

THFC New Stadium ï NFL scenario Seven Sisters Interchange Analysis

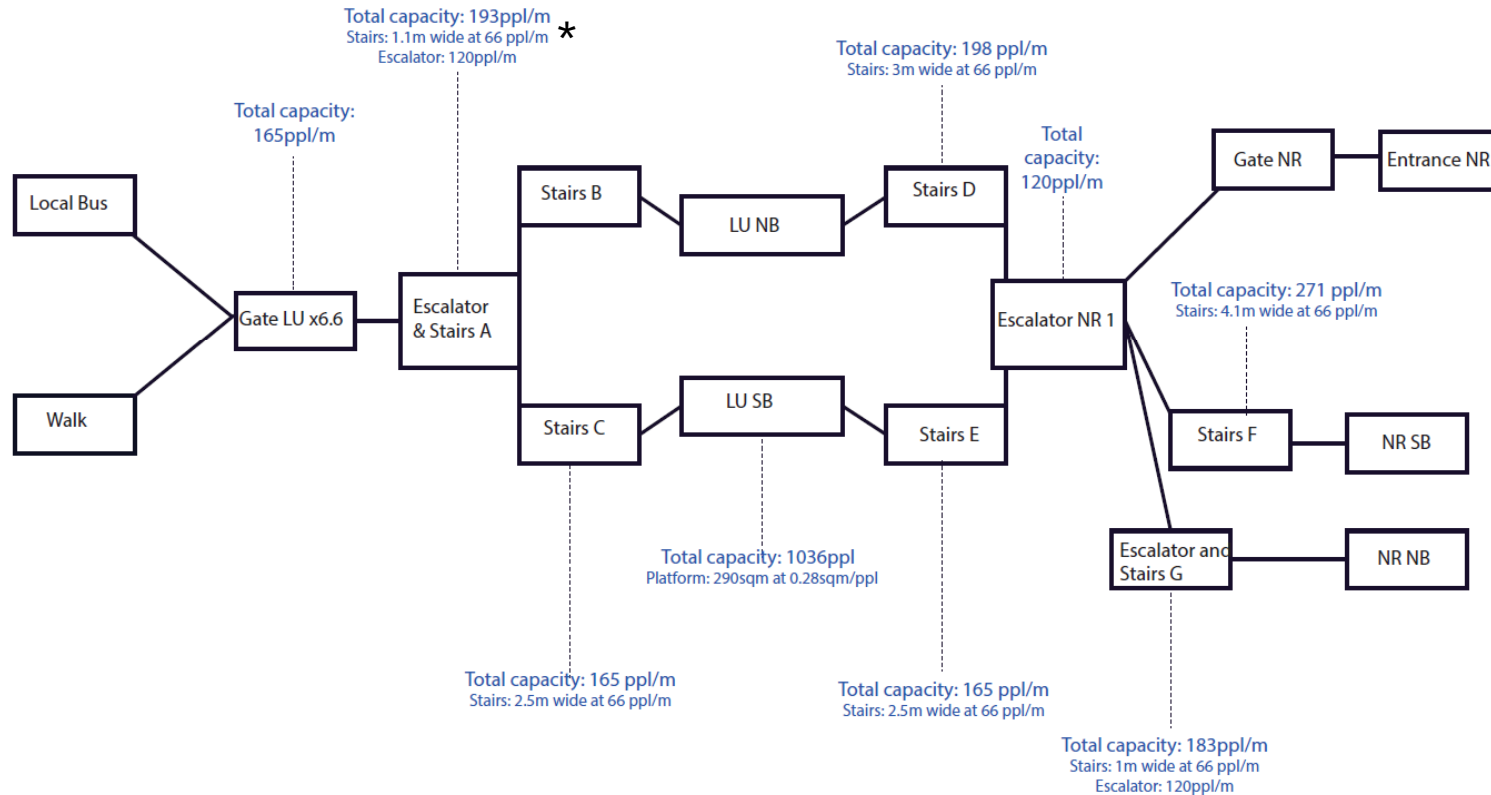
Assessment of Station Capacity

- ✂ This document contains the outcome of an assessment of capacity of Tottenham Hale Station in the light of anticipated demand associated with an expanded Tottenham Hotspur Stadium.
- ✂ The NFL Match day scenario is considered:
 - ï Sunday: 14:30 kick off, 18:00 final whistle.
- ✂ Spectator demand forecasts have been generated by Tim Spencer & Co, using information from existing THFC spectator surveys and analysis of demand patterns associated with spectators at NFL events at Wembley in 2014.
- ✂ Assumptions used to generate the forecasts of Spectator demand at Transport Nodes are listed in a Data Book (150821-563THTA-NFL Data Book - 0.2).
- ⚠ A spreadsheet model of demand and capacity has been constructed to assess the performance of different parts of the infrastructure.
- ⚠ The following pages summarise the performance throughout the pre- and post-match period for the Sunday NFL scenario.
- ⚠ Background loading on services and at the Station is included in the assessment. 8% growth has been applied to observed background figures to represent conditions in 2021.
- ⚠ Spectators boarding the Victoria Line at Tottenham Hale are taken into account in the assessment of available capacity on SB services in the post-match period.

Observed Post-Match Flow Rates

- ⚠ The default position for planning the capacity of different LU station elements is to adopt the flow rates contained within SPSG Special Events guidance. However, in this instance, the choice of flow rate used within the assessment is drawn from observation of actual spectator throughputs at Seven Sisters station associated with post-match conditions at Tottenham Hotspur matches. As it is expected that that future crowd management scenario at Seven Sisters in the post-match will be an extension of the current plan (albeit in operation for a longer period), it is considered appropriate to use the observed flow rates as a proxy for what can be achieved in the future. It is believed that observations should take precedence over planning guidelines where there is a contradiction between the two.
- ⚠ A count of station entries was undertaken at Seven Sisters for the post-match period associated with the THFC home match against Portsmouth on the 23rd March 2008. The peak outcome from the count data showed that at the busiest time, 811 people entered the station via the High Road within five minutes. This equates to approximately 162 people per minute. We know from the spectator survey undertaken on the day of this match that 90% of spectators travelling via Seven Sisters would board the southbound Victoria Line. Therefore, the flow towards this platform during this peak period equates to 142 people/minute and the stairs to the southbound Victoria Line platform, at 2.43m wide have been observed to operate with a capacity of **66 p/m/min**.
- ⚠ It is this data that has been used to inform the selection of appropriate flow rates for assessing the station stair capacities in a post-match operational scenario. It should also be noted that discussions with station staff and British Transport Police suggest that this is the typical outcome on a matchday, and that they have confidence that the station can operate within these parameters when required. **Tim: Appropriate for NFL crowd?**

Station layout and entry points (Post-Match)

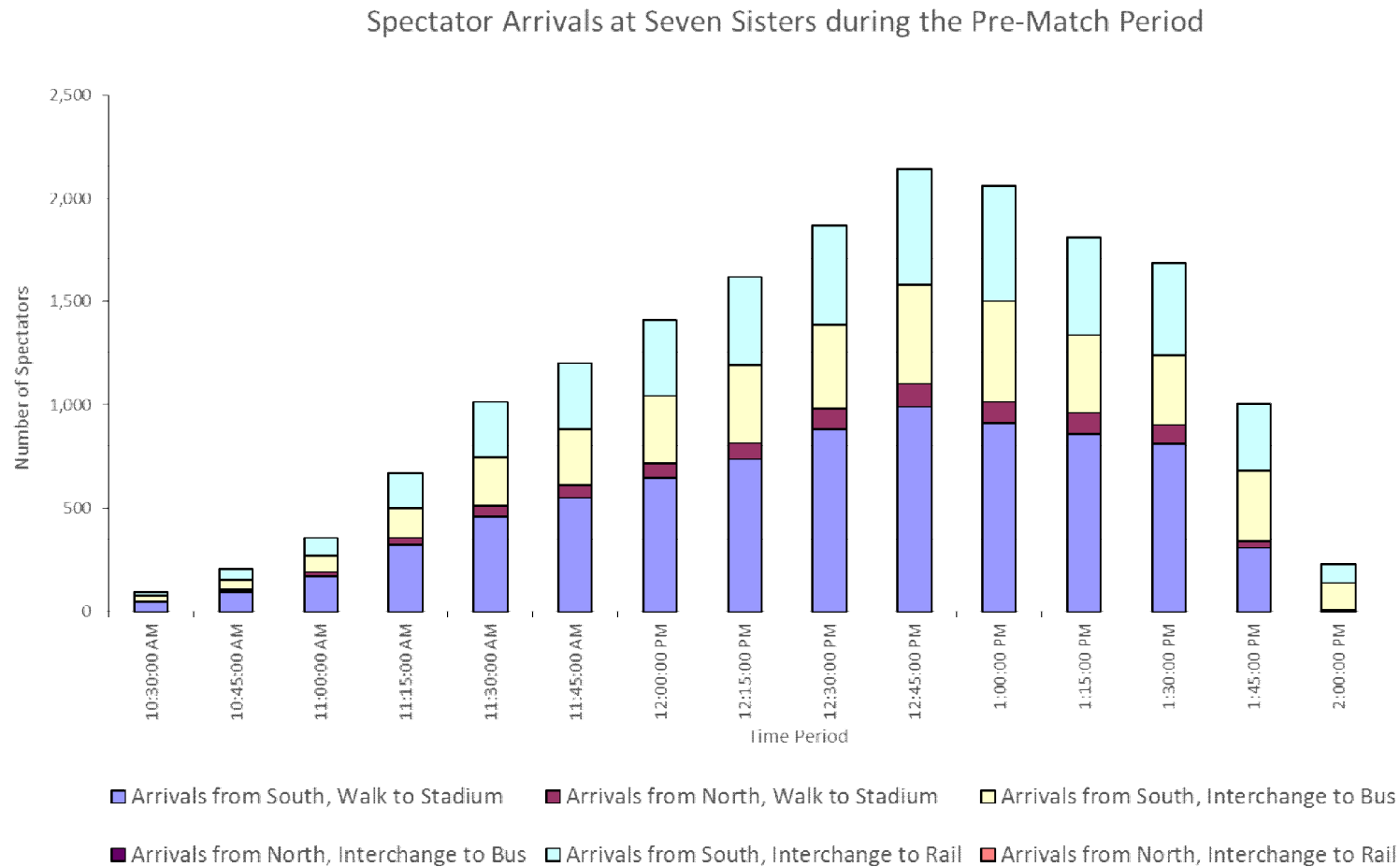


Å In the post-match management scenario, the stated capacities for Escalators & Stairs A will not be fully utilised as the flow will be regulated outside the Station to prevent queuing inside the Station (linked to capacity of Stairs C)



Weekend Scenario

Pre-match period



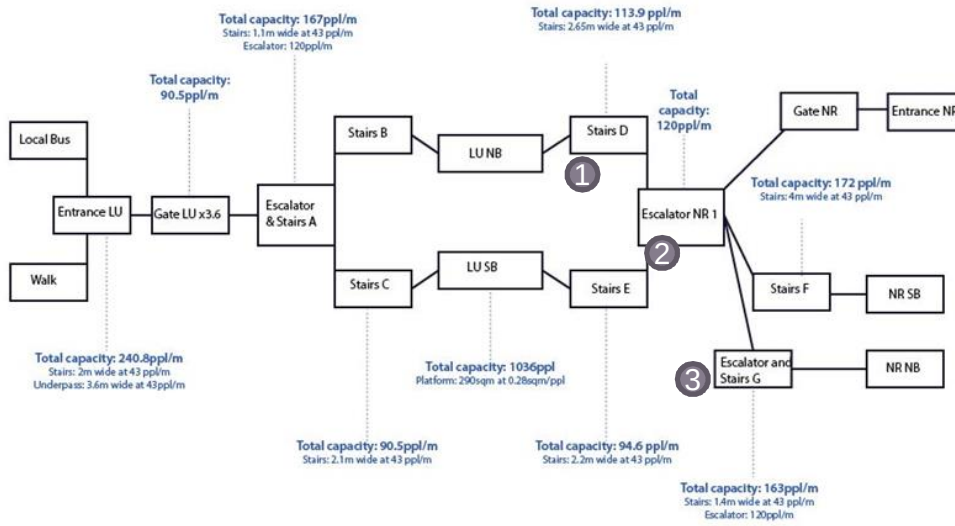
Å 17,365 spectators in total, all arriving on the Victoria Line

- 8,679 exit the station and Walk to the Stadium
- 4,633 interchange to NR trains to White Hart Lane
- 4,053 interchange onto Local Buses to the Stadium

Pre-match period

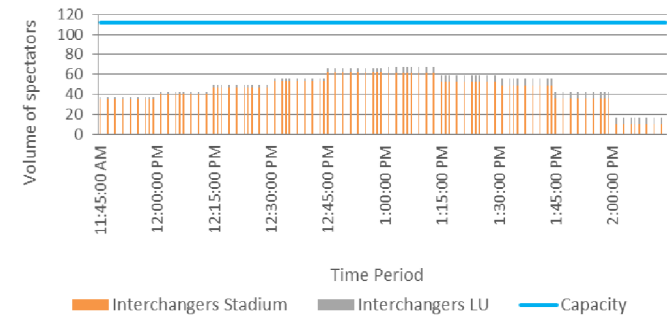
Å During the pre-match period, all station vertical circulation elements provide sufficient capacity to accommodate the background and spectator flows without delay.

Å This would also be the case should passengers choose not to use the stairs where there is an option between escalators and stairs.



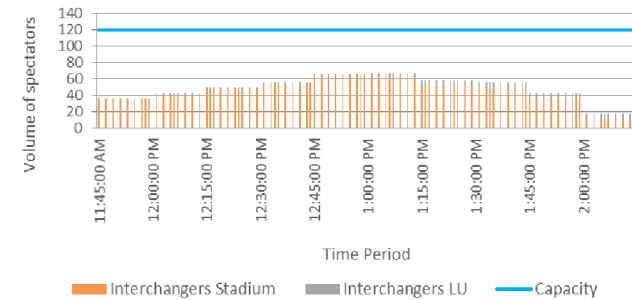
1

Demand at the bottom of Stairs from LU NB



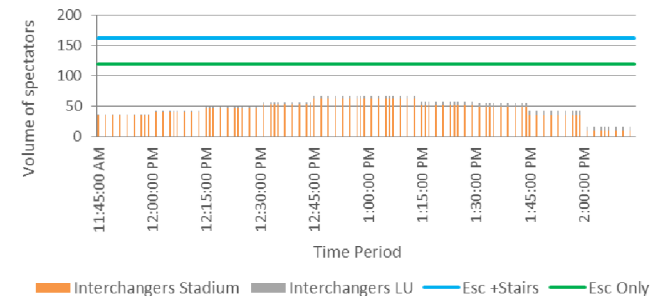
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Demand at the bottom of Escalator from LU



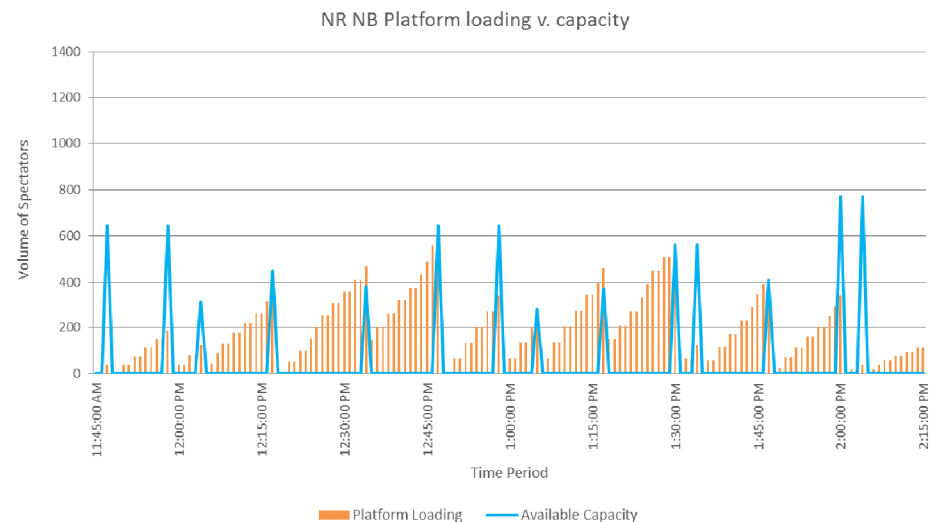
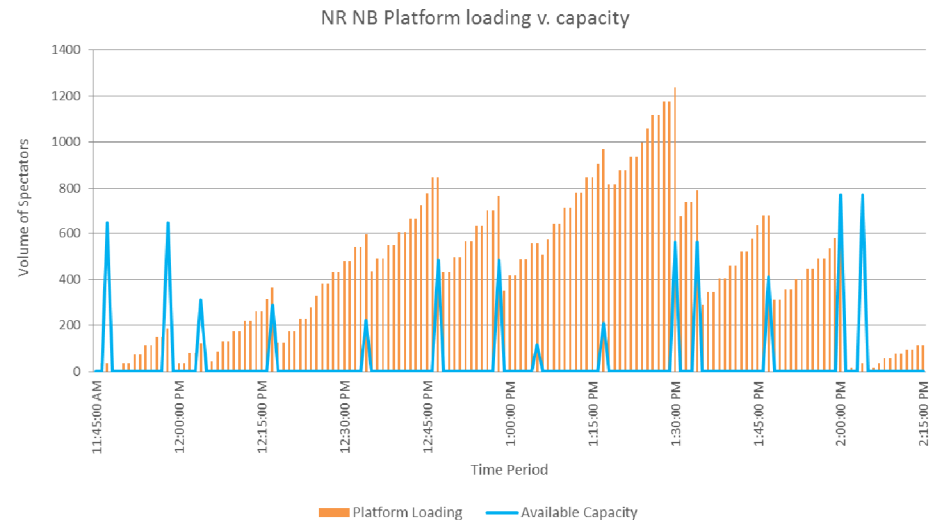
3

Demand at the bottom of Escalator/Stairs to NR

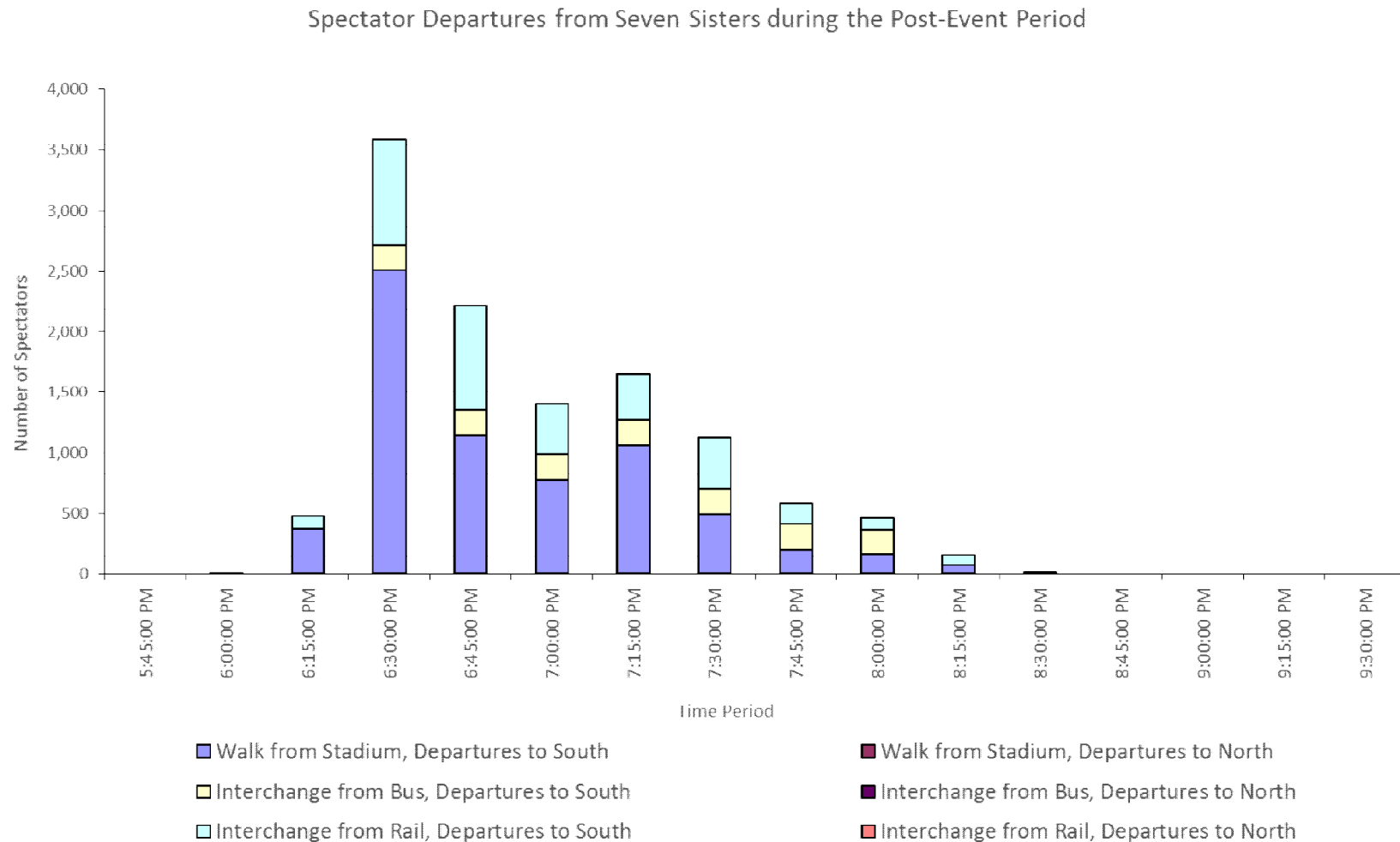


Pre-match period ÷ NR Platforms

- Å Trains arriving at Seven Sisters will already be partially loaded with background travellers and Spectators travelling to White Hart Lane from Central London
- Å Train capacity is assumed to be limited to 859 pax/train (TfL advice that service capacity at 85% of total for events), this implies some trains will have very little available space for boarders at Seven Sisters. Were this to be the case this would result in Platform loadings in excess of 1,000 people, with associated risks to safety and management.
- Å Some passengers would have to wait for the third or fourth train before they are able to board NB trains at Seven Sisters station.
- Å A sensitivity test has been run with a crush capacity of 1,020pax/train during the peak hour. This results in platform loadings reduced to up to 570 people, which can be accommodated at a reasonable density, although management measures to encourage efficient platform and train loading would be recommended.
- Å In this scenario, for all but two periods (12:30 and 13:30), all passengers will be able to board the first train after they arrive on the platform. It is also important to highlight that the transfer from Abellio to London Overground has resulted in greater levels of station staffing on a matchday at this station.
- Å NB: TfL have anecdotally stated that loadings of circa 700 pax per 4-car train have been observed during peak commuting hours on other London Overground lines (i.e. using this rolling stock).



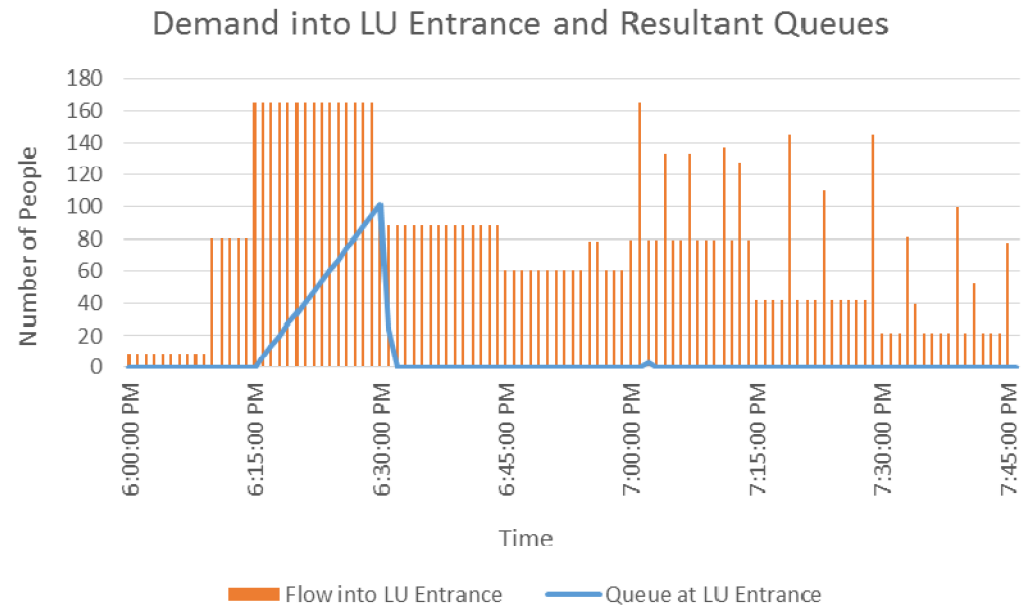
Post match period - Arrival Profiles over time



- 12,005 spectators in total, all departing on the SB Victoria Line
- 6,832 arrive on foot from the Stadium
 - 3,709 interchanging from NR train services from White Hart Lane
 - 1,464 interchanging from Buses from the Stadium

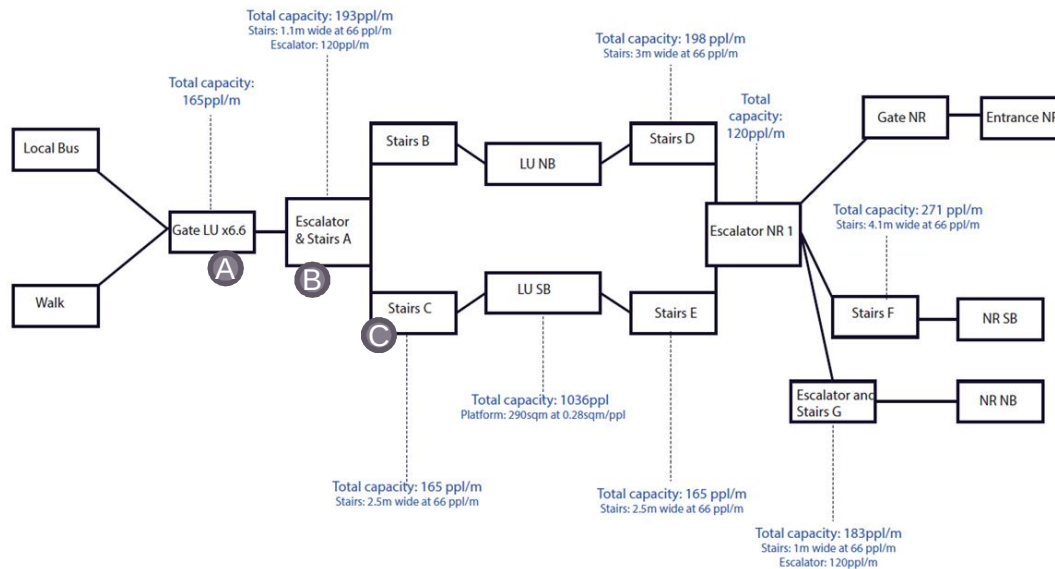
Post-match period at Main Entrance

- ⚠ To ensure that queuing and congestion does not take place inside the station, we have assumed that access to the station from the High Road is regulated.
- ⚠ Therefore, queues will form outside the station requiring a management plan to be adopted. All street level entry is assumed to be via the northernmost access point.
- ⚠ In this scenario, entry into the station would be regulated throughout at 165 people/minute (equivalent of 6 ATG + 1 WAG gateline). However, given the rate of arrival at the station, some queues would form from 18:15 onwards.
- ⚠ Maximum queue length: **101 people**
- ⚠ The requirement to accommodate some level of queuing outside the station would be for approximately **16 minutes**.
- ⚠ The maximum delay for any individual would be less than **one minute**.



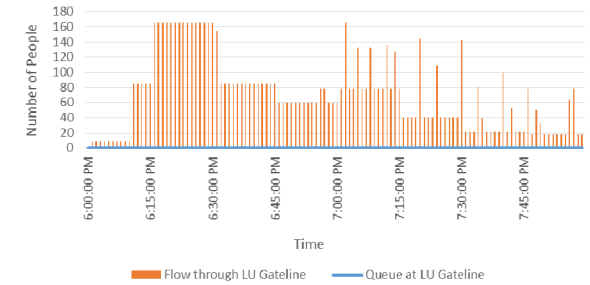
Post-match period i Other station elements

As demand is held outside the station to prevent queue formation inside, once people have entered their flow to the platform should not be impeded.



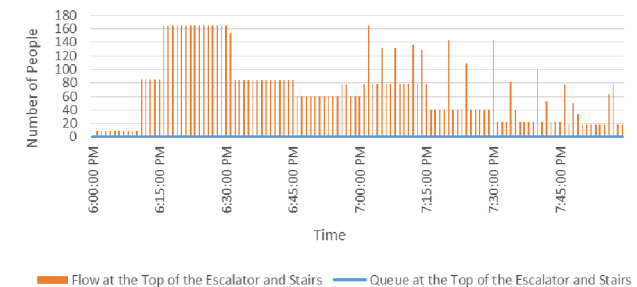
A

Demand at LU Gateline on High Road and Resultant Queues



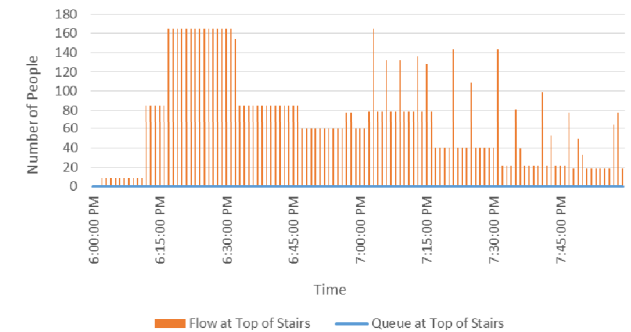
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Demand at Top of Escalator/Stairs and Resultant Queues



C

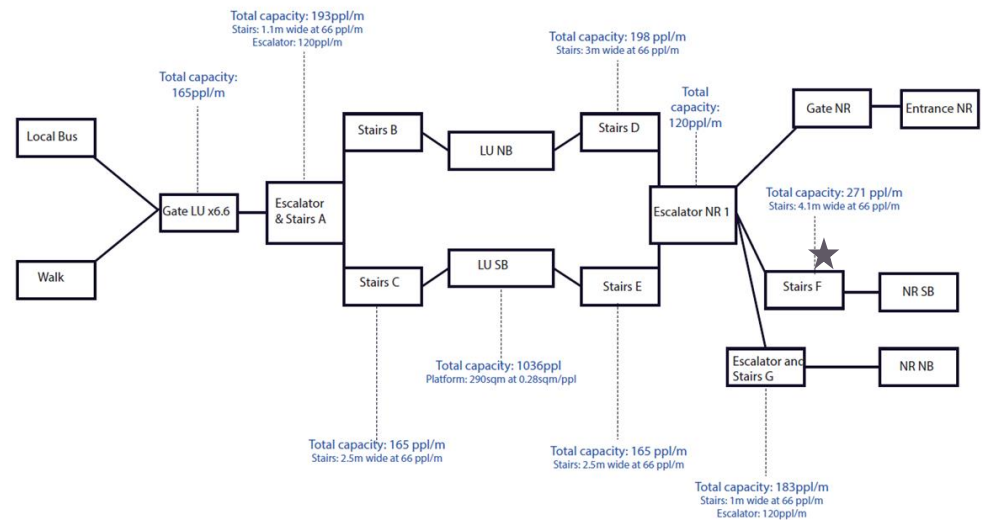
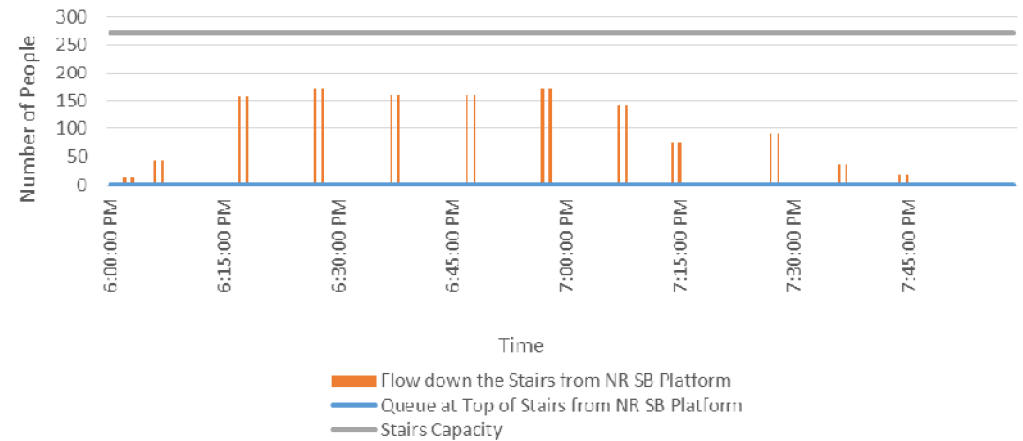
Demand at Top of Stairs and Resultant Queues



Post-match period i Stairs from NR Platform

- ⚠ Spectators interchanging from National Rail SB services (having boarded at WHL) onto Victoria Line services use different parts of the station to those arriving on foot or by bus.
- ⚠ No queuing is expected.

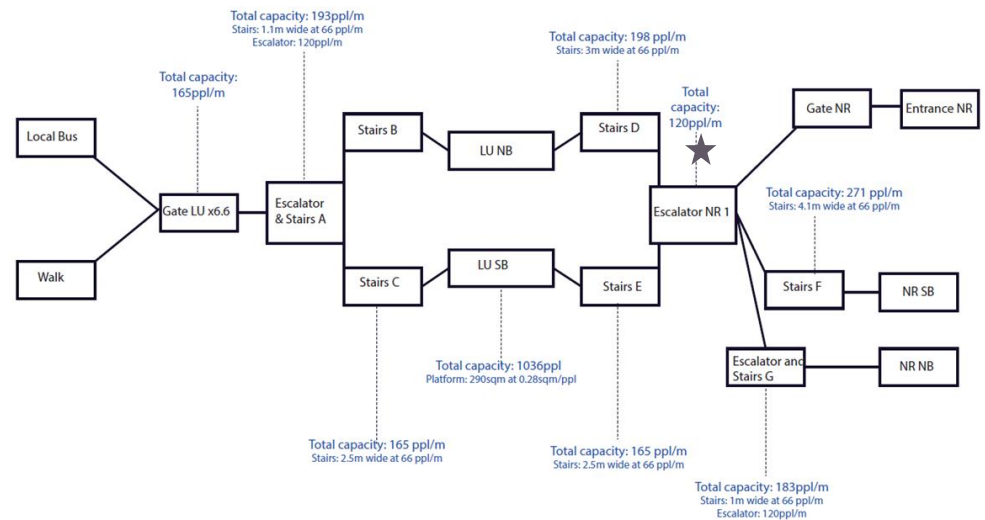
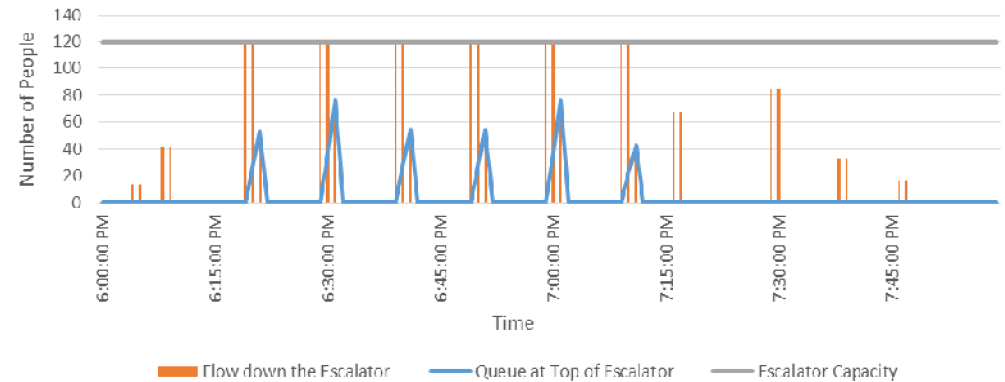
★ Demand at Top of Stairs from National Rail SB Platform and Resultant Queues



Post-match period i Escalator from NR to LU

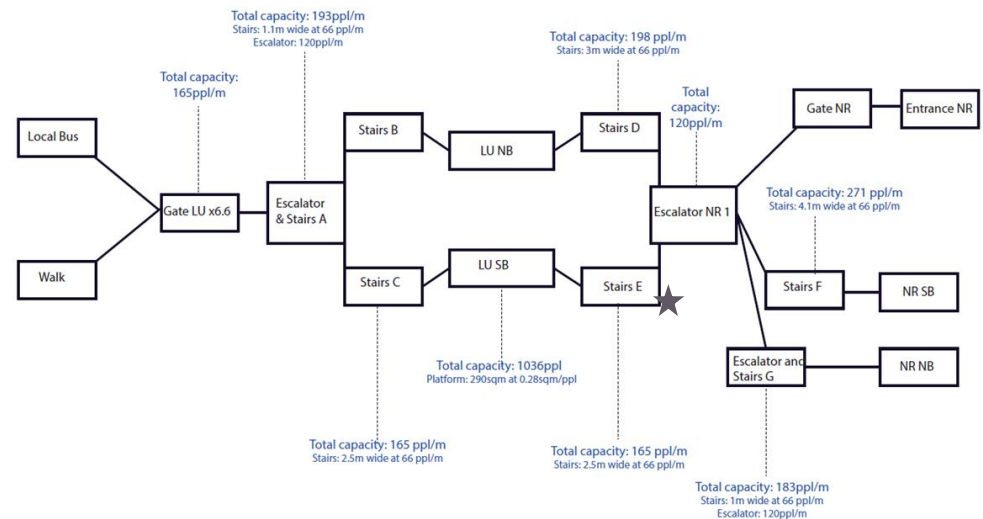
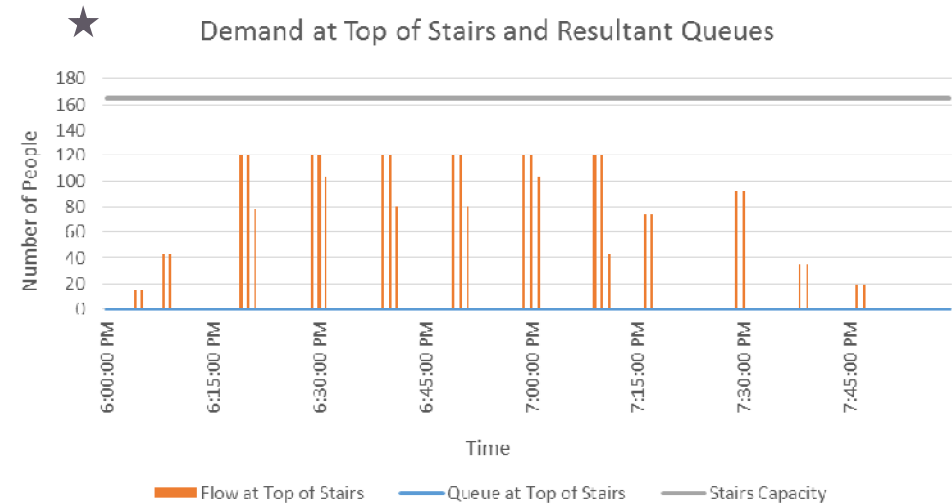
- ⚠ After passing from the platform through the Network Rail elements of the station, interchangers will descend an escalator to the Victoria Line.
- ⚠ Small, shuffling queues of circa 100 people are expected at the top of the escalator. Delays incurred will be less than 1 minute at the head of the escalator.

★ Demand at Top of Escalator from National Rail and Resultant Queues



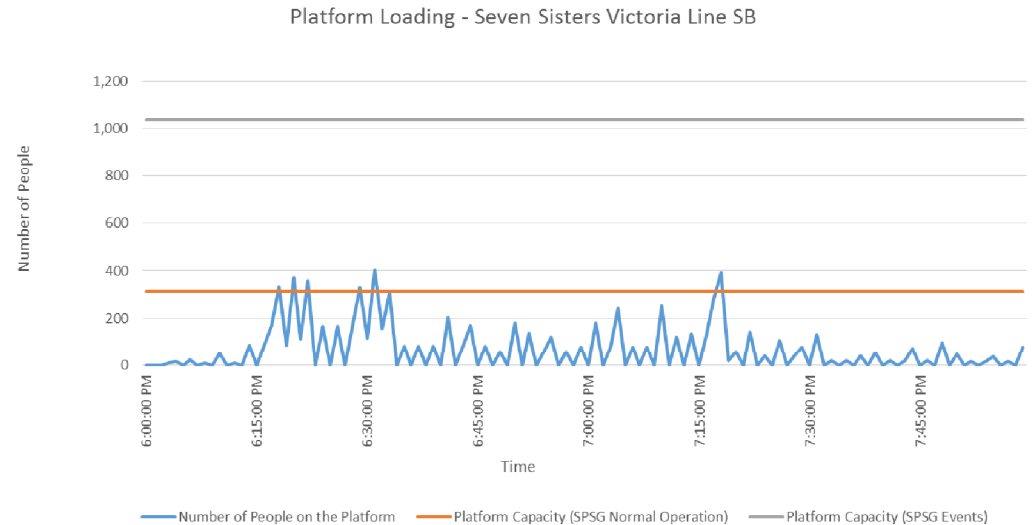
Post-match period - Interchange from NR to LU SB

- ⚠ At the base of the escalator, passengers descend further stairs to reach the Platform.
- ⚠ No queuing is expected.



Post-match i Platform SB

- ⚠ The SB Victoria Line Platform will be fed by two entry points at either end of the Platform.
- ⚠ Under SPSG Special Events guidance, the Platform has capacity for approximately 1,000 people. As indicated in this assessment, the peak anticipated occupancy is 400 passengers.
- ⚠ Whilst this suggests that conditions on the Platform during the post-match should operate safely without management intervention, any delay in service of more than two minutes at peak times may require access to be controlled.
- The available capacity on trains takes into account background users and spectators boarding at Tottenham Hale. For all but three occasions (18:15, 18:30 and 19:19), it will be possible for all passengers arriving on the platform to board the next train.



Conclusions

- ⚠ During the pre-match period, the interchange flows between LU and NR is the most challenging flow. This is principally due to the coincidence of high spectator flows and few Northbound services. The assessment shows that there will be occasions where some people will be unable to board the first northbound train.
- ⚠ During the post-match, assuming that the station infrastructure continues to operate at the same level of efficiency as has been observed in existing conditions, there will be some (limited) queuing outside the station on the High Road i with entry flows managed to match the internal capacity of the route through to the Victoria Line Southbound Platforms. The analysis indicates that these queues will be small, and any delays experienced would be a matter of minutes i and should be considered acceptable, particularly in the light of conditions elsewhere.

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