develop specifications in sufficient detail to ensure that the event could work safely, comfortably and cost-effectively, and to

¹ Micro-simulation software refers to crowd simulation packages that visualise people as dots or avatars moving through a 2D or 3D environment. Legion simulation software was used by Buro Happold for part of its analysis underpinning the High Road West Scheme, by Movement Strategies for its analysis of the Stadium scheme and Transport for London for the upgraded White Hart Lane station.

² Note: subsequently acquired in 2021 as Crowd Dynamics International by Buro Happold.

establish the land footprint, infrastructure and temporary overlay needed in advance of architects or designers developing the designs. The specifications produced were or could have been used to inform final designs but if alternative designs were subsequently brought forward then those were tested for performance and adopted if sufficient. Our advice helped secure town planning permissions and licenses for the Games to proceed and made a significant contribution to the success and visitor experience of the Olympic Park and the Games more widely.

- 1.8. Between 2009 and 2013 I was engaged to advise on the expansion of the Grand Mosque in Mecca. During that project I applied an innovative crowd dynamics and risk assessment approach to inform the redesign of the Mataf (the circulation area) around the Kaaba in the Grand Mosque, the expansion building and the design of the temporary Mataf during the construction of the expanded Mosque.
- 1.9. Between 2007 and 2019 I was the crowd dynamics advisor to Glastonbury and Reading Festivals. I provided masterplan, detailed design and operations advice, risk advice, real-time feedback and recommendations regarding crowd safety and people flow issues, and post event analysis. I have a practical understanding of crowd dynamics, crowd safety risks, and the development of crowd management measures to manage such risks.
- 1.10. Other notable projects include Last Mile planning for mega sports events, Notting Hill Carnival, the Queen's Diamond Jubilee, Stratford Regional Station, London Bridge and St Pancras stations during the London 2012 Games, Dubai Metro, the London Aquatic Centre, Edinburgh Castle, Leeds Festival, Hong Kong Jockey Club racecourses, UK Expo pavilions, Anfield Stadium, and most relevantly the development of the Tottenham Hotspur Stadium (the 'Stadium') and the wider Northumberland Development Project.
- 1.11. I led the Movement Strategies team supporting the design and development of the new Stadium from 2008 to 2019. Our advice included determination of the crowd circulation widths required around the Stadium, detailed design of the podium, the detailed design and capacity increase of the Stadium, the arrangement of security screening, and the plan to accommodate crowds moving to, from and around the pre-existing Stadium whilst the new venue was under construction. Movement Strategies also worked closely with Tottenham Hotspur and their other advisors to assess the potential viability of the transport nodes and 'last mile' route networks to accommodate increased travel to/from the venue on event-days.
- 1.12. I also led Movement Strategies' work for Tottenham Hotspur FC in 2015/16 to advise on the design parameters for the Station - Stadium Link³. This was used to inform the High Road West masterplan selection, and to brief London Borough of Haringey and its potential development partners including Lendlease.
- 1.13. Movement Strategies has recently been re-engaged to provide crowd movement advice to THFC in relation to developments in the vicinity of the Stadium and their impact on event-day crowd safety and visitor experience. This includes supporting the design teams for the Hotel and South Podium development and the consideration of Alternative Masterplan opportunities to the west of the High Road.

³ Appendix G to Proof of Evidence of Mr Richard Serra

Background and Scope of Evidence

- 1.14. I am instructed by a number of companies⁴ within the Tottenham Hotspur Football Club ("THFC") group structure to prepare a Proof of Evidence in relation to their objection to the London Borough of Haringey (High Road West Phase A) Compulsory Purchase Order ("the CPO") and to provide further oral evidence at Public Inquiry, if required.
- 1.15. The CPO relates to Phase A of the High Road West Development Scheme (the "Scheme"). It provides for the delivery of Plots A-G within the outline planning permission HGY/2021/3175 ("the Outline Planning Permission", CD 4.28, granted in August 2022).
- 1.16. Phase A comprises the southern elements of the Scheme to the south of White Hart Lane. Phase A reflects the parts of the Scheme that are subject to significant footfall volumes on event days at the Tottenham Hotspur Stadium (the "Stadium"), and therefore the focus of any consideration of crowd dynamics, safety and security. This area is referred to as the CPO Scheme.
- 1.17. My evidence considers the extent to which the CPO Scheme affects crowd safety in the local area around the Stadium to assist the Inspector's consideration as to whether there is a compelling case in the public interest to justify the confirmation of the CPO.
- 1.18. Lendlease has proposed that detailed access route planning and design in the CPO Scheme will be addressed in future Reserved Matters applications brought forward before each phase of the CPO Scheme.
- 1.19. THFC's position is that crowd flow and safety are so important and require sufficient space appropriately arranged that they should not be left for consideration in Reserved Matters applications. On event-days at the Stadium, THFC has a responsibility to deliver a safe operation for crowds within the Local Area.
- 1.20. THFC also has an overarching objection that there is no certainty that Lendlease has the ability to, or will, grant it the necessary legal rights of access over the CPO land in order to manage the safe operation of crowds.
- 1.21. The CPO documentation does not indicate any material change to the end state of the Scheme approved by the Outline Planning Permission upon completion. As such, the material submitted in support of the planning application is considered to represent the current extent of the proposals with regard to crowd flow and safety matters, except with regard to the phasing of construction for which a revised phasing plan has been submitted in support of the CPO, CD5.9.

⁴ Canvax Limited, Goodsynd Tottenham Limited, Meldene Limited, Tottenham Hotspur Stadium Limited, Paxton17 Limited, Stardare Limited, and High Road West (Tottenham Limited)

- 1.22. The matters I address in my Proof of Evidence are:
- Crowd safety and security risks and the importance of planning for crowd safety
 - The current event day operation
 - 'Zone Ex' and THFC's responsibilities with respect to crowd safety
 - Assessment of the proposed End-state of the Scheme
 - Assessment of the construction phasing proposals
 - The benefits of the Alternative Masterplan
 - Summary and Conclusion
- 1.23. I have read all of the background information and made such inquiries such as I consider necessary to fulfil my duties as an expert witness.
- 1.24. The evidence which I have prepared and now provide for this inquiry into the High Road West Phase A Compulsory Purchase Order 2023 within this Proof of Evidence (PoE), is true and I confirm that the opinions expressed are my true and professional opinions.

2. The Importance of Planning for Crowd Safety

The importance of 'crowd flow and dwell'

- 2.1. Stadium designers should, and venue operators must, consider the movement and safety of crowds moving within, to, from and around the stadium. This consideration includes the safe movement of crowds between the stadium and the local transport hubs, including stations, and through public highways or private space. This interstitial area is referred to as Zone Ex (see Section 4) in a UK football context.
- 2.2. The consideration of movement and safety of crowds includes provision of sufficient circulation width for crowds to 'flow' and space for crowds to 'dwell' informally (on the pavements, highways, or in 'squares and public spaces') or 'formally' in designated queue spaces to access transport or amenities. Some spaces allow for both flow and dwell at the same time. It should also allow for non-event related activities that form the normal background activity in the area as far as reasonably practicable.
- 2.3. However, provision of enough space and circulation width is not by itself sufficient when considering safety. The general arrangement of the space, or sequence of spaces, must be appropriately arranged and managed to address the risks in the movement/flow and assembly/dwell of crowds. These risks are discussed in more detail below.
- 2.4. While safety is a paramount consideration that is seeking to be assured, crowd flow and dwell are an important part of the 'spectator experience' - any aspects of the spectator journey that are uncomfortable, delayed or frustrating can diminish the overall experience for the individual, increase safety risk, and also influence the wider reputation of the venue or event.

Crowd Safety and Security Risks

- 2.5. Examples of hazards that affect individual and crowd safety include collisions between vehicles and people, Slips, Trips and Falls ('STF's), anti-social behaviour including aggression, crowd crush and terrorism.
- 2.6. Risk is defined by the probability of a hazard occurring multiplied by the severity of the outcome.
- 2.7. In higher crowd density environments, the probability of hazards occurring, and the potential severity of the outcomes, increase in comparison with those in less crowded conditions. Crowd risks and incidents are localised. For example, the probability of a STF is increased when the walking surface and any trip hazards are less visible due to high crowd density; and on steps or in queues, the severity of the outcome can be increased as the person tripping may affect others resulting in a series of falls. Crowds do not generally occupy a given space evenly so localised crowd densities must be considered; crowd densities tend to increase towards the front of large unstructured queues as there is a competitive element to be 'next', as people get closer to their objective.
- 2.8. In addition, the presence of crowds creates risks - including crowd crush but also the increased risk of anti-social behaviour and violence or terrorism.

- 2.9. Factors such as an incentive to compete (see below), consumption of alcohol, rivalry between fans, delays and poor spectator experience, and/or adverse weather may increase risks.
- 2.10. Crowd risks managed with temporary measures are sometimes greater than those inside buildings or places with permanently deployed infrastructure, even where the crowd make-up is the same. An ongoing requirement for reliance on temporary infrastructure and human intervention to mitigate any safety and security risks is inherently less robust than permanent infrastructure designed with those objectives in mind. Safety hazards also arise where the actual delivery of the operation does not match the plan due to lack of equipment or staff resources, or incorrect deployment, or where the state of spectator or staff knowledge about the environment is not what is assumed in the plan. Addressing risks during the design phase is preferable. Equipment and staffing can also be very costly.
- 2.11. There are many examples of crowd crush and incidents resulting in injuries or deaths including during activities such as queueing and emergency evacuation.
- 2.12. Relevant examples include:

- *UEFA 2020 Final between England and Italy at Wembley Stadium, 11 July 2021⁵. “A huge number of ticketless fans headed to the locality of Wembley stadium and excessive drinking and drug taking was noted to have begun very early in the day. As kick-off neared, many of these ticketless fans attempted unauthorized ingress into the stadium proper. Many succeeded and were reckless in their pursuit. Of note from the review is that “...many instances before, and during, the match, where the behaviour of ticketless fans created risks of progressive crowd collapse on staircases, door wedging, trampling in crowds, barrier collapse and entrapment. ...Analysis of CCTV footage reveals a number of incidents, which might have led to serious injury or worse. For example, at 5.25pm a surge of 100 individuals to the top of the Spanish steps caused barriers to collapse and led to a number of individuals being trampled, including a young male who fell and was temporarily ‘buried’ by other people falling on top of him”.*

Comment: There was a competitive incentive for fans to get into the stadium, and the fans caused safety incidents in pursuit of that goal, including those related to barrier collapse. Risks were likely increased by crowd state of intoxication. A powerful incentive to get into the venue was also a contributory factor in the recent fatal incident at the Brixton Academy.

- *Crowd crush at Twickenham Railway station after England vs Tonga, 6 Nov 2021 at Twickenham stadium. The queues outside the station were managed by Southwest Trains but it was reported that there was a lack of safety marshals and police to manage the crowds entering the station and keep people safe. There were reports of surges reducing some boys to tears, pushing and shoving, even fights, as people were forced to queue for hours. An elderly couple had to be rescued from “the scrum of people” after nearly falling over.*

⁵ Appendix C: The Baroness Casey Review: An independent Review of events surrounding the UEFA Euro 2020 Final ‘Euro Sunday’ at Wembley



Figure 1: Image taken from within the crowd at Twickenham Station, 6th November 2021

(Source: Twickenham Nub News⁶)

Comment: The incentive to get on a train and get home can cause high crowd densities and pushing/shoving, which can be exacerbated by poor infrastructure and barrier design, as well as inadequate staffing.

- *Greenvale Hotel in Cookstown, Northern Ireland, 17 March 2019⁷. Three teenagers died in the queue to get into a local disco. Witnesses reported that people at the back of the queue pushed forwards to get into the disco, compressing others against a wall, and the queue collapsed so people were trapped underneath. Low hundreds of people were involved.*

Comment: Crowd crush can happen in ‘every-day’ conditions. People in a crowd at the back of a queue cannot see or hear what is happening at the front of the queue.

- *National Monument, Dam Square in the Netherlands, 4th May 2010⁸. A wreath-laying ceremony and minute’s silence attended by Queen Beatrix was interrupted by a screaming man, holding a briefcase some presumed could be a bomb. In a scuffle, a security fence fell over creating a shot-like bang. The crowds quickly evacuated and 64 people were knocked down and/or injured in the resulting stampede; and.*
- *Piazza San Carlo, Turin, 3rd June 2017⁹. Thousands of Juventus fans filled to watch a live relay of the Champions League final between Juventus and Real Madrid. Crowd panic was provoked*

⁶ <https://twickenham.nub.news/news/local-news/crush-at-rail-station-raises-serious-safety-issues-after-sell-out-crowd-returns-to-twickenham-for-england-tonga-clash>

⁷ <https://www.bbc.co.uk/news/uk-northern-ireland-47606006>

⁸ <https://www.dw.com/en/dutch-police-detain-man-over-royal-ceremony-bomb-panic/a-5540270>

⁹ https://en.wikipedia.org/wiki/2017_Turin_stampede

in the final minutes of the match by an assumed firecracker explosion, which prompted suspicions of a terror attack. A crowd stampede ensued as people rushed to climb barriers and exit the square. Fans were crushed against the barriers, knocked over and trampled on. Approximately 1,500 people were injured from the stampede, including seven critical injuries.

- Comment (for both Dam Square and Piazza San Carlo): Emergency Evacuations can be triggered by a threat or even a reasonable fear of a threat, which are more likely in crowded places, including in and around stadiums. Subsequent high-density crowd and rapid crowd movement is risky with the potential for high rates of injury or worse. Emergency evacuations may not be orderly, and safety is promoted by generous provision of escape routes. Barriers used to manage people during normal operations are hazardous and can increase risk in situations of this nature.

- 2.13. Contributory factors to such incidents are high density crowds and an intent for individuals within a crowd to move towards an objective. There are various incentives to push forward - a desire to get into a stadium or an arena, a chance to win a prize or an offer, away from heavy rain or poor weather, or a desire to get on the next train. The risks can be increased by poor queuing system layouts, insufficient staff levels or inadequate training or planning, or crowd behaviour.
- 2.14. Most deaths in crowd crushes arise from compressive asphyxiation from the weight of people pressing against them or in a crowd collapse on top of them pinning them to the floor.
- 2.15. Crowd dynamics, *inter alia*, considers the effect of the general arrangement and design on crowd flow and densities; the physical relationship between crowd densities, flow rates, and user experience; event and crowd type and demographics; factors that influence behaviour such as crowd awareness and familiarity of their environment, knowledge and information they receive, risk assessment, management procedures and resourcing. The aim of crowd dynamics is to inform designers and operators how to arrange and manage the spaces used by crowds so that they may do so safely and comfortably.

3. Background: Crowd Flows at Tottenham Hotspur Stadium

Stadium Overview

- 3.1. The Stadium located in London Borough of Haringey ('LBH') was opened in April 2019 as part of the wider Northumberland Development Project. It replaced the previous stadium that had been on the same site used by THFC since 1899. The Stadium and associated development are on a plot bounded by the public highways of the High Road, Park Lane, Worcester Avenue and Northumberland Park.
- 3.2. While primarily in use as the home of THFC, typically hosting upwards of 25 matches per year, the Stadium is also contracted to host American Football (NFL) events and has hosted live music and other (non-football) sporting events such as Boxing and Rugby Union and will continue to do so in the future.
- 3.3. The Stadium has a 62,850-seat capacity and access is controlled such that entry requires either a ticket or an accreditation pass. The venue is designed with multiple entry and exit points accessed from either street level or at podium level, which is linked to street level by a combination of stairs and lifts. The combination of podium and streetscape allow attendees to circulate around the full extent of the Stadium building, with spectators being directed to a specific entry point dependent on the location of their seat. Upon departure, the majority of people leave the building via the closest exit from their seat, with circulation thereafter taking place outside the venue. Figure 2 is an indicative representation of the Stadium showing the number and location of entry/exit points.

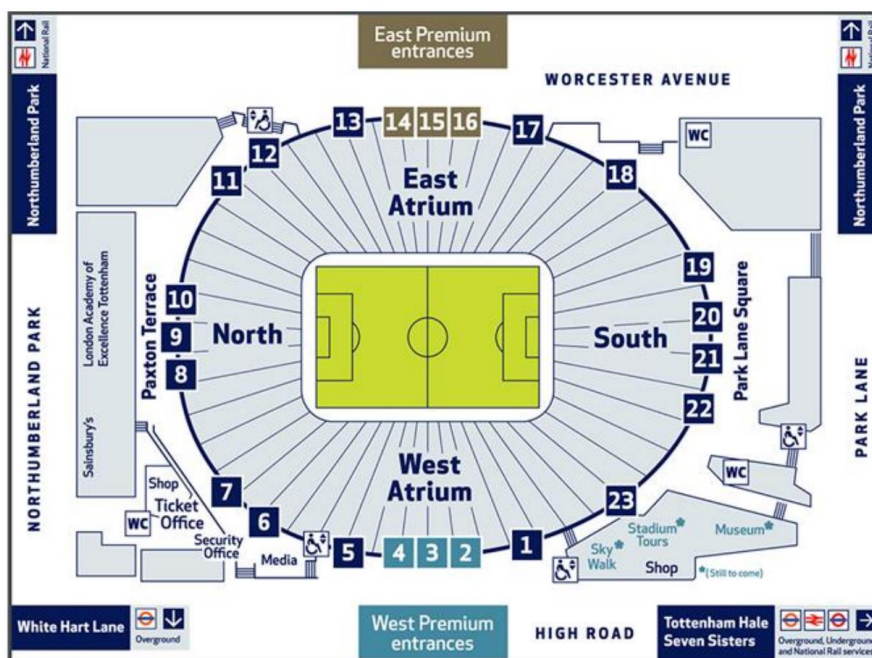


Figure 2: A graphic of Stadium entry points

(Source: Appendix D, Boxing Local Area Management Plan, Stadium Management Ltd, Nov. 2022)

- 3.4. Attendees are made up of General Admission ('GA') spectators and those with access to hospitality areas. These different groups have different offers at the Stadium, and this influences their decisions relating to the nature and timing of their journey to/from the event. The majority of attendees will be GA spectators and peak crowd conditions are related to their behaviours and decisions. For football events,

GA spectators can access the venue from two hours before kick-off and parts of the Stadium remain open and accessible for one hour after the final whistle. For concerts, the Stadium is accessible to GA attendees from one hour prior to the start of the first support act and closes one hour after the event finishes.

- 3.5. When the Stadium has been used for concerts the seating capacity has been curtailed, as the stage and rigging has been installed at the north section of the seating bowl and pitch area. However, there is spectator access to the playing field area that mitigates the reduction in overall venue capacity resulting from seating 'loss'. For example, the stated Stadium capacity in the concert LAMP for the Red Hot Chili Peppers concert on 21st July 2023 was 47,179, including approximately 15,000 attendees at pitch level. This change means that the use of ingress and egress gates is restricted in the north section and does not function in the same way as if it were in use for a football match. This affects the patterns of arrivals and departures across the venue, with increased loading via the south of the Stadium, which has its full seating complement as well as access to/from the pitch viewing areas.
- 3.6. When hosting boxing events, some seating is introduced at pitch level, but the overall capacity of the venue does not exceed that of football mode, and viewing is distributed across the 360-degree extent of the viewing accommodation.
- 3.7. When in use for NFL events, the Stadium itself operates for entries and exits in a consistent way with the football arrangement, using the same viewing accommodation and venue capacity. At some previous NFL events, a 'Welcome Zone' has been set up on High Road, north of the Stadium requiring additional road closures for spectators to congregate and access concessions before entry into the Stadium. This zone is not planned to be used for any events currently scheduled, although this may change in the future.

Phases of Operation – Ingress and Egress

- 3.8. In the hours preceding an event, visitors arrive in the locality via various transport modes. Rail transport to the four principal stations - White Hart Lane, Northumberland Park, Seven Sisters and Tottenham Hale serving the Stadium - constitute the majority of arrivals, although the relative distribution by mode and station varies by type of event and audience.
- 3.9. Tickets for the event provide details on the seat location and the designated entry point. Prior to reaching the Stadium ticket turnstiles, visitors must pass through a 'soft' ticket check - i.e., visual check by a steward - and then security scanning arches and associated bag search stations positioned as a cordon on the podium perimeter.
- 3.10. As an example of pre-event arrival patterns, Figure 3 indicates the percentage of the 59,215 visitors arriving in the Stadium vicinity relative to kick-off to attend a football fixture involving Crystal Palace FC on Wednesday 3rd April 2019. The spread of arrivals over a three-hour period indicates that there is not a significant 'peak', with several periods where the demand is similar in scale - the busiest 15-minute period accommodating approximately 12.5% of the total footfall.

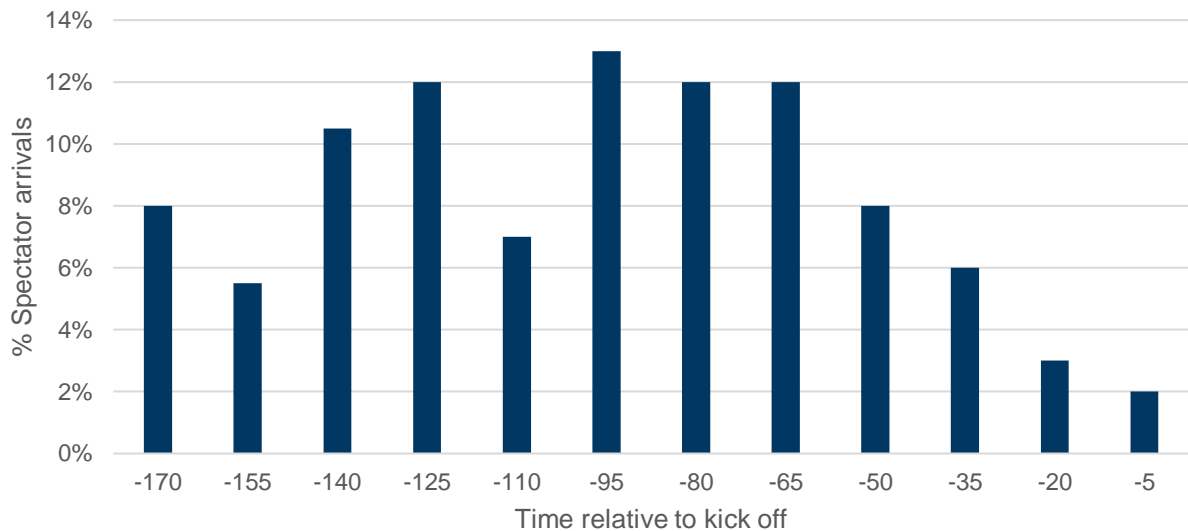


Figure 3: Arrival profile of spectators for THFC v CPFC, 03/04/2019
 (Source: Appendix E, Major Event Day Monitoring Report, Arcadis, October 2020)

- 3.11. In terms of attendee behaviours, most footfall arriving in this vicinity is transient and free flowing. There are some locations within the vicinity that attract spectators during the pre-event period - either in the form of local businesses or facilities, or as a specific location that is promoted as part of the event (e.g., NFL Welcome Zone).
- 3.12. The flows emerging from the station tend to be in 'surges' associated with the arrival of train services. Given the station layout, the demand from a single train tends to clear the station in approximately five minutes.
- 3.13. At the end of the event, spectators disperse from the Stadium into the local area, either moving directly towards their onward transport, or to a nearby destination to spend some time before travelling. Note that parts of the Stadium concourse and facilities remain open and accessible to GA spectators for an hour after the event, and this regulates the rate of departure from the venue. Hospitality attendees have access to different post-event facilities, and this influences their rate of departure.
- 3.14. During egress all exits are clear and there is no ticket scanning or security scan in place. As such, while the number of entry and exit points are the same, the exit capacity of the venue is higher than the entry capacity.
- 3.15. As an example of post-event departure patterns, Figure 4 shows the profile of people moving from the High Road to the west via White Hart Lane relative to the event end time. This profile emerges from a combination of the rate of departure from the Stadium and the time taken for attendees to circulate around the venue to reach this point. It is not constrained by any queuing, other than that encountered leaving the Stadium itself.
- 3.16. The egress flows are largely contained within a 90-minute period (acknowledging that this was a 'late-night' event), but there is clearly a 30-minute period that accommodates circa 65% of the demand. In comparison with the pre-event ingress flows, this indicates that the peak flows within Zone Ex during egress are likely to be up to three times higher than those during ingress.

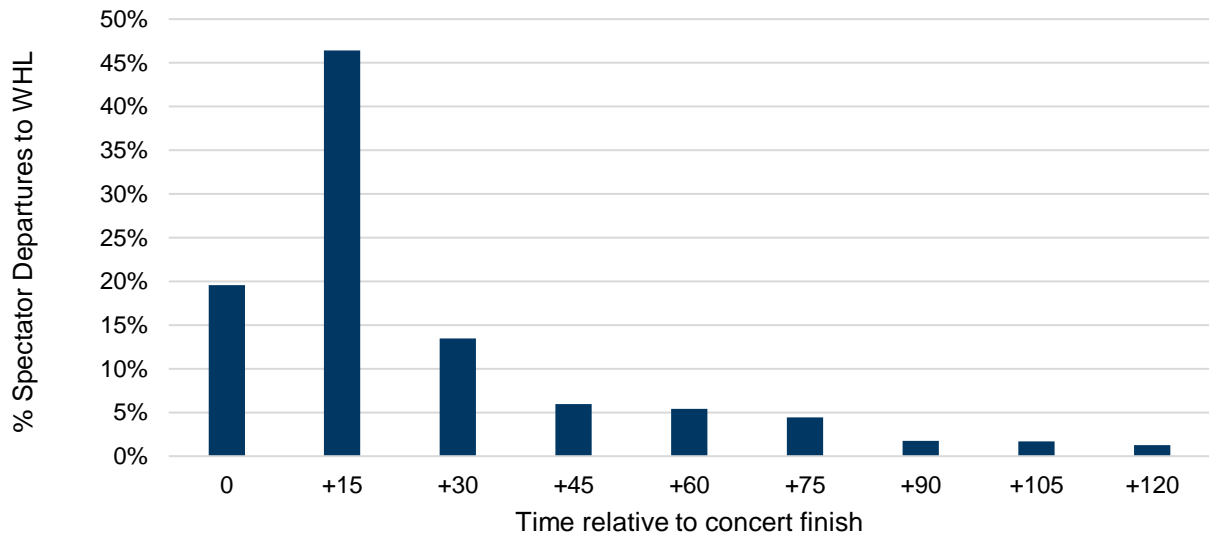


Figure 4: Departure profile of spectators from High Road to White Hart Lane

(Source: Appendix F, Tottenham Hotspur Stadium Event Monitoring Guns N' Roses, Friday 1st July 2022: White Hart Lane & High Road Pedestrian Survey Analysis, GHD, September 2022)

Differences between Event-types

- 3.17. The Stadium has hosted high-occupancy events for football, concerts, NFL matches, Rugby Union and World Championship Boxing. In the context of crowd flow within the Local Area the strategy is the same for all types of high-occupancy events at the Stadium. However, there are differences in the outcomes in terms of the experience within the Local Area resulting from differences in behaviours or planned/unplanned disruption to the transport network.
- 3.18. The differences in behaviours arise from factors such as a different distribution of points of arrival in or departure from the local area; a different arrival or departure profile given the type of event; or different mode split. Audience demographics, familiarity with the venue and local area and the availability of visitor information all affect the behaviours of crowds within the Local Area. Behaviours differ to some degree between THFC matches and third-party events. Attendees of football matches are more likely to be familiar with the Tottenham area and therefore are more likely to have determined optimum travel options rather than using the travel option nearest the Stadium. They consider alternative travel options to avoid extended delays to access WHL station, as well as being more accepting of delays than customers for other events, who exhibit more discontent while queuing. As such, the extent of queuing in this area and/or crowd management required is typically greater for third-party events.
- 3.19. The Stadium has been identified as a host venue for the 2028 European Football Championships should the bid from the UK and Ireland be successful (for which it is the only candidate - UEFA will announce the formal outcome of the bidding process on 10th October 2023). It is anticipated that the operational model for the Stadium and Zone Ex during this event will be different to any of those in place for events currently hosted at the Stadium. This may be due to differences in security profile or ticketing operations, arrival and departure profiles but it may also be in relation to the creation of additional event overlay in the vicinity of the venue to support the promotion of the major event experience and look and feel.

4. Zone Ex and the Local Area Management Plan

Zone Ex

- 4.1. Zone Ex is a key concept in relation to crowd safety at stadiums. It is defined in the Guide to Safety at Sports Grounds (The Green Guide)¹⁰ as "...the public realm and is likely to encompass the main pedestrian and vehicle routes leading from [the venue] to public car parks, local train stations, bus stops and so on." Zone Ex is sometimes referred to as 'Last Mile' or 'Grey Space' (the latter usually when the focus is on security). The 'Last Mile' is not a literal mile from the stadium.
- 4.2. The Green Guide is a document published by the Sports Grounds Safety Authority that provides guidance on the various aspects that come into consideration when a venue capacity is agreed for inclusion in its Safety Certificate - which it must have agreed in order to be licensed to host events.
- 4.3. Whilst the Guide has no statutory force and adherence to the Green Guide is not an obligation, its contents are widely used by sports venues in England and internationally as indicating 'requirements', particularly by Local Authority licensing authorities and - for larger venues - the Safety Advisory Groups¹¹ chaired by the Local Authority. When aspects of the Guide are adopted in Safety Certificates in force under the Safety of Sports Grounds Act 1975 they will become statutory at individual grounds. Safety Certificates are time-limited, supporting the intent for safety matters to be given ongoing consideration.

Responsibilities of Tottenham Hotspur Football Club for Zone Ex

- 4.4. The Green Guide states that the responsibility for all people present in a sports ground lies at all times with the ground management.
- 4.5. The Green Guide also states (s6.10) that "[a]lthough the routes or areas that make up Zone Ex do not, in most locations, fall within the jurisdiction of the ground management - they will either be part of the public realm or under private ownership - clearly they are key to the safe and secure arrival and departure of spectators. It is therefore vital that planning for the movement of people through Zone Ex involves the input of all relevant agencies and, where applicable, the owners of private property."
- 4.6. Given the multi-agency nature of the Zone Ex delivery, the Green Guide highlights the importance of establishing who has lead responsibility for co-ordination of Zone Ex on an event day.
- 4.7. In this case, THFC as the venue owner and operator represent 'ground management'. THFC takes on the role of the Zone Ex Co-ordinator for events at the Stadium. This role is discharged through the Major

¹⁰ [S1.1] "The Guide to Safety at Sports Grounds is an advisory document for use by competent persons working in the regulation and licensing, the design and planning, and the safety management and operation of sports grounds. The Guide has no statutory force but many of its recommendations will be made statutory at individual grounds where safety certificates are in force" (as in THFC). Excerpts provided at Appendix G.

¹¹ A Safety Advisory Group ('SAG') is a forum providing specialist advice to the local authority allowing it to discharge its functions under the Safety of Sports Grounds Act 1975 and/or the Fire Safety and Safety of Places of Sport Act 1987. NB. It is the Local Authority that issues the safety certificate but benefits from the expertise within the SAG. There is a SAG in place for the Stadium chaired by LB Haringey.

Event Day Local Area Management Plan that THFC is obligated to implement pursuant to the Section 106 Agreement for the Stadium.

- 4.8. In the context of the CPO Scheme, Zone Ex includes routes to WHL station and the Alexandra Palace / Wood Green shuttle bus loading/unloading zone to the west of the CPO area. The extent of Zone Ex and how the CPO footprint relates to this is shown in Figure 5.

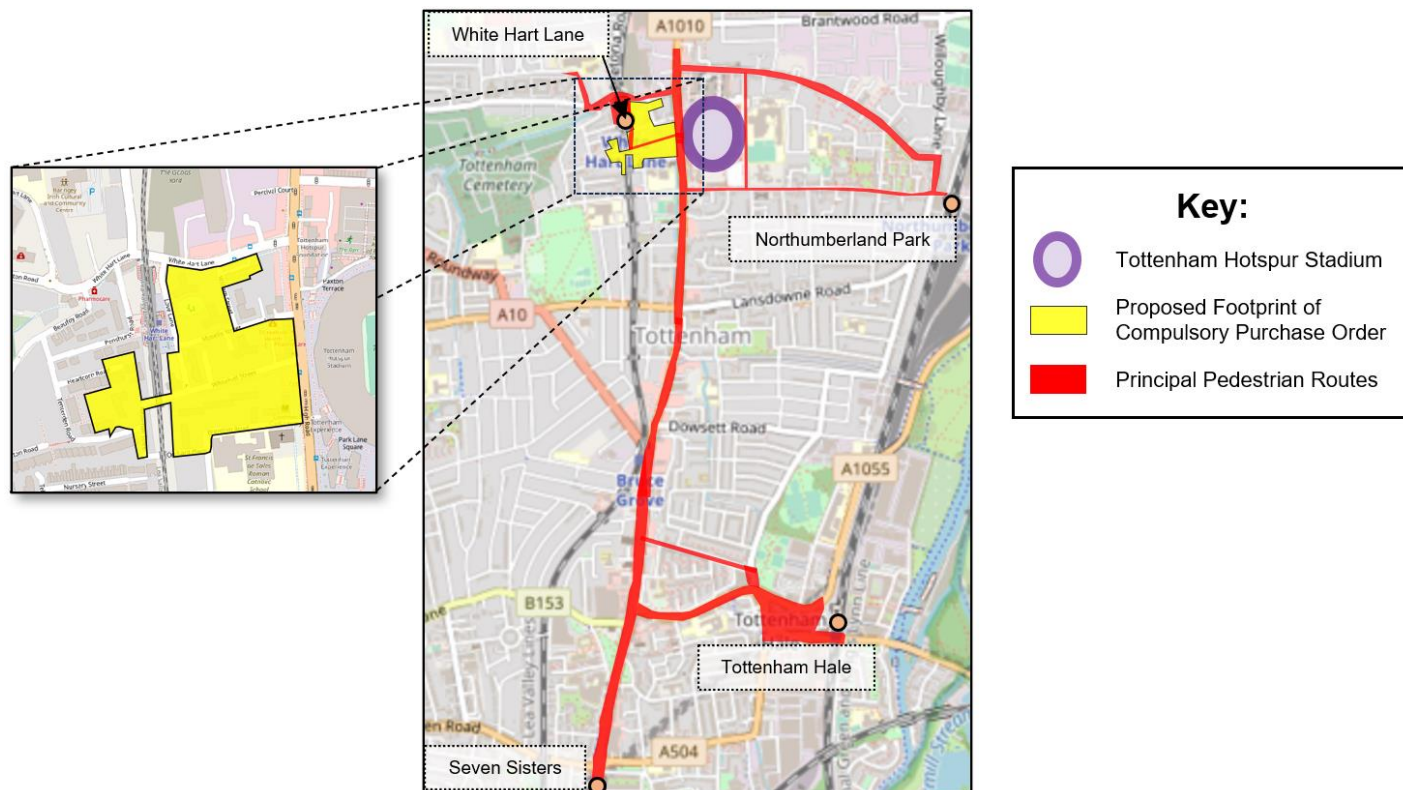


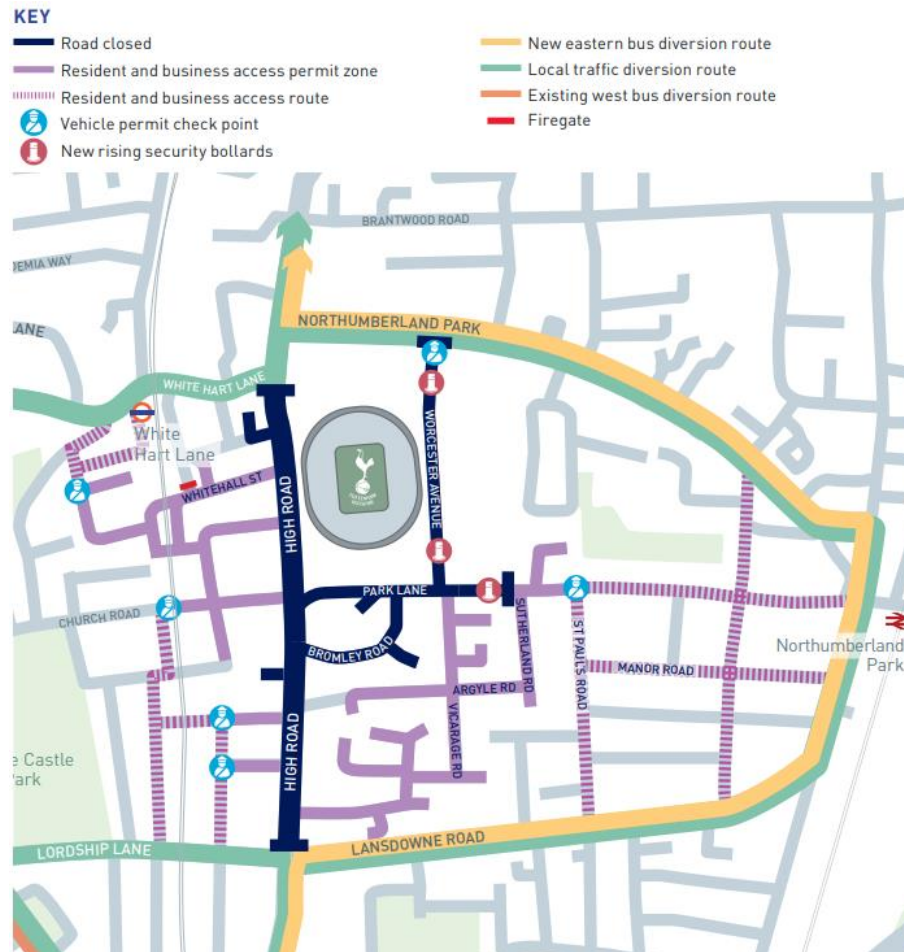
Figure 5: Zone Ex principal pedestrian routes relative to the Compulsory Purchase Order area

- 4.9. Areas within Zone Ex including static queues of people waiting to access railway stations at egress could be considered targets for terrorism. THFC is committed to the safety and security of people in Zone Ex on event day, with security considerations and measures such as the implementation of Hostile Vehicle Mitigation ('HVM') a key component of venue operation plan extending into the Zone Ex areas.
- 4.10. If THFC were not able to demonstrate that they and their partners can assure the safety of visitors to the Stadium as far as reasonably practicable, then the SAG would likely advise the Local Authority to issue a Safety Certificate with a reduced operational capacity or *in extremis* to withhold the Safety Certificate, which would mean that the Stadium is unable to host events.

Local Area Management Plan, Road Closures and Traffic Management

- 4.11. The Local Area Management Plan ('LAMP') is a requirement of the section 106 Agreement for the Stadium. It is a document indicating how THFC and other stakeholders deliver the transport and crowd management requirements associated with the Local Area. In crowd management terms, the Local Area is effectively equivalent to Zone Ex (defined in the Green Guide).

- 4.12. The crowd management plans for Zone Ex were developed in partnership with the multiple stakeholders and agencies when the Stadium first opened. While there are a number of operational stakeholders the onus is in THFC to ensure Zone Ex is co-ordinated and delivered. The LAMP is a 'living' document that evolves over time and in response to the specific events being delivered. It is subject to ongoing review with LBH.
- 4.13. The need for review by the multiple agencies and stakeholders with an interest in the LAMP means that update, comment, change and approval can take up to six months. This is particularly the case during the summer holiday period in advance of the new football season, although all stakeholders seek to facilitate approval before the season begins.
- 4.14. A key aspect of the current LAMP is the implementation of event day road closures and associated traffic management measures. These are in place on the routes shown in Figure 6 and are implemented from two hours before the event starts to one hour after the event finishes. The road closures are often phased to minimise disruption to the community, with one phase of multiple phases shown in Figure 6. The Road Closures are enabled by Traffic Management Orders (TMOs), which are legal documents for regulating the use of highways drafted and made by LBH, and also by Anti-Terrorism Traffic Regulation Orders requested by the Metropolitan Police Service advertised by LBH that permit HVM measures to be placed on the public highway.
- 4.15. The LAMP is partially reliant on influencing the behaviour of those travelling to and from the venue. There is a Stadium Travel Plan process in place that provides for communications to attendees in advance of their journey and also while they are en route to/from the venue. Responsibility for pre-event travel planning and communications differs between THFC matches and 'third-party' events - principally as there is a difference in who holds the direct relationship with the attendees in each instance. Responsibility for event-time communications within the LAMP/Zone Ex area is consistent across all events, with THFC taking the lead co-ordination role for messaging.



PHASE 2: ONE HOUR PRIOR TO THE START OF AN EVENT OR MATCH AND UP TO 15 MINUTES AFTER

During this period, no vehicles (except emergency services) are permitted in the roads that are highlighted in navy blue on the map above. This is to ensure safety and security is maintained around the stadium. Residents and businesses displaying a valid CPZ, Homes for Haringey or Blue Badge permit will be able to drive through the check points into the roads highlighted purple. Traffic marshals will close the remaining southern section of the High Road to Lordship Lane/Lansdowne Road.

Figure 6: Road closures on event day. Phase 2 of the multi-phase operation

(Source: Tottenham Hotspur Stadium: Events at the new stadium – a guide for local residents and businesses¹²)

White Hart Lane Station and further west

- 4.16. Located approximately 250m to the west, WHL station is one of the four principal rail stations serving the Stadium. As the nearest station to the Stadium it is a busy transport node for arrivals and departures and the route between the two forms a key part of Zone Ex. Whilst it varies from event to event, typically 15-20% of event day visitors to the stadium use WHL station as part of their event-day journey, and a further

¹² Appendix F to Proof of Evidence of Mr Richard Serra

2-4% who either use the Alexandra Palace/Wood Green shuttle bus that picks up and drops off to the west of the station, or travel via this area on foot to other local destinations¹³.

Current Zone Ex Operations

- 4.17. The Zone Ex operation in this location relies upon the public highways including White Hart Lane, Whitehall Street and Love Lane, with footpaths and carriageways used for flow between the station and the Stadium and also to accommodate queues to access the station post event. Figure 7 and Figure 8 show the principal elements of the Zone Ex operations during the pre-event and post event periods in this area.

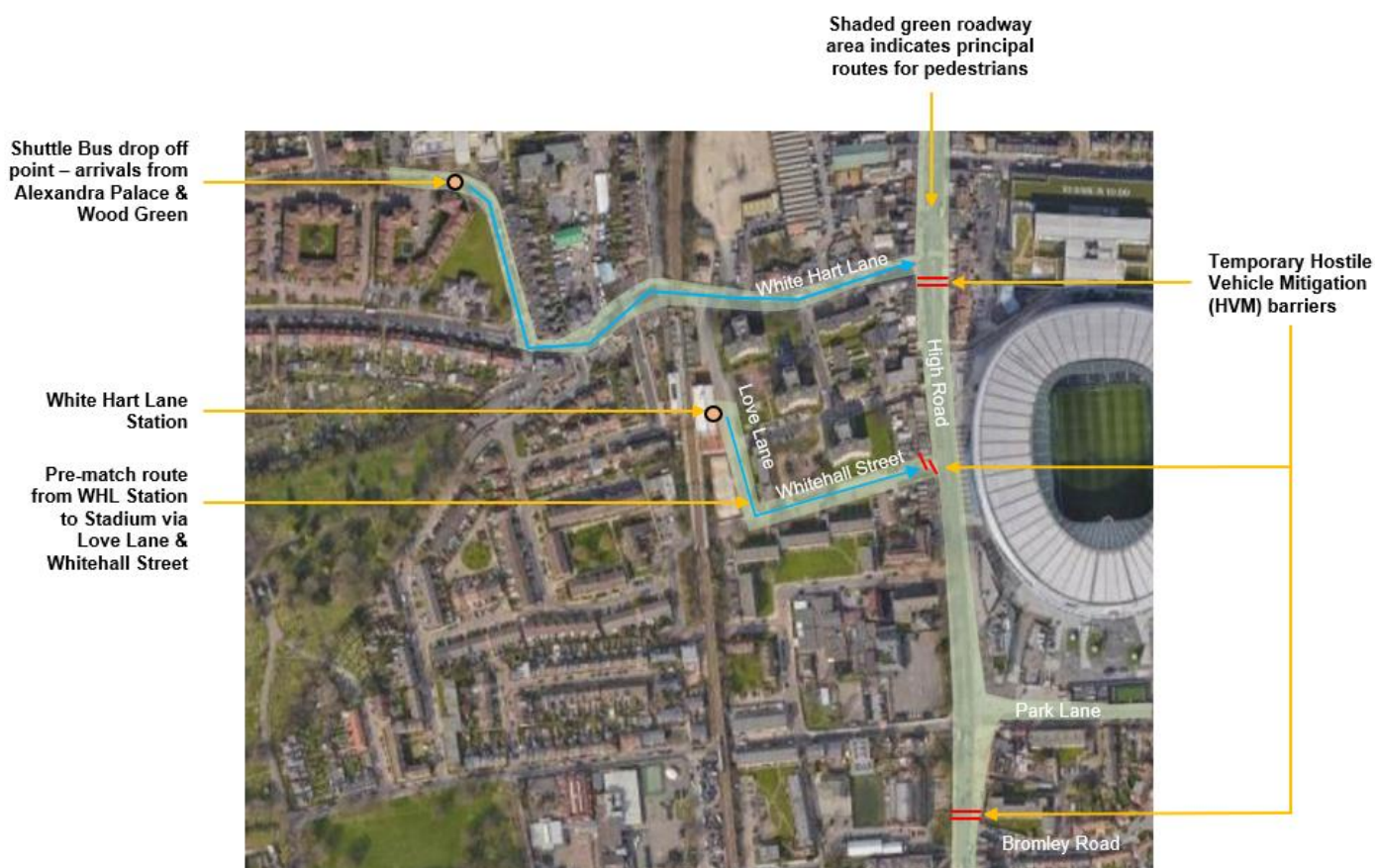


Figure 7: Pre-Event Zone Ex Operations and Routes in the High Road West Area

¹³ Appendix E, Tottenham Hotspur FC Stadium Major Event Day Monitoring Report, Arcadis, October 2020

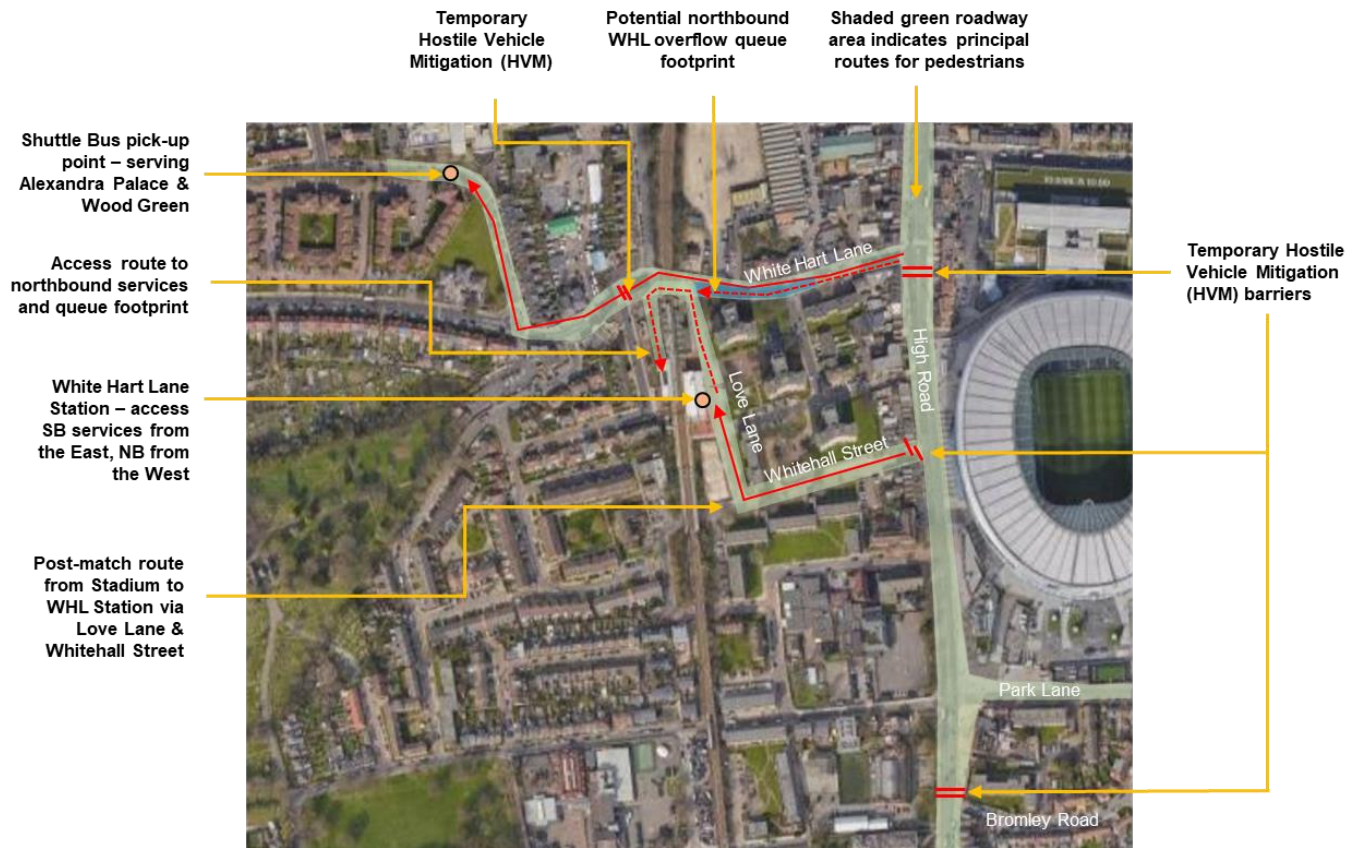


Figure 8: Post-Event Zone Ex Operations and Routes in the High Road West Area

- 4.18. The Zone Ex management is supported by temporary infrastructure brought onto site the night before or on event day and removed on each event day – this includes crowd barriers, temporary toilets, Variable Message Signage ('VMS'; 3rd-party events only), other wayfinding, and HVM measures. The toilets are in place on Whitehall Street the night before, while HVM, VMS and some barriers are deployed before the event when the roads are closed in the hours leading up to the start of the event and ingress period. Barriers for the post-event egress flows and queues are deployed after match kick-off.
- 4.19. Some of the barriers are needed to protect spectators from STF risks along White Hart Lane. The 'Rain Gardens' in White Hart Lane, a key event day route, were implemented in 2018/19. This introduced new landscaping features that included raised kerbs and dropped planting that increased risks (probability and severity) for STFs, so that THFC has to implement a barrier system (as shown in Figure 9). This reduces the available walkway capacity and increases the potential for event-day attendees to walk within the highway, increasing the likelihood of interaction between the crowds and moving vehicles. Without input from THFC at the appropriate time in the design process, this resulted in an ongoing uplift to the risks within this part of Zone Ex and ongoing costs to mitigate these effects. This is a pertinent local example of how a lack of consultation during the planning phase could lead to safety issues within the footprint of the Scheme. The impact of the Rain Gardens on crowd flows and safety was foreseeable and could have been mitigated.



Figure 9: Temporary Barriers limiting access to 'Rain Gardens' on White Hart Lane on an Event Day

(source: Stadium Management Ltd, July 2023)

- 4.20. The deployment of the temporary overlay and staff differ between ingress and egress periods. These are shown in the following figures.
- 4.21. Within the Zone Ex area adjacent to WHL station during the ingress period, the following key features apply:
- All passengers exiting from the station enter the public realm via the eastern exit, emerging on Love Lane. The spectators are directed towards the Stadium via Whitehall Street, using a combination of temporary barriers and wayfinding information (see Figure 10). Moselle Place and Moselle Street are closed to spectator footfall;
 - White Hart Lane is open to traffic, and those arriving via the shuttle bus or from the west of the station are directed towards the Stadium via this route. The pavement capacity on White Hart Lane is limited due to the presence of 'rain gardens' and barriers protecting them;
 - Toilets are available for use within Whitehall Street;
 - HVM are in place to protect spectators in the vicinity of the Stadium; and
 - Post-event infrastructure is stored in the vicinity, but not deployed in areas that are used by arriving crowds until the ingress period has ended.



Figure 10: Deployment of barriers in the vicinity of WHL Station during the ingress period

(Source: Appendix H, SM_THFC_Station Barriers_2023 – Draft v5. 8.9.23.THFC Arrival.pdf, Stadium Management Ltd.)

4.22. Within the Zone Ex area adjacent to WHL station during the post-event egress period, the following key features apply:

- The station operates with two points of access depending on the direction of travel. Those heading northbound enter on the west side (via White Hart Lane) and those heading southbound enter on the east side (via Love Lane). Moselle Place is closed to spectators;
- Entry to the station is regulated to ensure that platforms do not become overloaded at peak times. This results in queues forming outside the station, and these are managed with a temporary barrier arrangement;
- White Hart Lane is closed to traffic for approximately 45 minutes using a large van to block off access from the west and a road closure to the north of the junction with the High Road, with pedestrian demand from the Stadium towards the northbound platform, and the Shuttle Bus directed via this route;
- Alongside increased staffing, additional wayfinding and signage is deployed, including electronic VMS signs and loudhailers (on 3rd-party events); and
- Toilets are available for use within Whitehall Street.

- 4.23. The key feature of Zone Ex management during egress is the queueing and access arrangement in Whitehall Street, Love Lane, and White Hart Lane demarcated by pedestrian barrier. The barrier systems also allow for flows to move past the station (e.g., towards the Shuttle Bus Load Zone, and non-spectator demand) whilst queues are in place. This is shown in Figure 11 and Figure 12 below (also available in larger scale in Appendix M).
- 4.24. The 'southbound' queue in purple is most heavily used. It stops short of the area immediately in front of WHL station to allow circulation from the queue to both the eastern doors of WHL station. The northbound queue shown in pink is usually used as an access lane to the northbound queue that is usually contained in the area to the west of the station.

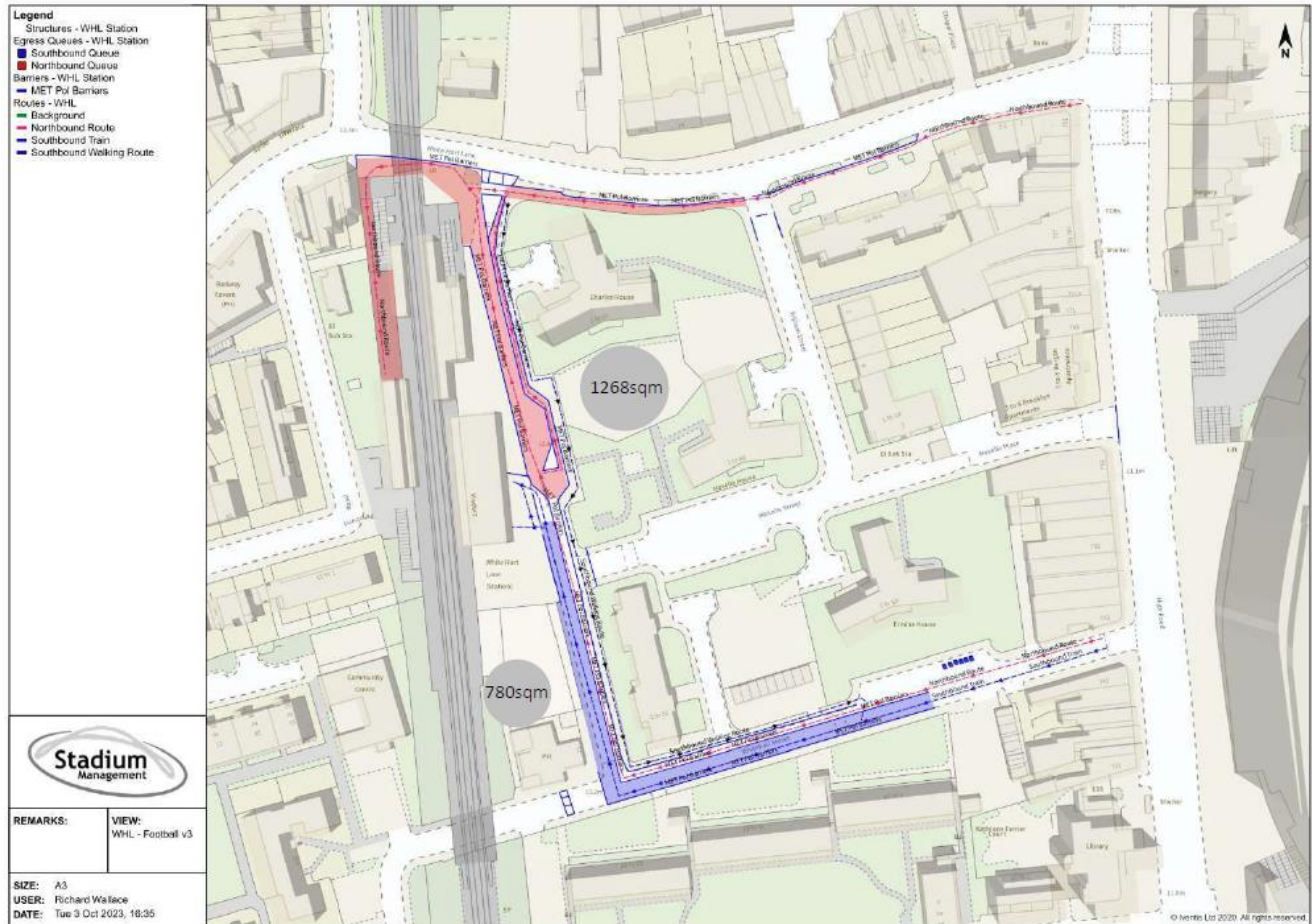


Figure 11: Existing barrier arrangements for post-match egress, Football
(Source: Appendix I, Stadium Management Ltd., July 2022)

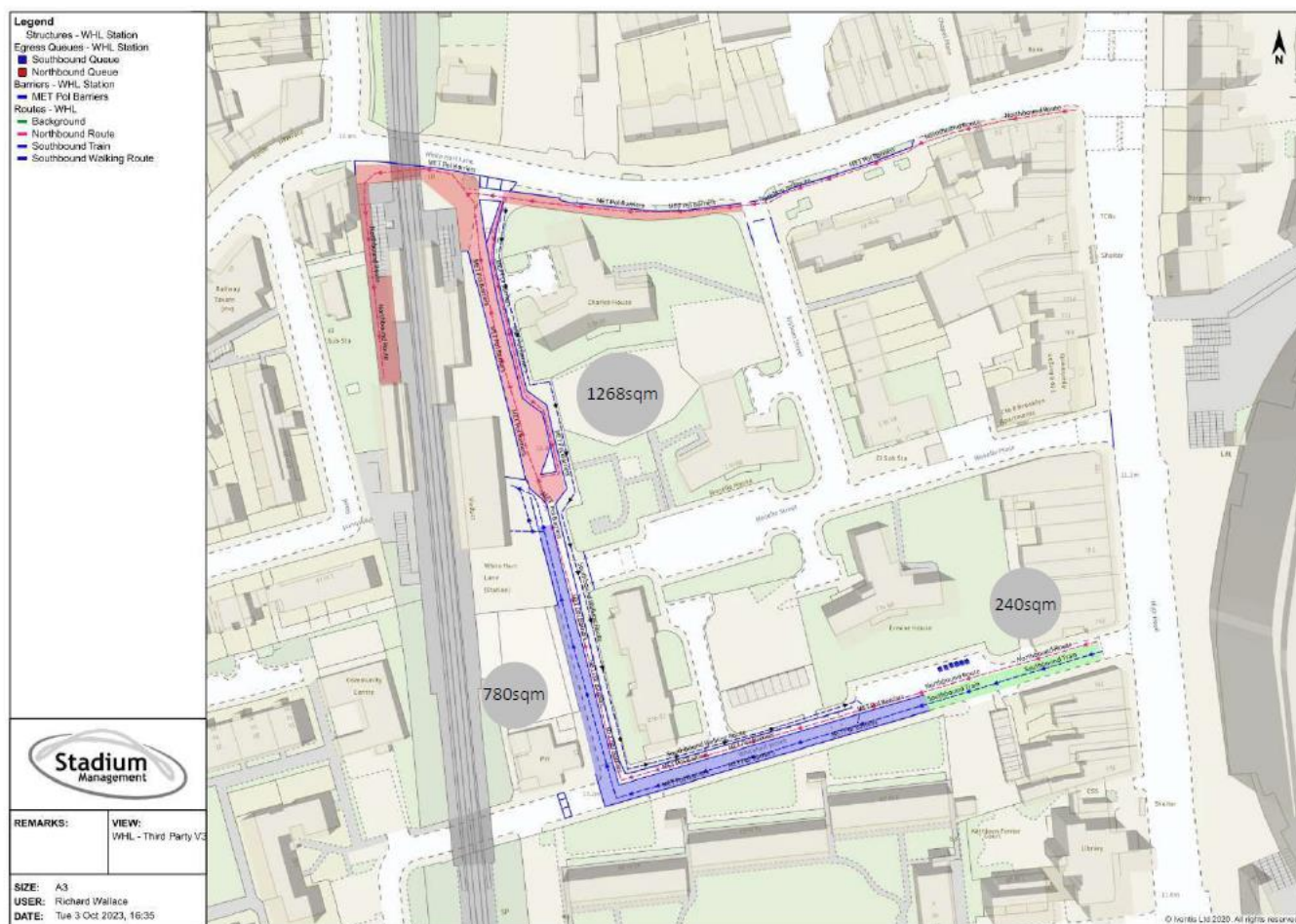


Figure 12: Existing barrier arrangements for post-match egress, Concert
 (Source: Appendix J, Stadium Management Ltd., October 2023)

- 4.25. In addition, there is a 'contraflow' route (shown in white) that is used for:
- spectators who wish to travel southbound at WHL station who arrive from White Hart Lane before turning along this access channel in contraflow to join the end of the southbound queue;
 - spectators approaching from the High Road along Whitehall Street to the bus hub to the north-west of White Hart Lane and other destinations west of WHL station;
 - for access for stewards and emergency service personnel to the queue, an accessible route; and
 - for any non-Stadium related footfall:
- 4.26. There is also an area in green for contingency queueing for events such as concerts or boxing with higher post-event queueing requirements than football, and/or where the transport service is experiencing planned disruption. Where the increased queueing is unplanned this area represents contingency.

4.27. The spatial footprint for the queues is given in this diagram as:

Southbound	780m ²
Contingency	240m ²
Total	1,020m ²
Northbound	1,268m ²

Table 1: Queue footprint

- 4.28. An early iteration of Figure 12 and associated spatial footprints were supplied to Buro Happold on 7th July 2022¹⁴, after the issue of their last full report associated with the Planning Application.
- 4.29. The spatial footprint quoted is described as the usable queuing space. This therefore does not include the space occupied by the feet of the 'Met' barrier. Met barrier lines are shown deployed in Love Lane in Figure 13.



Figure 13: 'Met' barrier looking north along Love Lane during ingress
(Source: Movement Strategies, Site visit, September 2023)

¹⁴ Appendix K, Email from Simon Owen, Movement Strategies to Jinu Vaughese, Buro Happold dated 7th July 2022.

- 4.30. The post-event queuing and circulation arrangement in cross section is illustrated in this figure extracted from the Buro Happold Crowd Flow Study report, May 2022, CD 4.40 that shows the existing widths allocated to each of the queuing lanes. The 780m² area indicated in this diagram refers to the extent of the formal barrier configuration in Football mode as shown in Figure 11.

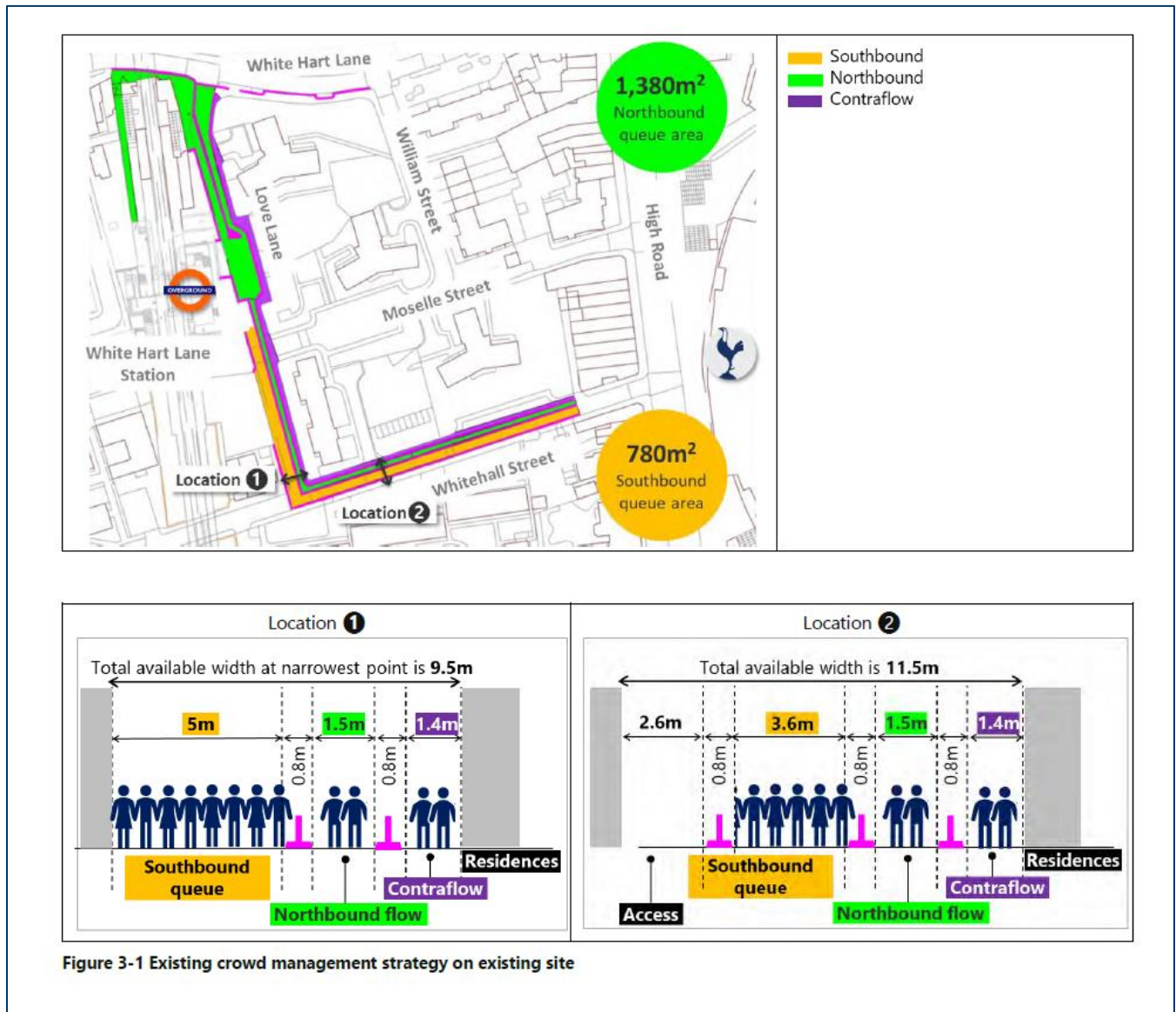


Figure 14: Queueing Arrangement in the existing situation, Football mode

(source: CD 4.40 / Crowd Flow Study, Buro Happold, May 2022 – Figure 3-1)

- 4.31. In addition, there are toilets located to the north of Whitehall Street (opposite Ermine House) shown in Figure 15.



Figure 15: Queuing on Whitehall Street after a Beyonce concert, 2023

(source: Stadium Management Ltd.)

- 4.32. The footprint for toilets (122m²) and an allowance for associated queuing is shown in Figure 16.

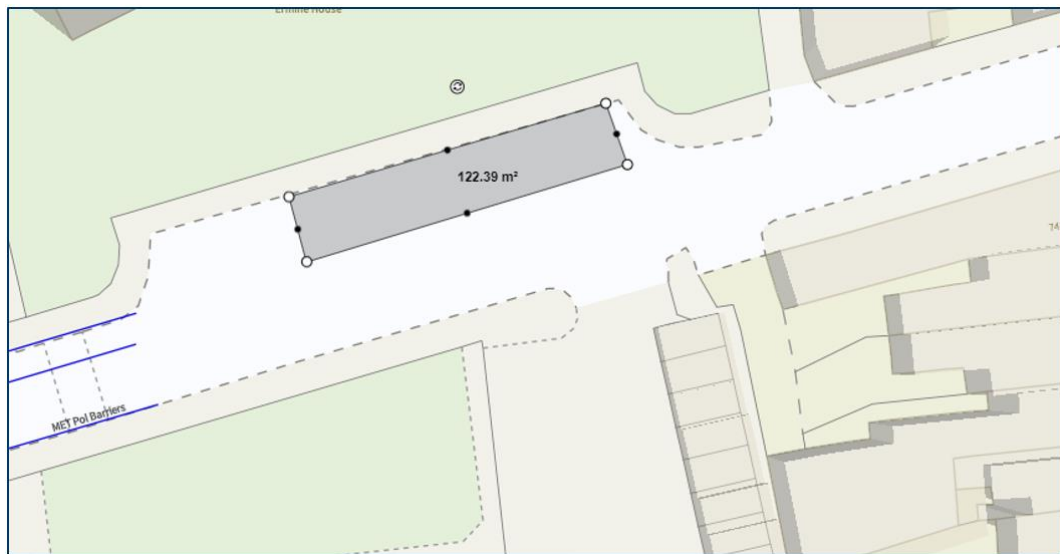


Figure 16: Footprint of Toilets and associated queuing on Whitehall Street post-event

(Source: Stadium Management Ltd. [LAMP Manager])

- 4.33. As with the ingress period, the area around WHL station does not attract people leaving the Stadium other than to access their point of departure from the local area. Therefore, the only dwelling in this area tends to be associated with queuing to enter the station or to use the facilities provided as part of the overlay.
- 4.34. The staffing deployment is shown in Figure 17. The black dots in Figure 17 also show the locations of VMS (3rd-party events only) deployed during the post-event period.

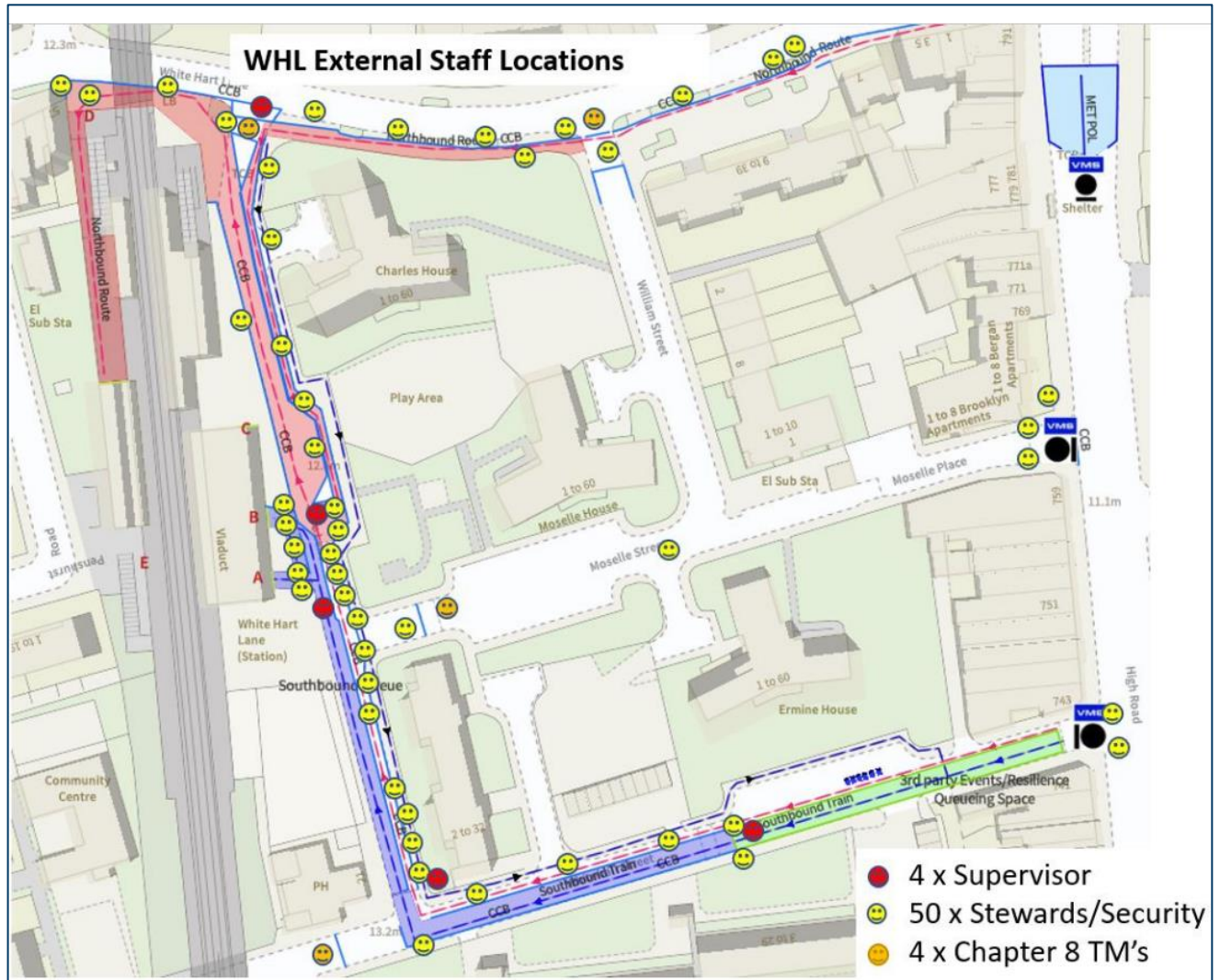


Figure 17: White Hart Lane station post-event staffing and crowd management plan.

(Source: Appendix J, Concert LAMP, July 2022)

- 4.35. The role of stewards is to provide information and help to spectators, ensure orderly queueing (i.e., preventing fans circumventing the system by jumping over barriers) and ensuring integrity of the barrier system. Stewards are regularly located along the barrier system. In the event of an emergency evacuation stewards are instructed to break the barrier line so that people queueing can evacuate away from the barrier system.

5. Crowd Flow and Safety Assessment

What is being assessed?

- 5.1. The CPO Scheme will involve the stopping up of public highways on Whitehall Street and Love Lane that are currently relied upon for Zone Ex operations. They will be replaced by a route through the future Moselle Square that will provide direct line of access and sight from the High Road to WHL station and vice versa, promoting wayfinding and sense of place. White Hart Lane will continue to be used as part of the Zone Ex operation.
- 5.2. The CPO documentation does not indicate any material change to the End state of the Scheme approved by the Outline Planning Permission upon completion. As such, the material submitted in support of the planning application is considered to represent the current extent of the proposals with regard to crowd flow and safety matters.
- 5.3. For Construction Phasing, a new phasing plan, CD 5.9 was submitted in support of Phase A. Given that there is less detail on this than in the phasing associated with the Scheme documented in the planning application, some of the principles and considerations associated with construction submitted during the planning application, CD 4.28 are also referenced and reviewed.

How has crowd flow and safety been considered to date?

- 5.4. The consideration of crowd flow and safety by Lendlease during the scheme development evolved over the course of the Planning Application and now the CPO. THFC is concerned that throughout the process, crowd safety and operations has not been given timely or adequate attention by Lendlease, and this has resulted in the matter now being subject to scrutiny under inquiry. THFC repeatedly raised these concerns as follows¹⁵:
 - Richard Serra of THFC contacted LBH on 21st October 2021 to indicate that there had been no Crowd Flow assessment supporting the Application. THFC understands that BH were only appointed after the Application was submitted.
 - Richard Serra of THFC contacted LBH on 15th February 2022 (once the application had already been submitted and validated to check whether the initial Crowd Flow Study provided to THFC earlier that month was part of the public documentation on the scheme or provided for THFC's comment. At this point, THFC indicated that there were initial concerns.
 - THFC objected to the planning application 4th March 2022, citing concerns around the approach to crowd planning and the lack of detail. A review of the material supplied by Lendlease in February and early March was undertaken by Movement Strategies, and a letter indicating areas of concern relating to omissions, technical inaccuracies or mis-interpretation of operations was issued on 17th March 2022, prior to the Planning Committee session where the decision was postponed. Updated versions of this material and additional information on the construction phasing were presented to the SAG on 6th May 2022 and issued on the planning portal between 20th and 30th May 2022.

¹⁵ Copies of these objections are appendices to the evidence of Mr Richard Serra.

- A further THFC objection was submitted to the planning application on 20th July 2022, including a series of remaining concerns related to crowd matters, a number of which were captured in a Movement Strategies review appended to the objection. The application was approved at the Planning Committee on 21st July 2022.

5.5. Given the evolution of the plans and the supporting information over this period, it is important to note that the basis for this Proof of Evidence is based on an understanding of the Scheme as most recently presented. The key documents used as the basis for this Proof of Evidence are described in Appendix A.

6. Assessment of the End-state of the Scheme

The space for queues and associated overlay in the existing layout is understated in the Planning Application assessments.

- 6.1. Figure 18, taken from the Executive Summary of the Buro Happold May 2022, CD 4.40, report, shows a key component of the crowd management operation during the egress phase for the 'Existing Layout', and the same management strategy mapped on to the Illustrative 'HRW Masterplan'.
- 6.2. The figure and report suggest that the Scheme provides significantly more space for queueing needed for spectators egressing the stadium and approaching WHL station than the Existing Layout. Indeed, the key objective of the assessment by Buro Happold was to focus on the increase in queuing space provided with a claimed "~55% - 90%"¹⁶ increase in queuing space for the heavily used southbound queue (the increase in the diagram shown is 90%).

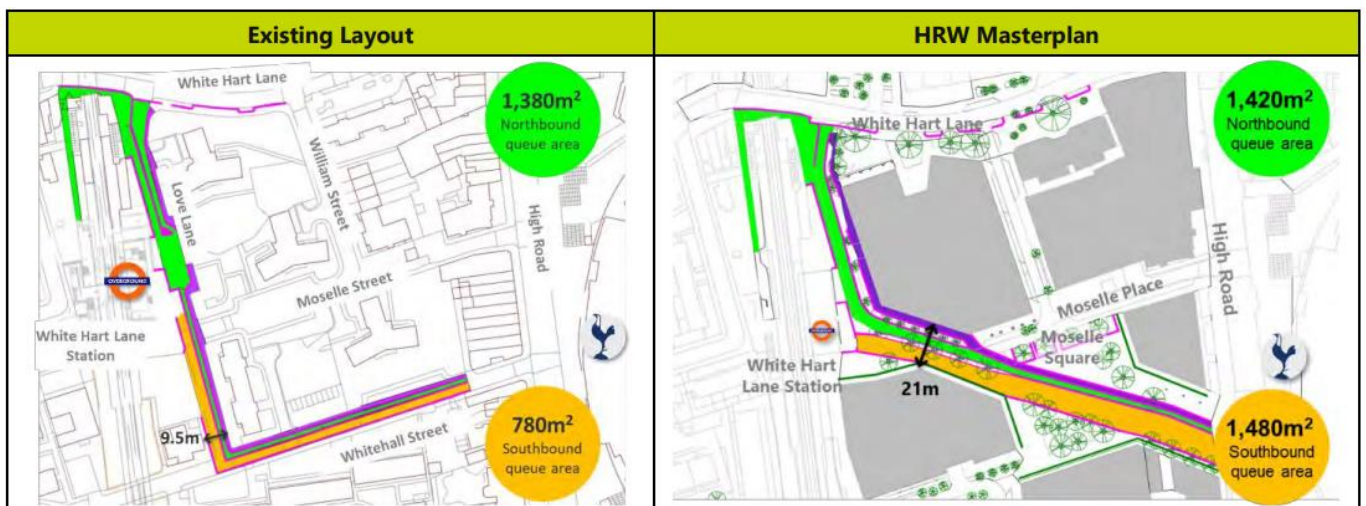


Figure 18: Space for queues and associated overlay
(Source: CD 4.40 / Crowd Flow Study report by Buro Happold, May 2022)

- 6.3. However, the comparison of queue space between the existing layout and HRW Masterplan understates the space in the existing layout by 240m².
- 6.4. Consider first the Buro Happold assessment of May 2022. In Figure 18 the southbound queue footprint in the 'HRW Masterplan' extends to the High Road while the queue footprint on Whitehall Street in the 'Existing Layout' is shown stopping short of the High Road. The areas are not compared on the same basis.
- 6.5. The queue footprint shown in the Existing Layout is that of the 'formal' queuing area demarcated by barriers. The 'formal' queue with barriers set away from the Whitehall Street / Tottenham High Road junction is set up that way for three reasons:

¹⁶ Source: CD 4.40, Executive Summary

- It allows spectators to visit the toilets in the (suspended) parking bays in Whitehall Street before they join the queue;
 - It allows a transition for spectators circulating down the High Road to 'get in lane' to join the queue; and
 - The formal queuing barriers do not interfere with the security measures (i.e., HVM) sited at the junction of Tottenham High Road and Whitehall Street.
- 6.6. For some events an 'informal' queue on Whitehall Street extends towards the High Road, and there are also crowds circulating to/from and queuing for the toilets (see Figure 15).
- 6.7. This informal queuing area is most frequently occupied during third-party events such as concerts and/or when the train service is disrupted. The area is needed as contingency for these occasions, and this space is referred to as contingency queuing area.
- 6.8. Buro Happold also identify scenarios¹⁷ where the queue would be expected to extend into the High Road - albeit for a short duration, which is as observed. This confirms the requirement for this contingency space.
- 6.9. THFC's LAMP Manager subsequently (July 2022) provided a detailed drawing sent to Buro Happold¹⁸ showing the current layout and spatial footprint. This has subsequently been updated as part of the LAMP process (August 2023) providing a figure of 780m² for the football queue and 240m² for the contingency queue (i.e., a total of 1,020m², Figure 12).
- 6.10. In addition, space for toilets, access and queuing space to the toilets must be provided together with any HVM, VMS or other temporary overlay.

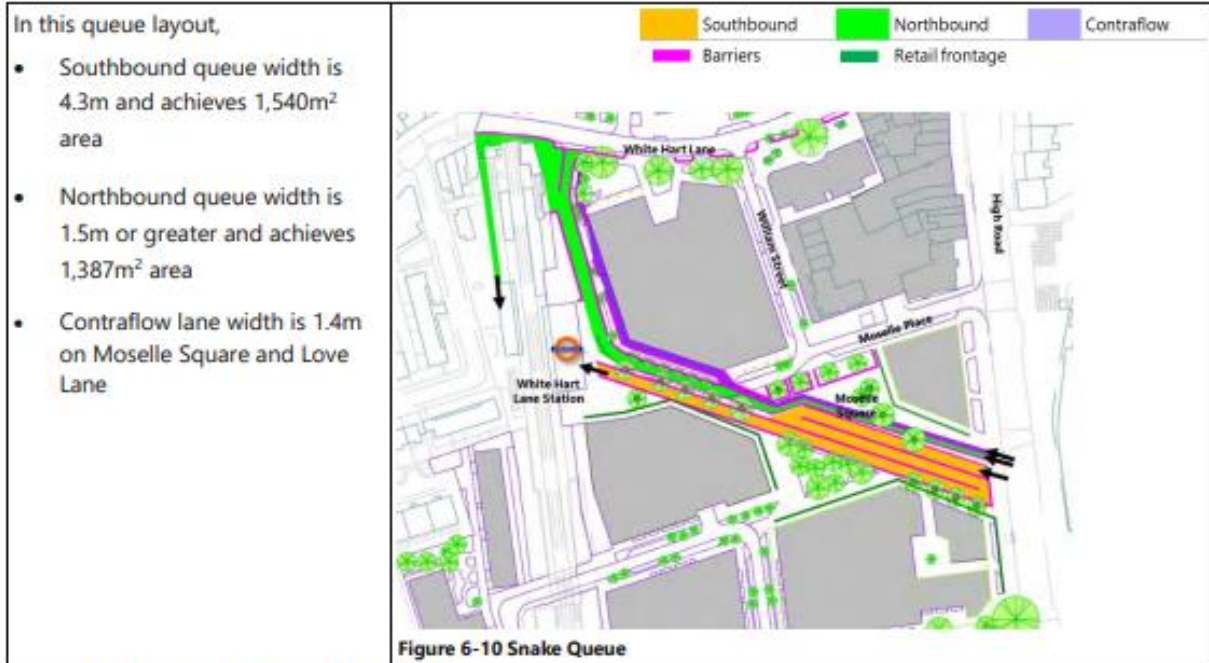
The usable queue space in the HRW Masterplan (the Scheme) may be overstated

- 6.11. The queue space provided in the Scheme is not all usable because of practical considerations for queue design. This is illustrated below by reference to CD 4.40 where three potential designs for queuing are presented (Figure 19 and Figure 20).

¹⁷ P35-40, CD 4.40

¹⁸ Appendix K: Email Simon Owen to Jinu Varughese, 7th July 2022.

6.3.1 Option 1 – Snake queue



6.3.2 Option 2 – Disney style queue

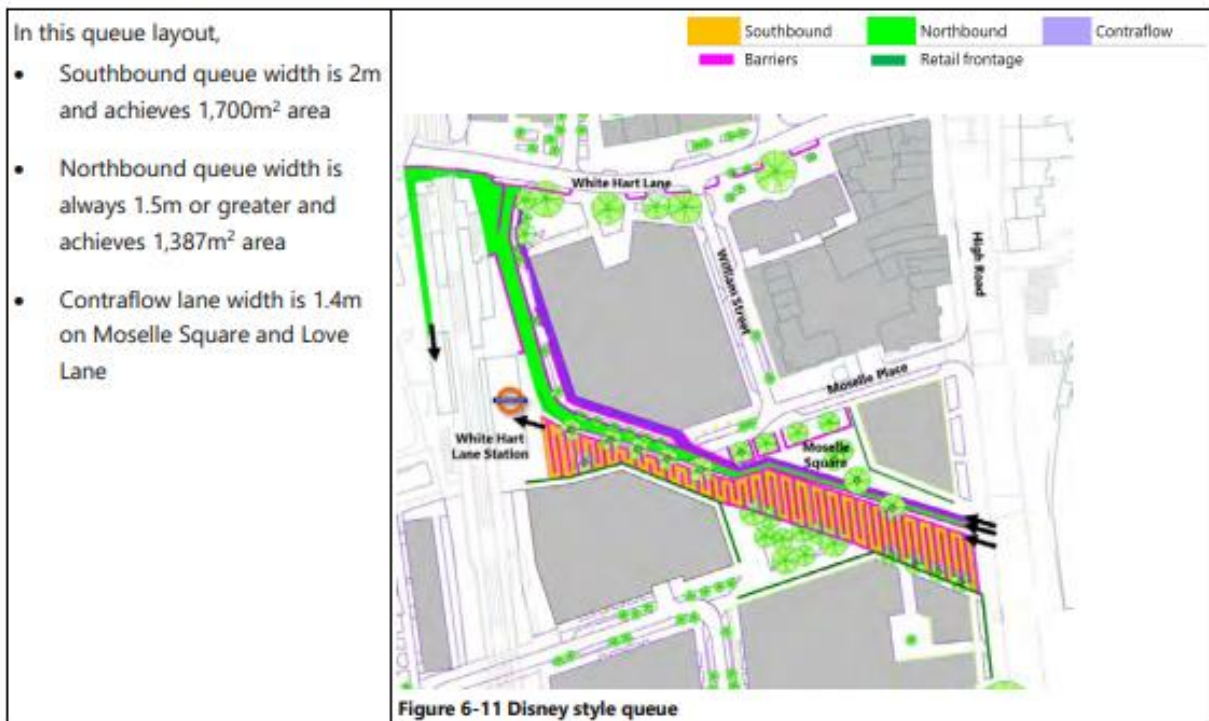


Figure 19: HRW Masterplan Scheme: Queue Layout Options 1 and 2
(Source: CD 4.40, Updated Crowd Flow Study report by Buro Happold, May 2022)

6.3.3 Option 3 – Straight queue

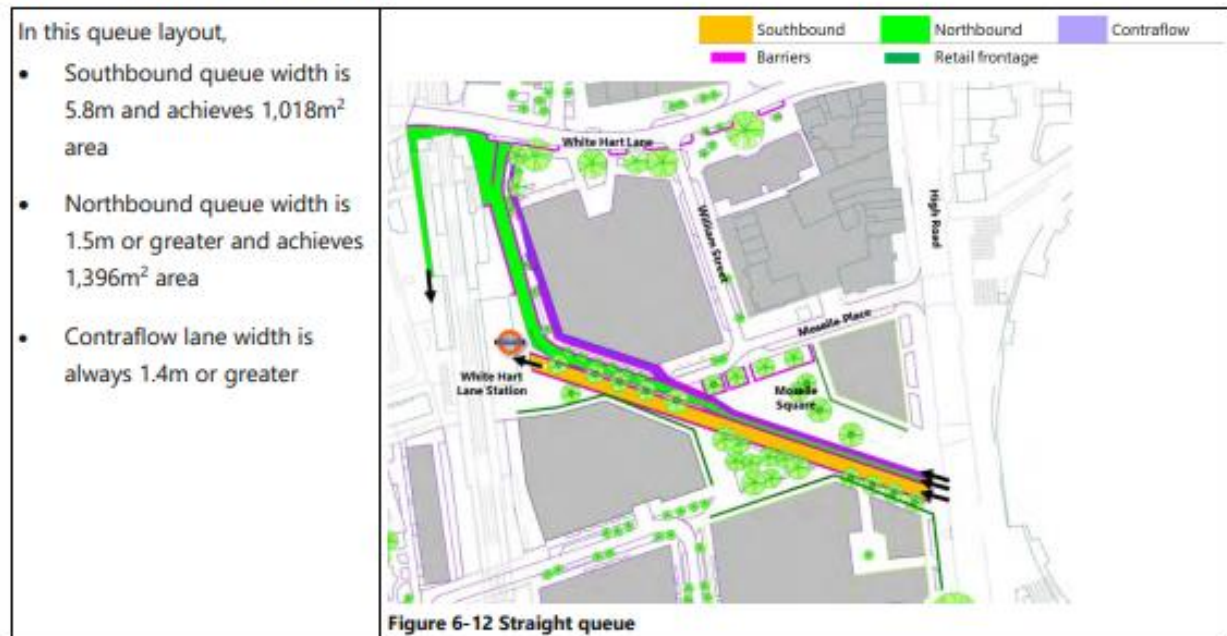


Figure 20: HRW Masterplan Scheme: Queue Layout Option 3
(Source: CD 4.40, Updated Crowd Flow Study report by Buro Happold, May 2022)

6.12. A critique of the queueing arrangements is detailed below:

Option 1	Option 2	Option 3
The queue design takes spectators half-way to WHL station before switching back, creating frustration. Some spectators may seek to jump barriers requiring more stewarding and more opportunity for conflict, increasing risks.	Very frustrating for spectators to use, particularly at times of lower demand. Likely to result in some spectators trying to jump barriers requiring more stewarding and opportunity for conflict increasing risks.	This arrangement would be preferred by spectators.
It is the medium option in terms of barrier required. This has a direct impact on costs (including costs of barrier hire, and operational effort to set out and dismantle)	Highest option for amount of barrier required with more cost and time to implement and demount, and longest duration of implementation affecting community. This amount of barrier would result in the space occupied by barrier footings being used by the crowd, thereby increasing STF risk.	Least amount of barrier required and therefore lowest cost and deployment time option.
It would be harder to evacuate queue or provide emergency service access to the middle of queue in the event of an incident. Increases risk.	Very difficult to evacuate with many barriers creating hurdles to escape and increasing risk. Difficult for emergency service access.	Easiest to evacuate within Moselle Square. Queue may be bounded by buildings and retail frontage of Plot D which may limit opportunities for escape in this direction.
	Poor utilisation of space within queuing system – the corners not fully occupied as people switch-	

	back. Capacity of queue will be lower than planned and shown in the BH report.	
No space provided for toilets, which should be provided before the end at which the queue starts.	No space provided for toilets, which should be provided before the end at which the queue starts.	No space provided for toilets, which should be provided before the end at which the queue starts.

Table 2: Critique of the queuing arrangements

- 6.13. Of these I consider Option 3 the safest and most cost-effective to operate. The THFC LAMP Manager has confirmed that it would be the only one of the three considered as a potential basis for implementation.
- 6.14. Buro Happold gives the southbound queuing area in Option 3 as 1,018m², equivalent to the 1,020m² in the recently updated drawings for the Existing Layout (Figure 12) developed for the 2023 LAMP¹⁹.
- 6.15. It is not clear from the Buro Happold figures (shown in Figure 19 and Figure 20) whether the usable queuing space identified allows for space for barriers and their footings. It would appear that Option 2 (with the most barriers) generates the most space despite being on a similar gross footprint to the others. Detailed drawings are necessary to clarify the position and demonstrate that a reasonable End-state provides the equivalent or better than the Existing Layout.
- 6.16. The Buro Happold assessment also does not detail the space required for provision of toilets (ca. 122m² from Figure 19Figure 16), and access space in the existing layout. The BH assessment defers decision-making for the toilets to later:
- “Moselle Square has space to accommodate a wider strategy which can create comfort for White Hart Lane Station users and others. Location for toilets can be reviewed in detail later, in coordination with stakeholders to ensure best place is created for all users as well as existing residents”*
- 6.17. However, the toilets are an important part of the operation and may affect the design of the queuing system. Consideration of where toilets will be located is important - if they are to be in Moselle Square from the night before or installed on the day, it needs to address whether this fits with the needs of the businesses occupying Moselle Square. If the toilets are located away from Moselle Square, would this lead to a risk of anti-social behaviour in Moselle Square and elsewhere. The requirements for and impact of logistics associated with toilets and site cleaning should also be considered, including access for ‘slurpers’ to empty toilets during longer running events. An integrated design and concept is necessary to demonstrate that toilets and site cleaning can be satisfactorily incorporated into the Scheme.
- 6.18. The purpose of redevelopment of this area is to seek opportunities to make the area better for local residents and businesses, as well as for those attending on an event day. For example, there is an ongoing requirement for event day wayfinding including VMS. There may be opportunities for permanent media in Moselle Square that can be used as VMS to provide information on train service or queuing times on event day (and others) and therefore provide a better user experience. Their location and orientation would depend on the queuing system adopted. A local barrier store would reduce event day

¹⁹ Appendix I

traffic and noise benefitting the local community. A detailed dialogue would result in a better design and outcome for day-to-day use as well as event-day operations.

The assessment has not considered ingress and emergency conditions

- 6.19. CD 4.40 considers only egress and the key proposed route through the future Moselle Square in any detail. It does not fully address the context of all crowd flow considerations within the CPO Scheme. Neither pre-event ingress nor emergency evacuation from the queue are examined. The assessment has as its focus the space provided for queuing in Moselle Square. CD4.40 considers only this principal route and does not include, for example, White Hart Lane or the High Road. While the Buro Happold assessments acknowledge that there are other requirements and operational considerations, Lendlease considers that these can be deferred to Reserved Matters applications.
- 6.20. THFC has consistently argued that focusing only on the queue size during the egress phase of event day is an inadequate basis for assessment and does not mean that the Scheme is necessarily operable and safe. As such, Lendlease - as the agent of change, and for whom LBH is requesting a CPO - should demonstrate that the Scheme works for other phases of event days, provide sufficient detail to ensure risks to spectator safety are not increased, and allow THFC to have certainty that it can fulfil its safety and operational commitments without accepting increased safety risk or undue cost.
- 6.21. THFC has previously identified the work that needs to be undertaken to provide the necessary level of certainty. This comprises additional information that is necessary to assess whether the CPO Scheme can safely accommodate:
- Pre-event ingress flows;
 - Post-event egress flows for all types of event taking place at the venue and across all routes within the Phase A area;
 - Dispersal and emergency service access in the event of an incident requiring evacuation;
 - Facilities and overlay associated with the Zone Ex operation (e.g., toilets);
 - Locations and footprints of physical security measures required to protect crowded spaces on event-days; and
 - Access for those attendees in the crowd with mobility impairments.
- 6.22. Until this information is provided, the acceptability of the End-state of the CPO Scheme is unproven.
- 6.23. These aspects were raised by THFC as objections to the Planning Application process on a number of occasions but were not satisfactorily addressed prior to the Outline Planning Permission being granted. Lendlease and the Council's position appears to be that these any issues can be addressed at the Reserved Matters stage and through the discharge of planning conditions. However, because the parameters of the Scheme have been fixed in advance of the necessary considerations of crowd flow issues, subsequent detailed assessment may identify a need for additional space or requirements that cannot be incorporated within the fixed parameters. In these circumstances, the burden for addressing any increased or additional and unnecessary risks would fall to THFC to address, if any deficiencies can be addressed.

Conclusions regarding assessment of End-state

- 6.24. In requesting a CPO of the land under the CPO Scheme the agent of change should as a minimum demonstrate that the Scheme can be operated at the same level of risk to safety as currently.
- 6.25. With regard to the End-state the crowd flow assessments by Buro Happold have focused on one route in the egress phase and have not considered pre-event ingress in any detail or the requirements for emergency evacuation and emergency service access during an emergency incident affecting Zone Ex.
- 6.26. In turn, the assessment by Buro Happold of the egress phase has focused on the question of whether the space provided for queueing in Moselle Square and Love Lane is adequate and comparable to the provision in the Existing Layout. The results of Lendlease and its advisors' assessments understate the existing provision and likely overstate the provision in the proposed Scheme by not considering the layout and usability of the space and associated operational requirements.
- 6.27. This confirms the requirement for i) agreement on the space required in the detailed design in the existing layout and ii) a safe and operable design demonstrated in drawings with sufficient detail (e.g., including barrier system) for the future End-state to be provided. This was the principle adopted in 'Operability': designing for the Olympic Park where the concept design, concept of operation and thus land use had to be defined years in advance of the final detailed design and operational plans being determined (see 1.7).
- 6.28. No workable and detailed integrated design and concept of operation has been provided and THFC has consistently argued that this work should have been undertaken prior to the determination of the Lendlease Planning Application.
- 6.29. While egress is the key phase, an assessment and consultation with THFC that considered other phases of operation and operational requirements could reveal a need for additional space, changes to the configuration, or design requirements relating to landscape features, required to support the viability and flexibility of Zone Ex operations. These would be reflected in designs and plans and associated access agreements and ensure that sufficient space suitably arranged would be provided.
- 6.30. Alternatively, it might identify opportunities that would otherwise be missed until too late. The purpose of redevelopment of this area is to seek opportunities to make the area better for local residents and businesses, as well as for spectators. By focusing on equivalency with the current state, the CPO may result in these opportunities being missed.
- 6.31. Unless and until this additional work is undertaken, it has not been demonstrated that the CPO Scheme (in the End-state) will provide satisfactory arrangements for the safe movement and management of crowds.

7. Construction Phases

CPO Scheme Plans provide insufficient detail to assure the safety of the Scheme

7.1. The CPO introduced a new phasing proposal superseding that indicated in the Scheme planning application. This is shown in Figure 21.

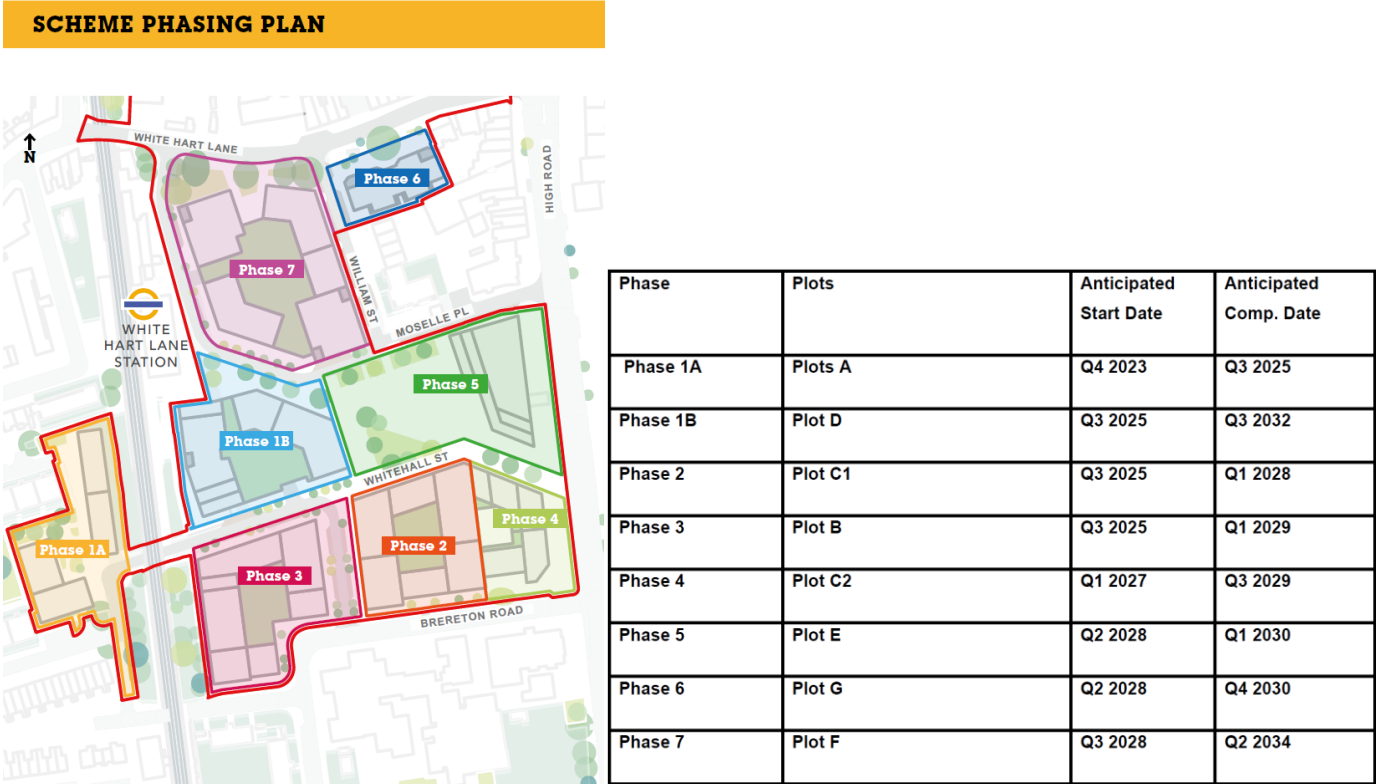


Figure 21: CPO Construction Phasing Overview
(Source: CPO Statement of Case, Pinsent Masons, CD7.1 & CD 5.09, May 2023)

- 7.2. With respect to crowd flow matters the proposed phasing means that any temporary arrangements will be in place from commencement of Phase 1B until completion of Phase 7 (nearly nine years).
- 7.3. Neither Lendlease nor the Council has provided an updated proposal or assessment in respect of the construction phase access routes now proposed in support of the CPO, nor has there been any update to the Construction Environmental Management Plan – CD 4.41. As such there is insufficient information to assess whether THFC and its partners will be able to meet their Zone Ex obligations during the protracted construction period.
- 7.4. In the absence of detail on the CPO Scheme, the principles described in the planning application documentation associated with construction management have been considered. These are principally provided in CD 4.40 and CD 4.41.
- 7.5. The construction phasing in the planning application is shown in Figure 22.

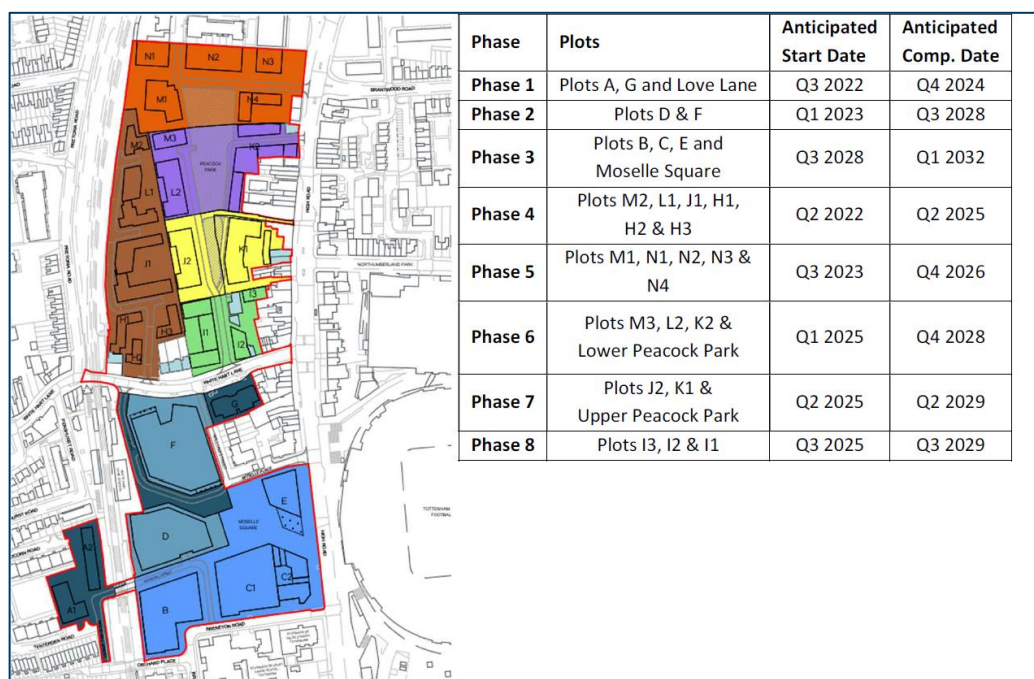


Figure 22: HRW Masterplan Construction Phasing Overview
(Source: Construction Environment Management Plan (CD 4.41), May 2022, p73)

Equivalency of Queuing Space Provision understates the requirement

- 7.6. The assessment of the provision in the existing layout forms the basis on which Lendlease is proposing to develop the access plan and routes for the construction phasing. Lendlease intends to apply the principle that they would:

“...provide at least equivalent or better queue widths, areas for queueing and general queue safety for crowds during the various construction phases, such that crowds are capable of being managed with at least equivalent levels of efficiency and safety as existing, as well as identifying opportunities to enhance the existing situation.”²⁰

- 7.7. The CEMP (CD 4.41, p70/71, Table 9-1) gives the spatial footprint of the southbound queue area in the current configuration as 780m² – see Figure 23.
- 7.8. As discussed in Section 6 of this Proof of Evidence this is not a correct representation of the space currently available for the southbound queue, including contingency, which is 1,020m². Lendlease's proposal to provide equal or greater to 780m² during the construction phasing would therefore fall short of providing the same quantum of space as is currently provided. This again illustrates why the detailed assessment should not be left to the Reserved Matters stage.

²⁰ Page 67, CD 4.41, CEMP, Lendlease, May 2022

Table 9.1 compares the existing strategy with the proposed strategy for construction and the final condition once works are completed.

Comparison Areas	Existing Strategy	Proposed Strategy – Construction	Proposed Strategy – Final Condition
Minimum width of queuing/circulation area at narrowest point	9.5m	9.5m (equals spec)	21m (11.5m increase)
Northbound queue area	1,380m ²	≥1,380m ²	1,420m ²
Southbound queue area	780m ²	≥780m ²	1,480m ²

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High Road West | Construction Environmental Management Plan

Total queuing area	2,160m ²	≥2,160m ² (equals spec)	2,900m ² (740m ² increase)
Direct route and line of site to WHLS from Stadium	No – route via Whitehall Street with a 90 degree turn along Love Lane to station. No direct line of site.	No - similar to existing strategy as proposals come forward	Yes – a shorter more direct route across the HRW masterplan with station in direct line of site.

Table 9-1 Comparison Between Existing, Construction Specification, and Illustrative Masterplan proposed strategy

Figure 23: HRW Masterplan Construction Phasing Overview

(Source: CD 4.41 / Construction Environment Management Plan, May 2022, p70/71)

- 7.9. Subsequently, in CD 4.40 (pages 48-51) and CD 4.41 (pages 71-79) the access routes through the Scheme during construction during the phasing proposed in the Planning Application are shown in diagrams and the available queuing area reported.
- 7.10. In most phases (other than that in CD 4.41 page 74) the key southbound queue is reported as 1,010m². These diagrams and associated values for space confirm that there is significantly less queuing space during construction phasing than the End-state.
- 7.11. The diagrams and values reported also suggest that there is an equivalency of space with the provision in the Existing Layout for the key southbound queue (1,020m²) and for the northbound queue, but this is not reflected in the table 9-1 shown in Figure 23. However, the barrier lines are not included (which is important as discussed in s6.11) and the diagrams do not show details of the contraflow lane.
- 7.12. More detail is shown in Figure 24 taken from the Buro Happold May 2022 report, CD 4.40²¹. This appears to confirm that equivalent or better usable space for the southbound and northbound queues can be achieved, with a contraflow lane and including space for barriers separating the lanes. The queueing space runs right up against WHL station and to the High Road. In the Existing Layout and other drawings

²¹ Page 52, CD 4.40

of the future arrangement there is circulation space between the end of the queueing lanes and the boundary of WHL station, used for access. The usable queueing space may again be overstated.

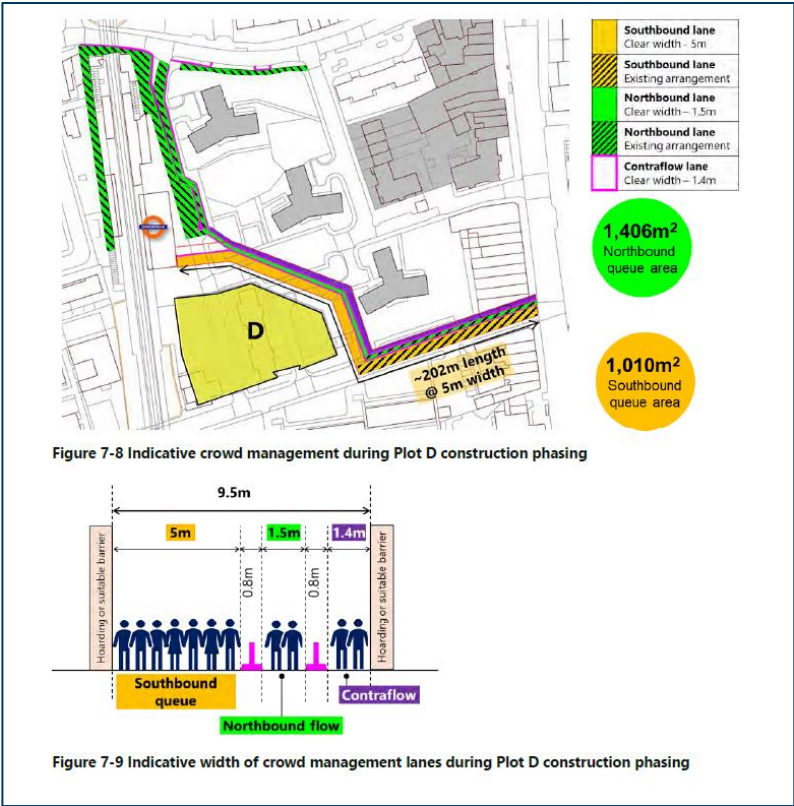


Figure 24: HRW Masterplan Indicative Crowd Management during Plot D Construction

(Source: CD 4.40, Buro Happold Crowd Flow Study, May 2022, p52)

7.13. This detail is reported for only one phase of construction but Lendlease states that these principles will apply to all phases (Figure 25).

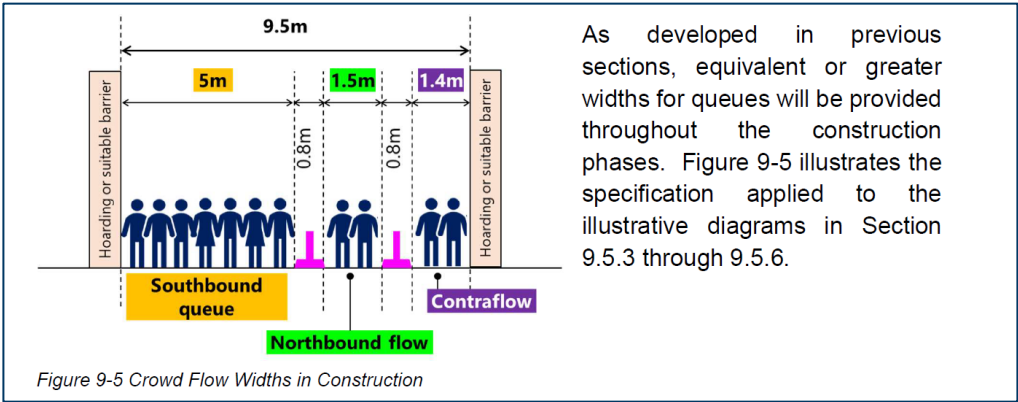


Figure 25: HRW Masterplan Construction Crowd Flow Widths

(Source: CD4.41 CEMP, Lendlease, May 2022, p73)

- 7.14. Detailed barrier drawings are required for all phases of construction to verify that equivalent (1020m²) or greater usable space can be provided in the new phasing plan and resolve the uncertainties. These drawings do not depend on detailed design of the Scheme so could be provided.

The circulation routes provided do not account for all Zone Ex requirements

- 7.15. The assessment of construction phases presented in the Buro Happold report (CD 4.40) and the CEMP (CD 4.41)) focus on the link between the Stadium and the station through the future Moselle Square, and in turn, the need to accommodate the post-event queues for access to the station. As described in Section 4 of this proof, the crowd flows and operations in the Zone Ex area covered by the Scheme are not just constrained to this route, and not solely of relevance to the post-event period. There are other aspects of the operation that are not addressed in the construction phasing, which would have an impact on the event day crowd management strategy.
- 7.16. Consider the example from the planning phase in Figure 26, taken from CD 4.41, p74. This shows that the hoarding for Plot G will extend onto the White Hart Lane southern pavement, which is a space that is used currently to accommodate flows to/from the Stadium from the west of the station, and as a route by some spectators accessing the northbound platform having circulated around the north of the venue. There is no discussion of the impact of this intervention on crowd movement, nor any proposed mitigation – indeed, CD 4.41 explicitly states (9.3.5.1) that Plot G does not have an impact on the existing crowd flow strategy.



Figure 26: Crowd circulation route proposed during Q3 2022 to Q2 2023

(Source: CD 4.41, s9, page 74, May 2022)

- 7.17. Also within the Phase presented at Figure 26, a new Love Lane diversion is proposed, stopping up the public highway south of the station building. CD 4.41²² indicates that hoarding will be constructed around the works to Love Lane, “with no impact on the queuing area or pedestrian access to the station”. This does not take into account the other flows that use this route – namely the access to the northbound platform and destinations further west of the station during egress, as well as the existing contraflow lane that supports the existing operation. Together with a reduction in available walkway capacity on White Hart Lane as a result of Plot G this will require a change to the crowd management strategy across the CPO scheme and may give rise to additional risks. Neither the change in strategy nor the associated risks have been assessed.
- 7.18. A further example of where the proposals may impact Zone Ex operations is evidenced in Figure 27, this time in relation to the High Road. The High Road is a principal pedestrian route within Zone Ex and is used as part of the main circulation route around the Stadium during the pre-event and post-event periods. Whilst the road is closed to traffic for the peak periods of ingress and egress, it is not the case for the full duration of the ingress and egress periods and at these times crowds flow would be constrained to use of pavements with vehicles in the carriageways. Both Plots C and E cover the full extent of the western High Road pavement and therefore have the potential to reduce the capacity available for flow on this key north-south corridor.



Figure 27: Phase 3 Construction Work Stage as presented in the CEMP (p79)
(Source: CD 4.41 Construction Environment Management Plan, Lendlease, May 2022)

- 7.19. The CEMP (CD 4.41) at pages 74 and 78 again proposes that issues of this nature could be addressed at Reserved Matters stage. However, in my view detailed consideration and assessment should be undertaken at the outset to demonstrate that the safe management and movement of crowds can be accommodated.

²² CD 4.41, Construction Environment Management Plan, Lendlease, May 2022, p74

Hoarding plans do not provide sufficient detail to understand safety and operational risks

- 7.20. One aspect that is distinct between the End-state and the Construction phases is in relation to the temporary hoarding - physical barriers and associated management to segregate pedestrian access from active construction sites.
- 7.21. Hoardings increase risk in a number of ways:
- Unlike barrier lines, ‘normal’ hoarding lines cannot be readily broken by stewards on site to allow crowds to escape through the line of hoarding, nor can individuals in the crowd jump over or break the barrier line. Exit gates or moveable hoarding are required. Reasons to require escape include dangerous overcrowding from crowd surges, or aggression or hostile acts.
 - Hoarding lines are typically 2.4m high and create a psychological feeling within the crowd of being hemmed in, which increases anxiety. This can turn to fear and an incentive to push to escape if there are reasons for the crowd to feel anxious – such as crowd density increasing to uncomfortable levels.
- 7.22. In the existing situation crowds within the barrier line can escape from the barrier along the line of the route demarcated by barrier (i.e., approximately 240m) by unlinking barriers or - in adversity - climbing over the barriers, into adjacent spaces along Whitehall Street and Love Lane outside the queue lanes. That will not be the case for some elements of the proposed access route that will be bounded by hoarding at certain stages.
- 7.23. As noted in the CEMP (p71), CD 4.41, the Counter Terrorism Security Advisor (‘CTSA’) may require two types of hoarding:
- “Hoarding design type 1 will be a non-fixed type: an example of which could be rhino barriers with mesh panel used along routes where the queuing strategy is to be implemented. This hoarding type will address the potential crush effect in the event of a crowd surge as highlighted by the CTSA during the consultation held on the 6th May 2022.
 - Hoarding design type 2 will be a full timber hoarding to a minimum height of 2.4m or higher if required under a plot specific risk assessment and with a specific design. This hoarding type will be used on elevations where there is no interface with the queuing strategy.”
- 7.24. The hoarding proposal was provided on 20th July 2022²³ late in the Planning Application process following a meeting with the CTSA and responding to their concerns. This was one day prior to the Planning Committee decision on the Scheme. The proposal was provided in presentation format, with some diagrams and associated commentary including high level outline hoarding proposals for the construction phasing in the Planning Application. Figure 28 indicates the level of detail provided. The details of the hoarding and, for example, how it interfaces with the station and facilitates those heading northbound and contraflows is not at all clear.

²³ Appendix B: Applicant Crowd Flow Hoarding Clarifications & Emergency routes 20th July.pdf

- 7.26. This is the extent of evacuation planning provided and gives an indication of emergency evacuation considerations. However, in 7.15 onwards I note that the precise arrangement for access for crowds for the northbound platform at WHL station and for the shuttle bus and other routes to the northwest outside WHL station have not been identified.
- 7.27. The southbound queue in this area approaching the station is likely to be at its highest crowd density as crowds move towards their objective of getting on the train. There will be a 40m 'corridor with exits at either end (although the routing to the north of Love Lane is not yet defined - s7.17) and to Moselle Street and onward to Moselle Place. These emergency exit routes are also intended as emergency service access routes (see Figure 30), which could be attempting to travel in at the same time as crowds are evacuating. There is also a requirement to allow for emergency evacuation of White Hart Lane station, which is not taken into account in the material provided.

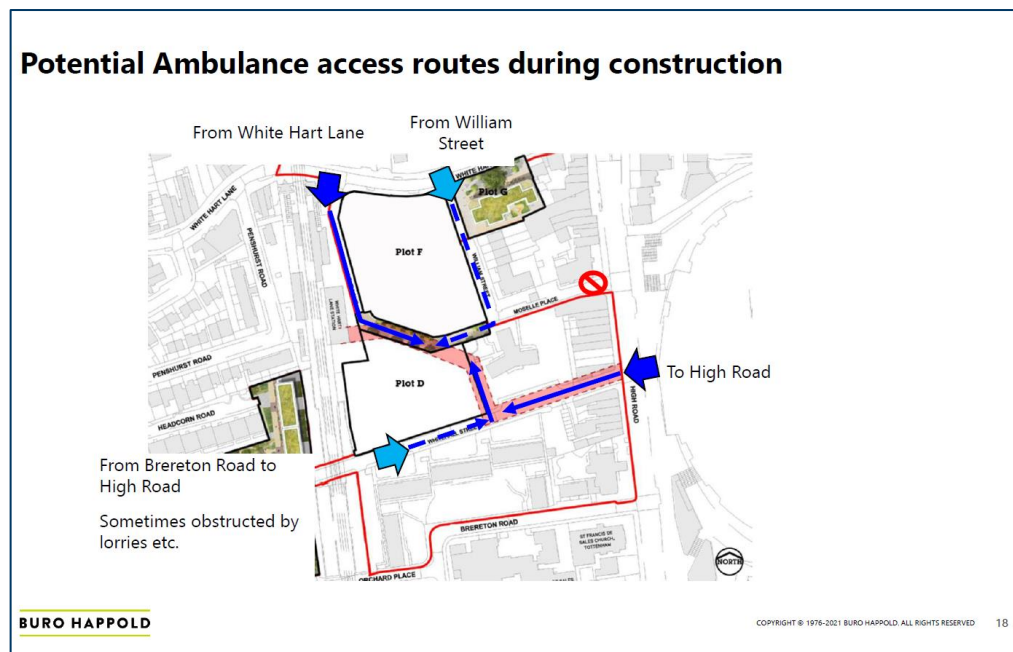


Figure 30: HRW Masterplan Construction Phasing – Potential Ambulance Access Routes

(source: Applicant Crowd Flow Hoarding Clarifications & Emergency routes 20th July.pdf, Buro Happold, p18)

- 7.28. No detailed drawings combining barrier layout, hoarding and evacuation considerations have been provided for the planning application nor for the revised phasing for CPO. Consequently, it is not possible to conclude that the access routes and wider crowd management strategy during the phases of construction are safe. Again, until this detailed design information is provided and assessed it is not possible to conclude that the proposals will be safe.
- 7.29. Consider also the following construction work stage (Figure 31) proposed as part of the Planning Submission (i.e., no longer replicated in the CPO Scheme, although used here to demonstrate relevant points).



Figure 31: Phase 3 Construction Work Stage as presented in the CEMP (p79)

(Source: Construction Environment Management Plan, Lendlease, May 2022)

- 7.30. The CEMP, CD4.41 has indicated that the channel in red would be 9.5m wide, and during peak egress is likely to accommodate 5m wide queues to access the station for southbound services, potentially back to the junction with the High Road. The remaining width would be used by spectators flowing to access the northbound services and an allowance for a contraflow. The queues and flows would be separated by temporary barriers.
- 7.31. In this instance, consider an incident taking place in the queue area at the point where Plots B, C, D and Moselle Square join. The population of the red footprint to the east of that point would be contained in a 9.5m wide 'corridor' for approximately 90 -100m bounded on one side by hoarding (see Figure 32), with a potential need for clearance and dispersal from this area. Moselle Square will be available to crowds on that side of the wide queue. While CD 4.41 considers the use of non-fixed barriers in place of hoarding, this only addresses the immediate means of escape from the area - to safely disperse requires an assurance that space is available beyond the hoarding, and that this is provided with adequate frequency to limit the risk of localised crowd crush as people seek and converge towards exit points.



Figure 32 HRW Masterplan Construction Phasing – Indicative Hoarding Plan (2029 to End)
 (source: Applicant Crowd Flow Hoarding Clarifications & Emergency routes 20th July.pdf, Buro Happold, p12)

Duration of Construction works affects Crowd Safety risk profile

- 7.32. Setting aside Phase 1A, the CPO Scheme construction timetable set out in Figure 21 suggests that construction is scheduled for nearly nine years within the CPO footprint – with some part of the event day Zone Ex operation directly interfacing with one or more of the development plots.
- 7.33. As discussed in 2.10, the risk of occurrence of safety issues is greater where the layout, positioning or configuration of the operation changes. The number of changes to the access routes in the CPO Scheme should be minimised to reduce risk. The effort to address these changes also has an economic cost to the various parties involved.
- 7.34. With the Stadium in use on at least 25 occasions per year, seeking to minimise the duration and changes during the works insofar as they affect event day operations is considered a significant opportunity to minimise both risk and cost.

Lack of certainty of delivery could see construction phase as the End-state

- 7.35. As set out in the evidence of Mr Bashforth and Mr Cottage, THFC has raised significant concerns regarding the viability of the Scheme, and whether Moselle Square and associated access route will ever actually be delivered. Were Moselle Square and the access route not to be delivered this would leave Zone Ex in one of its construction phase configurations, or potentially another state.
- 7.36. Setting aside the wider implications of this, it highlights the requirement for an adequate level of information and certainty on the ability of each phase of construction to accommodate safe event-day

Zone Ex operations. For the reasons set out in this section, insufficient assessment has been undertaken to demonstrate that the construction phases of the CPO scheme can provide for the safe management and movement of crowds.

Conclusions regarding assessment of Construction Phasing

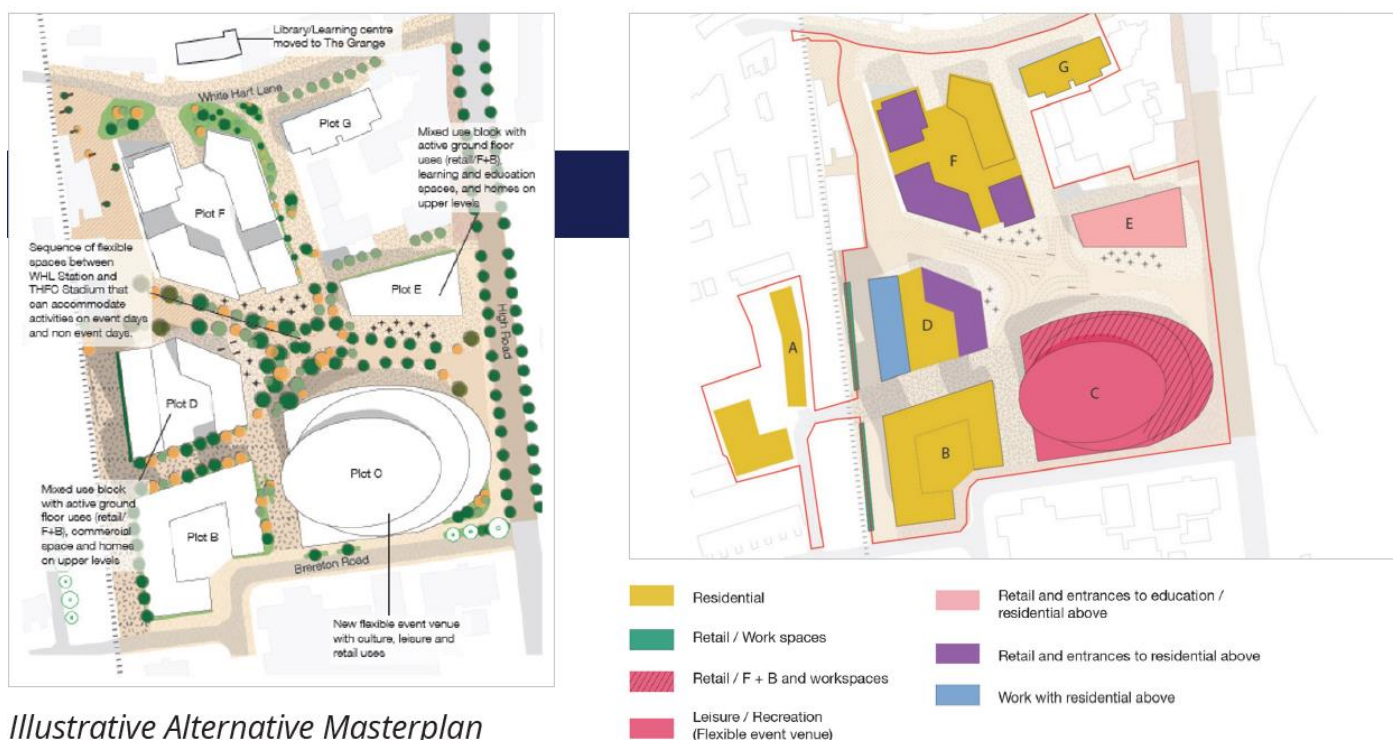
- 7.37. The CPO Scheme construction timetable proposes an overall schedule of 10 years duration, and cross-referencing with the image provided, it appears that for nearly nine of those years, the construction areas will be directly affecting or adjacent to areas currently used for crowd flow. Temporary, changing environments are more prone to crowd safety risks than a permanent configuration that has been designed with the crowd requirements in mind, so there is a requirement to recognise and mitigate these risks for an extended period.
- 7.38. The Proofs of Evidence of Mr Bashforth and Mr Cottage indicate that there is no certainty of delivery of the final approved scheme, so it may be that the actual End-state will be represented by one of the construction phases. This underlines the importance of having a series of phasing plans that are demonstrably safe and workable.
- 7.39. The description of the construction phasing has been updated since the Planning Application but the information provided is limited to a single page image in the CPO Scheme, without the necessary detail to identify the access routes and crowd flow strategy in each phase.
- 7.40. Given the lack of specific detail about the CPO scheme, I have considered the information provided on the construction phasing associated with the planning scheme.
- 7.41. The assessment in the construction phases has as its focus the provision of queuing space and the comparison with the existing layout. In my opinion Lendlease has not demonstrated that they have achieved this stated intent of providing equivalent or better usable space in a workable operation than the current arrangement for post-event queuing to access White Hart Lane Station. There is a need to agree what is the value of 'equivalent space' to the provision in the existing layout. Until detailed information on design and operation is provided it is not possible to conclude that the proposals will be safe.
- 7.42. With the principal focus of their assessment on the post-event egress and queuing provision through Moselle Square, there is limited consideration of other aspects of the event day operation, meaning that some areas used by crowds are earmarked for development, but with no consideration of the impacts on crowd flow management and risks arising.
- 7.43. Finally, the arrangements for emergency evacuation scenarios in each phase, including of WHL station, and the implications of these on the provision of space have not been proposed in detail or adequately assessed, particularly in the light of the changing risk profile with the introduction of construction hoarding on the route.
- 7.44. In summary, the information provided in support of the Planning Application and CPO is insufficient to conclude that THFC will be able to meet its Zone Ex obligations and that the safe management and movement of crowds can be accommodated during the lengthy construction period.

8. Access Rights

- 8.1. To operate its Stadium and fulfil its safety and security obligations in Zone Ex, THFC needs appropriately sized and arranged access routes between the Stadium and WHL station through the CPO Scheme area in the End-state and during construction.
- 8.2. I append a Legal Note in Appendix L drafted by Richard Max in relation to the status of 'Access Rights for Crowd Flow Management'. This note sets out the obligations on Lendlease regarding the grant of rights of access to THFC across the CPO Scheme.
- 8.3. In the event that a suitable Access Licence is not provided and as such access for spectators to and from WHL station cannot be provided, alternative access routes and management plan will need to be implemented requiring significant change and potentially an increase in risks. For example, WHL station may have to be closed on event days, increasing event-related footfall at other stations (increasing crowd risks there) or resulting in people travelling to/from the venue via other modes of transport, and/or other aspects of the LAMP will experience significant change, e.g., closure of White Hart Lane to traffic and extension of the pedestrian only zone on the High Road, etc. These consequences may last as long as Access is not available.
- 8.4. A further consequence might be that the Stadium's Safety Certificate might have a limitation on capacity imposed. In the event that a limit on capacity is imposed, the risk appetite for safety among stakeholders is likely to be higher, with increased temporary overlay and staffing to manage the safety risks, which will be higher. There will be significant revenue and cost implications for THFC and to the local economy.

9. Alternative Masterplan

- 9.1. The objection to the Compulsory Purchase Order by THFC included a number of different grounds, one of which was that the High Road West could be developed in an alternative way that would deliver greater public benefits in line with the Local Plan policy. THFC has produced an Alternative Masterplan to demonstrate how this might be achieved.
- 9.2. Details of THFC's Alternative Masterplan were appended to its Statement of Case as shown in Figure 33.



Illustrative Alternative Masterplan

Figure 33: Illustrative Alternative Masterplan

(Source: Objection by Tottenham Hotspur FC and Alternative Masterplan, July 2023)

- 9.3. The wider benefits of the Alternative Masterplan and the alignment with the Local Plan are set out in the Proofs of Evidence of THFC's other witnesses. There are several features in the Alternative Masterplan that are favourable from a crowd safety and experience perspective to those proposed in the Scheme.

The sequencing of construction phasing would bring forward the permanent Zone Ex routes

- 9.4. A key difference is in the sequencing of the construction phasing. The Alternative Masterplan offers scope to bring forward the Moselle Square delivery by decanting the Love Lane Estate residents into the Depot site that would be developed in the initial phase. Consequently, the risk that the Phase A of the Scheme will not be developed in its entirety, and that Moselle Square and associated access routes is not delivered, is reduced.
- 9.5. This proposal also limits the duration of works taking place in the vicinity of the areas that are most critical to event-day Zone Ex operations. As outlined earlier in 2.10, the risk of safety issues arising are higher in environments that are temporary in nature and where the layout, positioning or configuration of the

operation is changing. As such, adjusting the schedule to bring forward the final scheme earlier will reduce the crowd safety risks associated with the project. There is also an economic cost associated with both the planning and approval of updated LAMPs and the training and deployment of staff operating in the new environment.

- 9.6. The Alternative Masterplan offers the potential for Moselle Square to be developed in its entirety in advance of the Euro 2028 Football Championships, which if - as anticipated - the UK & Ireland bid is successful, will include the Stadium as a host venue. It is expected that the Euro 2028 operation will be different to a typical THFC event day - the major event overlay is likely to affect the flows and dwells not only at the venue but also in the local area - in the form of fan zones and activations which will influence movement patterns.
- 9.7. The availability of Moselle Square and a second event space at this time will not only open up more opportunities to activate and showcase the area as part of the major event, it also offers more scope for the safe and flexible management of alternative crowd flow operations associated with the event.
- 9.8. In the Lendlease scheme the CPO construction phasing plan suggests that the plots adjacent to the High Road facing the Stadium would be under construction at this time, and the available space to the west of the High Road would be limited (see Figure 21 - Phases 4 & 5). In terms of crowd safety risk, this would effectively lead to a position during Euro 2028 where a new event and crowd management operation would be being introduced to accommodate visitors who are unlikely to be familiar with the area. Placement of this operation in the vicinity of construction sites would introduce further challenges and constraints.

The spatial configuration supports event day operations at the Stadium and a second venue

- 9.9. The Alternative Masterplan is not solely shaped by the provision of space for post-event queuing to access the station but has been informed by crowd operations and dynamics associated with different event phases. The implications for pre-event flows and flows in the event of transport disruption as well as existing operational challenges have been considered and informed by discussions with those involved in the delivery of the LAMP.
- 9.10. The design and layout of space responds to operational considerations for various scenarios, and not just the provision of equivalent quantum of existing space. Nevertheless, the Alternative Masterplan design does provide an equivalent or larger footprint for the southbound access channel than both the existing case and the Lendlease alternative, assuming that the space is managed via a single queue channel of consistent width. Figure 34 indicatively shows the post-event arrangements for a Stadium event in the context of the Alternative Masterplan, with a single-width channel allowance for each of the Southbound access, Northbound access and a Background flow.
- 9.11. For example, when allowing for channels of 1.5m width for northbound and background contraflow respectively and segregation by 0.8m wide barrier lines, the footprint for the southbound queue in this configuration would be approximately 1,750m². This additional footprint is sufficient to accommodate anticipated demands under normal operations as well as more resilience for the operation in the event of disruptions to the transport network or for events where attendee choices place more demand on this part of Zone Ex.

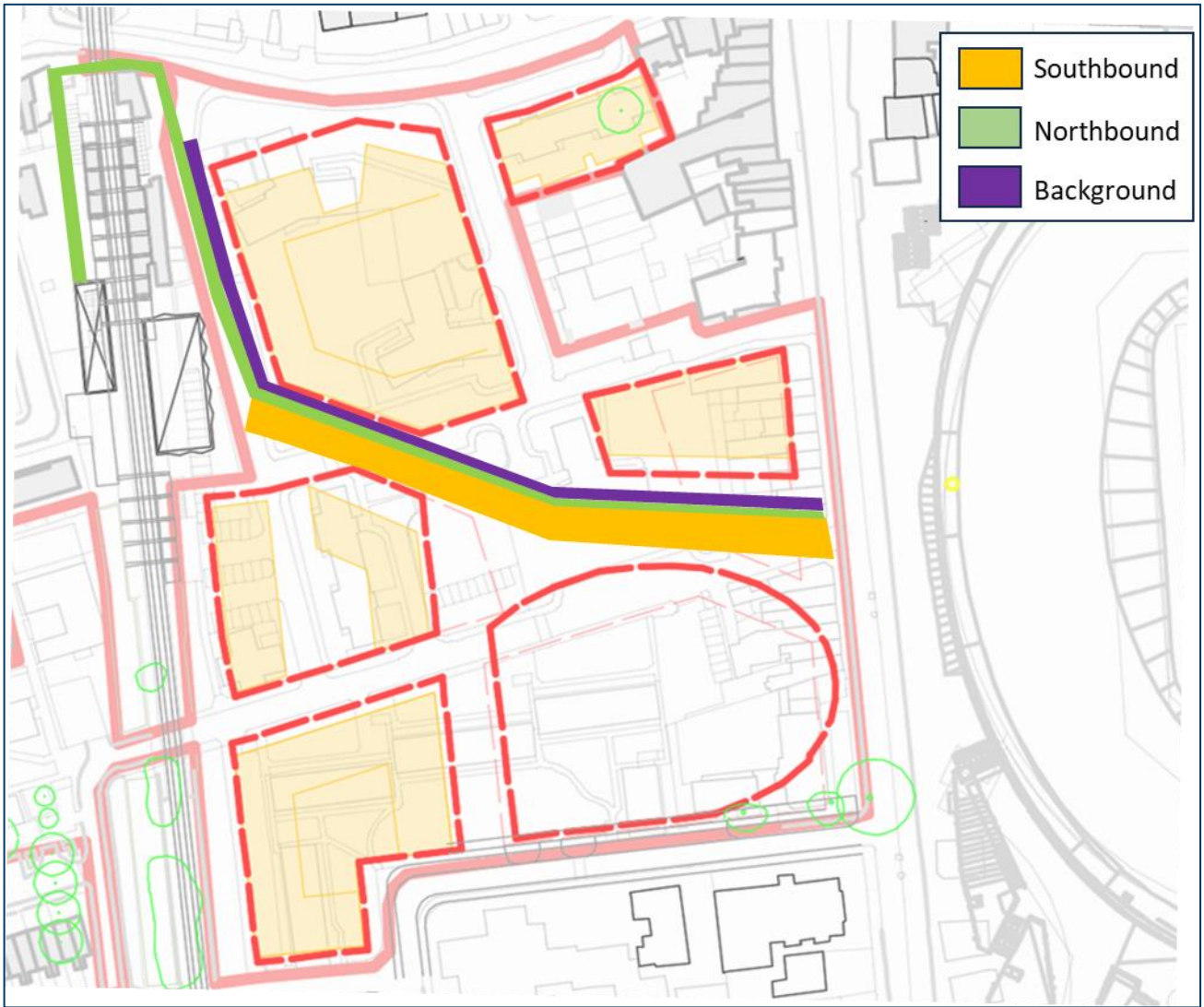


Figure 34: Indicative Spatial provision for Post-Match Queuing and Flows on the Stadium – Station Link with the Alternative Masterplan

- 9.12. One of the differences between the CPO scheme and the Alternative Masterplan is the re-shaping of Plot E in conjunction with the introduction of leisure/cultural venue at Plot C. A plan view of the two side-by-side is shown at Figure 35 with a number of dimensions associated with the route between the Station and the High Road also marked in both instances.

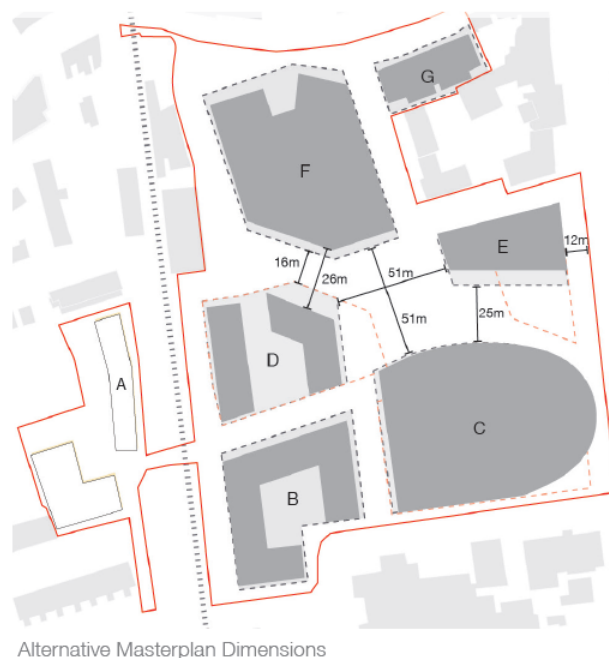


Figure 35: Location of Plots for the HRW PP Scheme and the Alternative Masterplan
(Source: High Road West South: Alternative Masterplan Summary, THFC/Arup, June 2023)

- 9.13. The re-shaping of C & E adjacent to the High Road increases the distance between the two plots to 25m. As well as accommodating queuing spaces associated with access to the southbound platform and routes for those flowing to the northbound platform and destinations to the west, it offers benefits for safe and effective crowd operations. By opening up the space at the junction with the High Road, it encourages flows from the north of the Stadium into Moselle Square and supports the opportunity for more operational flexibility as Stadium attendees approach from the north, south and east. It also provides space for ancillary support such as temporary toilets and visible wayfinding provision in the location that would offer the most support to the operation, and to the spectators.
- 9.14. The operational input has been key to informing the Alternative Masterplan design, informing the assessment of a range of event scenarios, including coinciding events at the Stadium and a newly introduced leisure/culture facility. One of the key considerations around crowd safety has been in relation to an incident requiring evacuation. Given the introduction of a new venue, there is a potential scenario whereby this venue would be evacuated at the same time as the route between the High Road and the station is populated by spectators arriving or departing from the Stadium. Based on indicative designs for the Plot C venue, the Alternative Masterplan design has been developed to ensure that the evacuation and dispersal away from the venue can be accommodated without relying on the space required for Stadium Zone-Ex operations.
- 9.15. Figure 36 considers a scenario where the Plot C venue has a potential capacity of 5,500 people. If there were a need to evacuate the venue, the indicative exit capacities would support a clearance of viewing areas within 2.5mins - the likely requirement for compliance with fire regulations. The key consideration here is the 5m flow exiting to the north of the venue at the time when the Stadium Zone Ex infrastructure is in operation or in situ. It is important to allow for onward dispersal of the evacuating crowds, and therefore the minimum requirement is to enable 2.5m clear width either side of the 5m exit (i.e., for equal dispersal to the east and the west). As shown in the diagram, the dimension of the Stadium Zone Ex

corridor(s) is a total of 16m to ensure continuity of width, but the overall space between the two plots is 25m. This difference of 9m indicates that there is adequate space available at this location to support the onward dispersal.

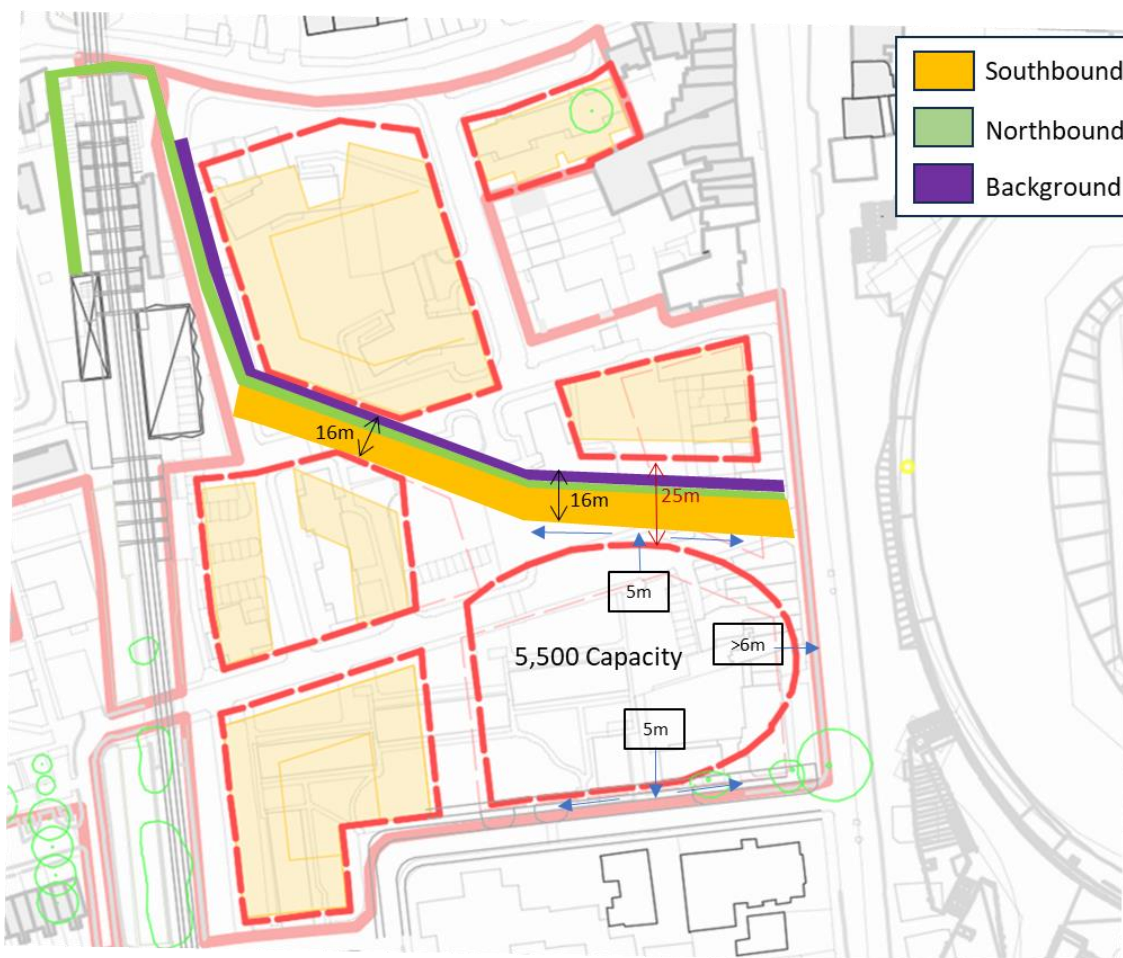


Figure 36: Indicative allowance of space for clearance of attendees evacuating from Plot C while Stadium Zone Ex egress is in use in the Alternative Masterplan

- 9.16. The event day operational considerations have also informed the scoping of necessary parameters for scheduling arrangements. The spatial layout has been developed to allow for simultaneous operation of the two venues - for example, identifying how the crowd management strategy can be adapted to allow for arrivals and associated entry process overlay at the Plot C venue during the same period as the Stadium is decanting. In addition to looking at the available space, the need to consider the messaging and flows as attendees enter/emerge from the station in these scenarios has been considered indicating the importance of effective co-ordination between different parties.

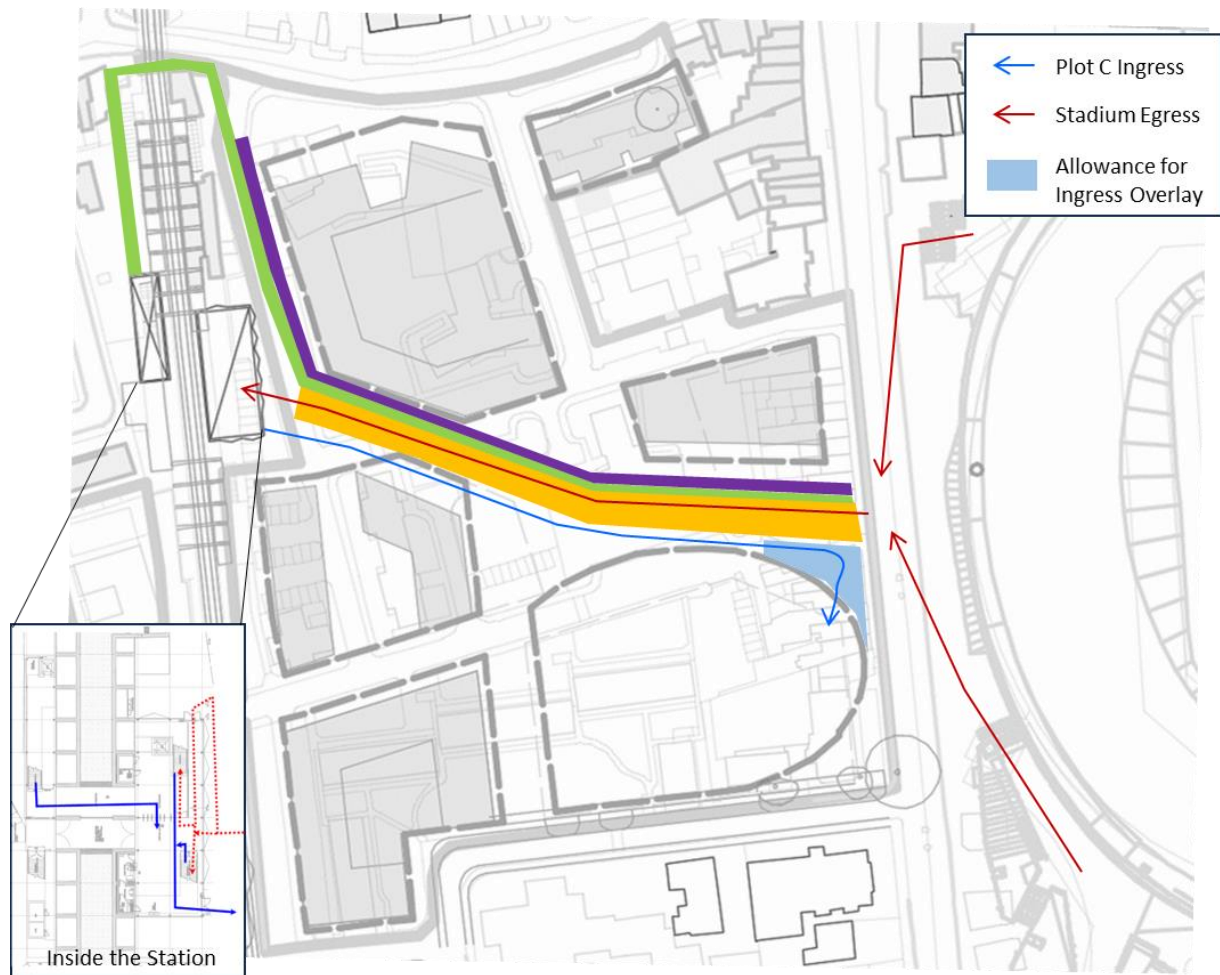


Figure 37: Spatial and Operational Implications of Coinciding Ingress and Egress Periods within the Alternative Masterplan Context

- 9.17. Analysis undertaken by Arup comparing the THFC event schedule across the year with a typical schedule for leisure/culture venue of the scale envisaged for Plot C indicated that the likelihood of coinciding finish times at the two events was small. However, further analysis showed that if such an outcome did arise, it was possible to identify the extent to which a staggering of the event timings would be necessary to ensure that the Zone Ex operations could be accommodated within the Masterplan footprint. This provides a set of initial parameters to inform the basis of operational co-ordination between THFC and the operator of the new venue.

Current operational challenges have been considered when shaping the Alternative Masterplan

- 9.18. Furthermore, the input from the LAMP advisors and the THFC team has indicated that the ability to re-design this space offers opportunities to address some challenges with the existing operations. The Alternative Masterplan considers and makes an allowance for adjusting the existing crowd management strategy to re-direct post-event flows currently using White Hart Lane through Moselle Square.
- 9.19. If this were to be achieved, there is scope to reduce the duration or eliminate the need for road closure on White Hart Lane that is currently in place for typically 45 minutes after the end of each event. An enabler of this would be the viability of using the underpass to the south of White Hart Lane (i.e., the ticket hall of

the old White Hart Lane station) to route those boarding northbound services to the West of the station - thereby avoiding the need to circulate via the public highway. This principle is shown in Figure 38, but it is highlighted that access of this nature has not been discussed with the station owner.

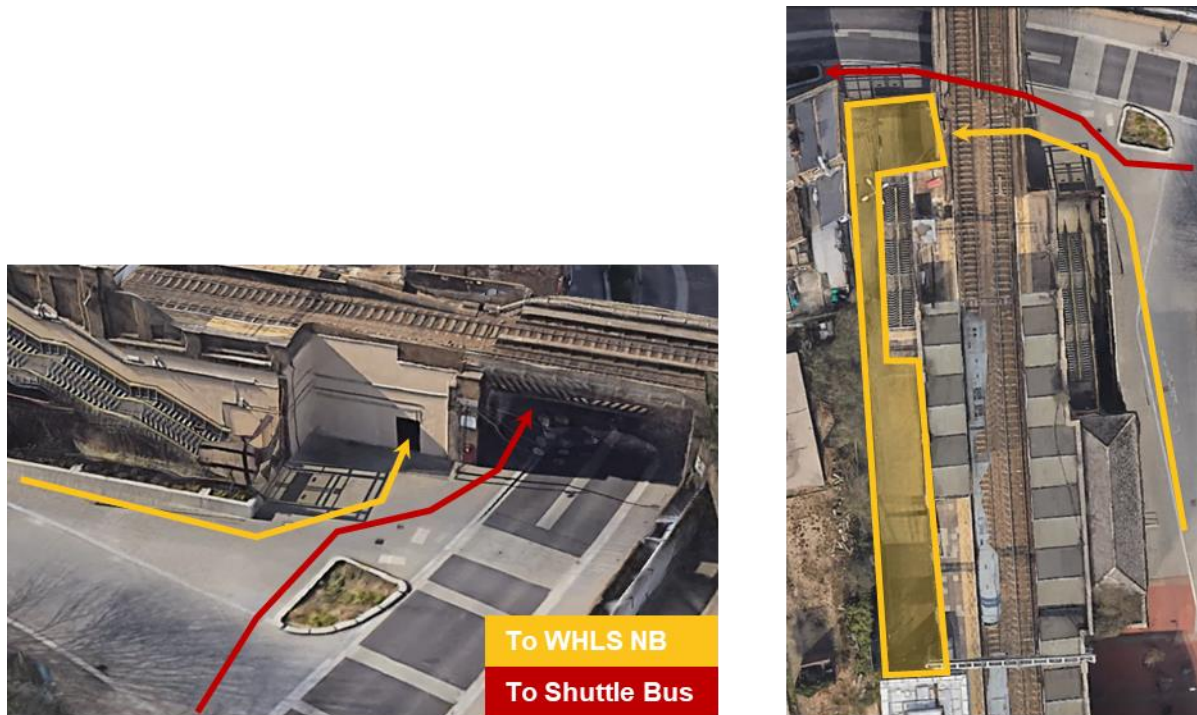


Figure 38: Option for re-routing Northbound spectators to reduce footfall on White Hart Lane

- 9.20. The impacts here would be beneficial in terms of traffic congestion relief, and this would have a positive impact across a large part of the road network given the limited number of east-west connections in this part of North London. It is noted that the security aspects of this operation would require additional consideration, with the change in proximity of egressing crowds and open traffic routes.
- 9.21. Figure 39 shows the implications for wayfinding at the Stadium to deliver this strategy. To achieve this, it would require a change to the direction of movements for groups of people emerging from the east and north parts of the stadium heading to the West. One key change to the current messaging would be that any spectators leaving the Stadium heading for WHL Station NB services would need to head to Moselle Square - currently those leaving from the northernmost exits would use White Hart Lane. The messaging would also change for those using the Shuttle Bus services - to head northwards to avoid Moselle Square.

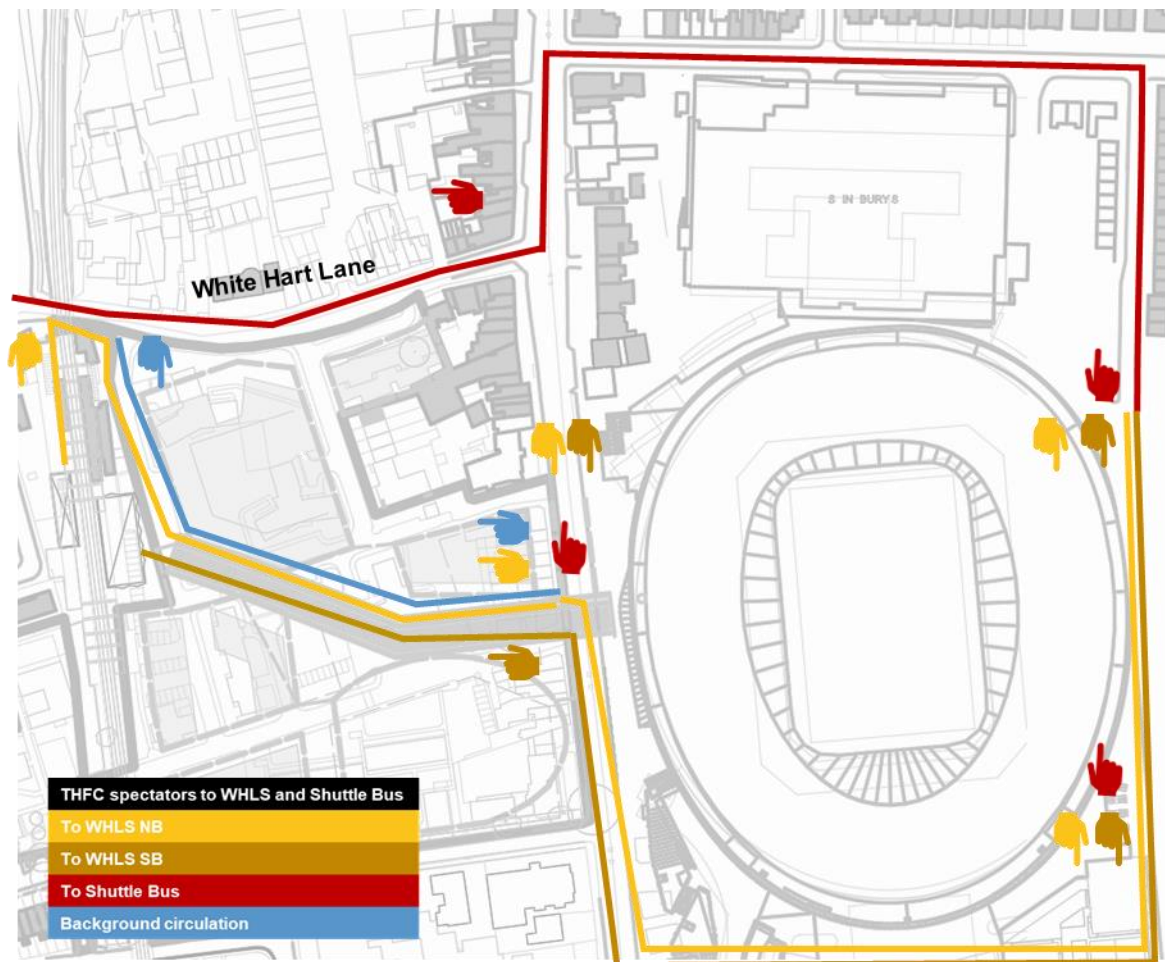


Figure 39: Wayfinding Implications of Alternative Operations to reduce post-event footfall on White Hart Lane

- 9.22. One anticipated outcome would be greater use of the channel for access to the northbound station entry through Moselle Square than in the current situation, with associated spatial and management implications along this route. The dimensions required to accommodate this (and the remaining flows using White Hart Lane pavements) have been considered during the development of the Alternative Masterplan, taking into account the relative demands for northbound travel and egress profiles associated with different events.

Summary

- 9.23. In summary, the Alternative Masterplan proposal has been developed with awareness of current Zone Ex operations and challenges and seeks opportunities to address these as part of its design. In my view there are clear alternatives to the Lendlease scheme that would deliver better outcomes.
- 9.24. Inclusion of a second multi-purpose cultural venue supports the objectives for regeneration of the area. It has the potential to introduce new event day scenarios, and the requirement to accommodate these has influenced the sizing and design of the space within the proposal.
- 9.25. A key benefit of the Alternative Masterplan is to bring forward the Moselle Square development in the timeline to provide increased certainty that it (and the benefits that accrue) will be delivered rather than at

risk resulting from the viability of the whole Scheme. The shorter duration of construction phasing minimises the potential for disruption of event-day operations associated with construction and the changing temporary states, and the higher crowd safety risks that would arise.

10. Summary and Conclusions

- 10.1. The CPO Scheme area has a high degree of overlap with Zone Ex, which is the public realm encompassing the main pedestrian and vehicle routes between the Stadium, the local area, and onward transport nodes used by spectators on event days.
- 10.2. The high crowd footfall in Zone Ex creates and/or increases crowd safety and security risks including but not limited to crowd crush, Slips, Trips and Falls, vehicle-people collisions, aggression, and terrorism. THFC is responsible for co-ordinating crowd safety and security within Zone Ex and has requested that Lendlease, as the Agent of Change requesting a CPO, demonstrate that crowd safety and security risks are not increased by the end-Scheme and during construction phasing, which is scheduled for nearly nine years.
- 10.3. The CPO Scheme proposals involve the ‘stopping up’ of parts of the public highway which are currently relied on for THFC’s Zone Ex operations. THFC will therefore require legal rights of access across the CPO Scheme. There is currently no agreement that provides such access rights, nor an absolute obligation that an Access Licence will be granted. If the necessary rights are not provided there would be a significant impact upon THFC’s Zone Ex operations, with increasing risk to crowd safety not just in the footprint of the CPO Scheme but elsewhere in the Local Area.
- 10.4. However, even assuming that the necessary rights of access are provided, Lendlease has not provided sufficient information to demonstrate how crowd flows can be safely accommodated in the CPO Scheme either in the End state or during the extended construction phases. Their approach is to defer detailed assessment to the Reserved Matters or discharge of conditions stage, and consideration by the Safety Advisory Group that advises London Borough of Haringey on these matters.
- 10.5. I consider that crowd safety is too important to be considered at a later stage when the scope to deliver satisfactory arrangements may be limited. In these circumstances THFC and other stakeholders would have to accept the burden of higher risks which need to be taken into account at this stage. In my view, a detailed design integrated with an accompanying concept of operation across Zone Ex and within the CPO Scheme area for all phases of event day operation and through all construction phases should have been developed in sufficient detail to demonstrate that it could be operated as safely or better than the existing layout, prior to approval of the outline planning application.
- 10.6. Lendlease has focused its crowd studies and assessments of its proposals on the egress phase of event day operation. It has likewise focused its assessment on queuing through the proposed Moselle Square and whether the provision of queueing space and widths during the End-state or construction phasing is the equivalent or better than in the existing arrangement. The egress phase is the most ‘demanding’ phase to be considered, and queue space is an important consideration, but other phases such as pre-event ingress and emergency evacuation also place requirements on the integrated design and operation, and other routes within Zone Ex should have been considered.
- 10.7. My review concludes that Lendlease and its advisors has understated the existing provision of queuing space (by not including the ‘contingency queuing area’ and space for associated overlay such as toilets). This is important as the provision in the existing layout is the basis for planning the construction phases, and providing assurance to THFC, that the space provided is the same or greater than the existing arrangement.

- 10.8. Lendlease appears to have overstated the scale of useable queuing area provided in the End-state and has not demonstrated through detailed drawings that it has taken account of the operability of its queuing arrangements in its barrier design and associated overlay. As such, the proposed End-state is unproven.
- 10.9. Lendlease has provided only a single page outline of its construction phases underlying the CPO Scheme, with no detail on the access routes during the construction phasing provided since the planning application.
- 10.10. Some detail for crowd flow during construction phasing was submitted for the planning application, and in the absence of any update to this, my assessment relies on the information provided for the planning application.
- 10.11. On the question of equivalency of space for queuing during construction phasing Lendlease shows a series of access routes through the future Moselle Square phases that provide near equivalency of space as the existing layout - but demonstrably less than the claimed End-state.
- 10.12. Lendlease also states that they will follow the principles of providing the same or more space and equivalent widths as the existing layout, but the provision in the existing layout has been understated. Notwithstanding that Lendlease claim approximately equivalent space for queuing in their construction phasing as in the Existing layout I have concerns that the diagrams provided do not take into account of important details of the existing crowd flow operation and considerations of emergency evacuation and emergency service access. The consequence of consideration of these details may be to reduce the available queuing space during construction phasing. No detailed drawings have been provided to verify that equivalent or better space can be provided.
- 10.13. During construction, the access routes will be hoarded. Both THFC and the Metropolitan Police raised concerns about this aspect during the planning process, and the first details of the Hoarding arrangements and associated evacuation implications were provided in a high-level presentation form on 20th July 2022 – one day prior to the planning committee, suggesting it was a late consideration, and planning for emergency evacuation remains undeveloped.
- 10.14. No detailed drawings combining barrier layout, hoarding and evacuation considerations have been provided for the planning application nor for the revised phasing for the CPO Scheme. A critical consideration in assessing evacuation from a hoarded area is the requirement for exits in appropriate locations and exit routes allowing crowds to disperse. Planning for emergency evacuation is critical requirement.
- 10.15. No detailed drawings combining barrier layout, hoarding and evacuation considerations have been provided for the planning application nor for the revised phasing for the CPO Scheme. A critical consideration in assessing evacuation from a hoarded area is the requirement for exits in appropriate locations and exit routes allowing crowds to disperse. These are not shown on any detailed plans to date and it is possible that the requirement for emergency evacuation routes could reduce the space available for queuing.
- 10.16. Furthermore, THFC has concerns about the viability of the Scheme, and that whether Moselle Square and associated access route will be delivered. Were Moselle Square and the final access route not to be delivered this would leave the Zone Ex arrangements in one of the construction phase configurations.

- 10.17. I conclude that the limited information on Zone Ex operation in the CPO Scheme construction phasing documentation does not demonstrate that the safety of crowd flows in Zone Ex can be delivered by the CPO Scheme.
- 10.18. An Alternative Masterplan proposal has been developed by THFC as they consider there is an opportunity to deliver the regeneration of High Road West in a way that accords the Local Plan objectives for the area and provide greater public benefits than the CPO Scheme.
- 10.19. In terms of crowd flow, the Alternative Masterplan has been developed with awareness of current Zone Ex operations and challenges and seeks opportunities to address these as part of the design. The Alternative Masterplan provides greater certainty that THFC will be able to comply with its Zone Ex obligations and would lead to improvements to the existing crowd management arrangements which would benefit both THFC, spectators and the local community.
- 10.20. A key benefit of the Alternative Masterplan is to bring forward the Moselle Square development earlier in the timeline to provide increased certainty that it (and the benefits that accrue) will actually be delivered. The shorter duration of construction phasing minimises the potential for disruption or event-day operations associated with construction and the changing temporary states, and the higher crowd safety risks that arise.

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