

Buckingham Group Contracting Ltd

170248 Headbolt Lane New Station GRIP 4 Pedestrian Analysis

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1.0 Introduction

Headbolt Lane Station – Pedestrian Analysis

1.1 Context

Headbolt Lane is an infrastructure project to extend the Merseyrail network from the existing terminating station at Kirkby to a new station to be constructed at Headbolt Lane.

The existing rail corridor comprises a single line. The Merseyrail network will be extended east from the existing terminating station at Kirkby, a new turnout will provide access to a new twin-track arrangement.

The existing Northern Rail station at Kirkby will be decommissioned and a new station interchange provided at Headbolt Lane. This new station will comprise three platforms, with two platform faces serving Merseyrail and a single platform face serving Northern Rail. Buffer stops will be provided to Merseyrail and Northern Rail to delineate between the two Train Operating Companies. The platforms will be connected by a station access arrangement replicating the operational functionality at the existing Kirkby station.

A new 300 space car park, with passive provision to increase to 500 spaces should demand require, and public transport interchange facilities will be provided at Headbolt Lane. Parking facilities for 100 cycles will be provided with passive provision for a further 200 spaces.

The scheme has been developed to GRIP 3 by Network Rail. Buckingham Group Contracting Ltd (BGCL) have been appointed to develop the design to GRIP 4, who in turn have appointed Arup to undertake design services.

This pedestrian analysis study presents a review of the station performance. It provides context of the station design and, where appropriate, has been supported by quantified analysis to demonstrate the capacity of the station to accommodate the forecast level of passenger demand. Engagement with Network Rail has been undertaken as part of the study to agree the approach to the analysis.

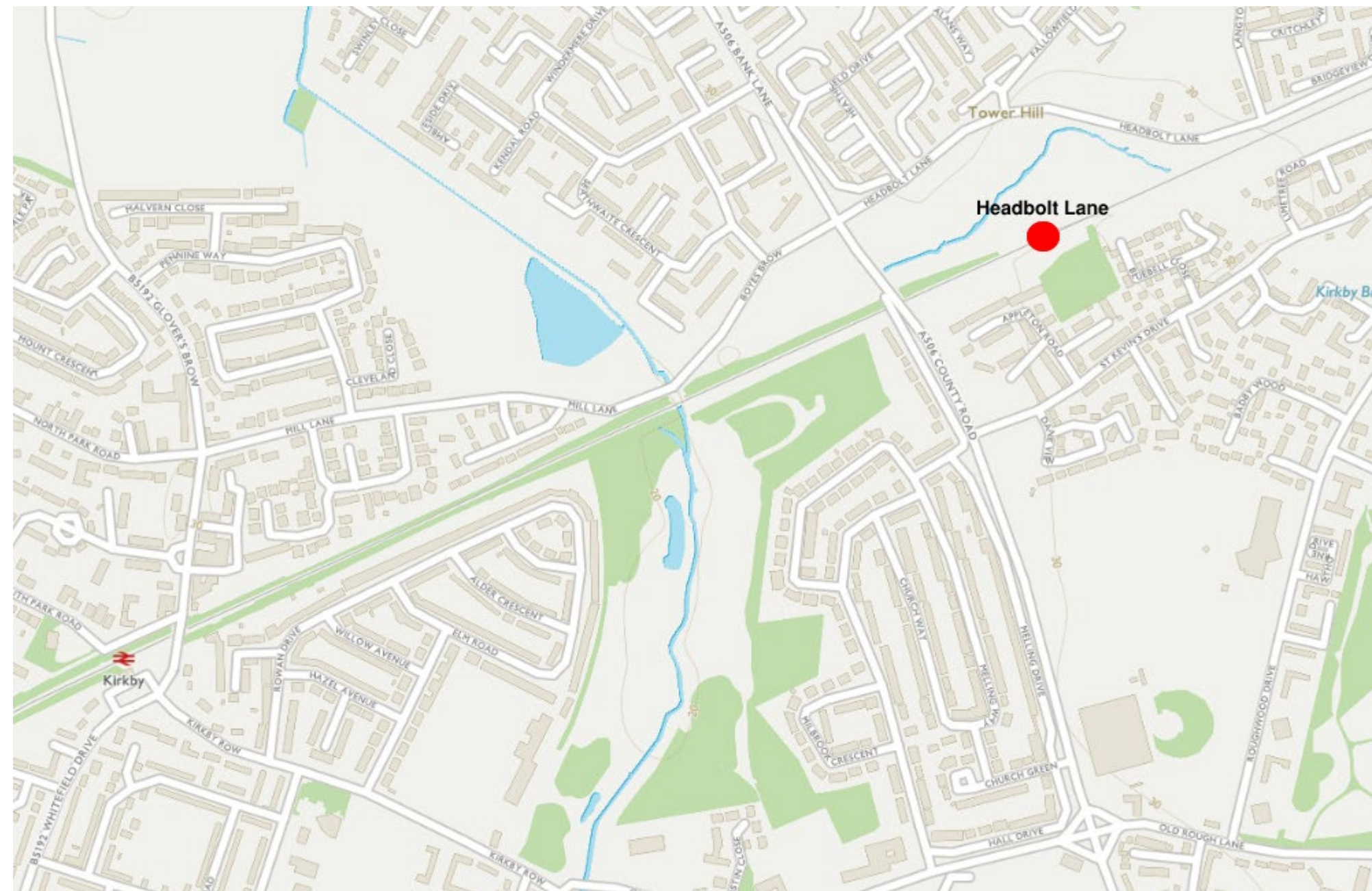


Figure 1 – Site location

2.0 Approach

Headbolt Lane Station – Pedestrian Analysis

2.1 Approach and scenarios

The existing terminating station at Kirkby has been used to determine key elements of the station design that will facilitate the movement of passengers.

Passenger count information has been provided by Merseyrail for the winter period in 2019 at Kirkby station (HBL-RFI-041) to provide the basis for the assessments. The assessments have been split into component parts to understand them in isolation, and to ensure compliance with Network Rail’s *Station Capacity Planning Guidance* (SCPG). A summary of each assessment is described below:

- 1) **Platforms** – assessments of all three platforms to determine capacities during peak periods under normal and service perturbation conditions; and
- 2) **Platform 1/2 connectivity** – an at grade crossing will be built for the opening of the Headbolt Lane station to provide a connection between platform 1 and 2 that will serve the Merseyrail train services.

It has been confirmed by Network Rail that ticket gates *are not* required within the station design (HBL-TQN-021). This analysis has therefore not been included within the report.

Forecast passenger demand modelling outputs from work undertaken in GRIP 2 have been provided for the future year scenarios of 2024, 2030 and 2040 (HBL-RFI-042). A requirement for the project is to demonstrate the design can safely operate with 3 million passengers per annum (HBLG4-002). Using each of these approaches, the capacity of the station design has been assessed using the following scenarios:

- **Opening year** – the station is anticipated to open in 2023. Forecast passenger demand for 2024 has been used as a representative data set for this opening year;
- **Future year** – based on 3 million passengers per annum; and
- **Service perturbation** – the busiest 15-minute period and the busiest train service using the 2024 forecast passenger demand.

It should be noted that 2030 and 2040 future year assessments have not been included in the study. Further context is provided in Section 4.4.



Platforms



Platforms 1/2 connectivity

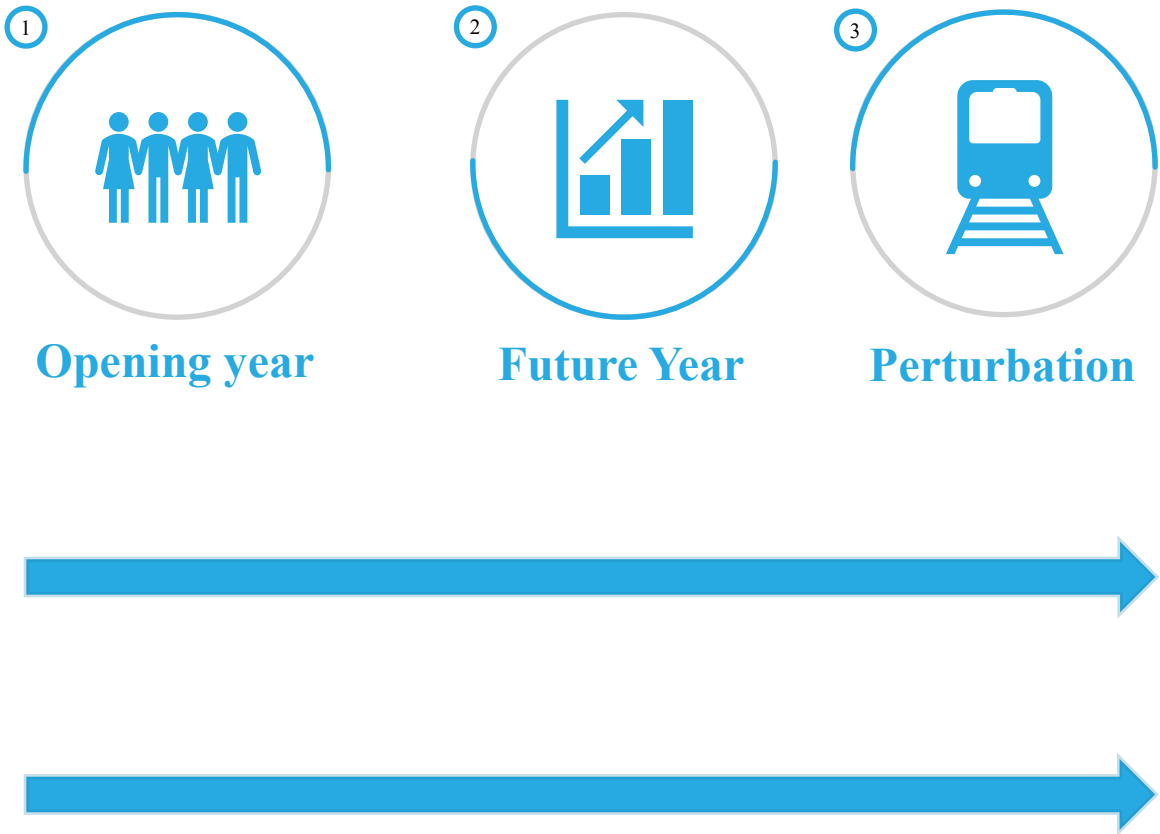


Figure 2 – Pedestrian flow scenarios

3.0 Station Layout

Headbolt Lane Station – Pedestrian Analysis

3.1 Proposed station layout

The new station at Headbolt Lane will comprise of the following transport connections:

- 1) The main transport access will be to/from Headbolt Lane where the station building will be located;
- 2) Pedestrian access to/from St Kevin's Drive forming a secondary access;
- 3) A 100 cycle parking hub with passive provision for a further 200 cycle spaces;
- 4) Bus interchange accommodating 2 bus stops;
- 5) A new 300 space car park with passive provision for a further 200 spaces;
- 6) A pick-up/drop off location for taxis and cars;
- 7) Two platform faces serving Merseyrail (platforms 1/2);
- 8) A single platform face serving Northern Rail (platform 3); and
- 9) At grade crossing providing connections to/from Platform 2.

Each of these elements of the station are illustrated in Figure 3.

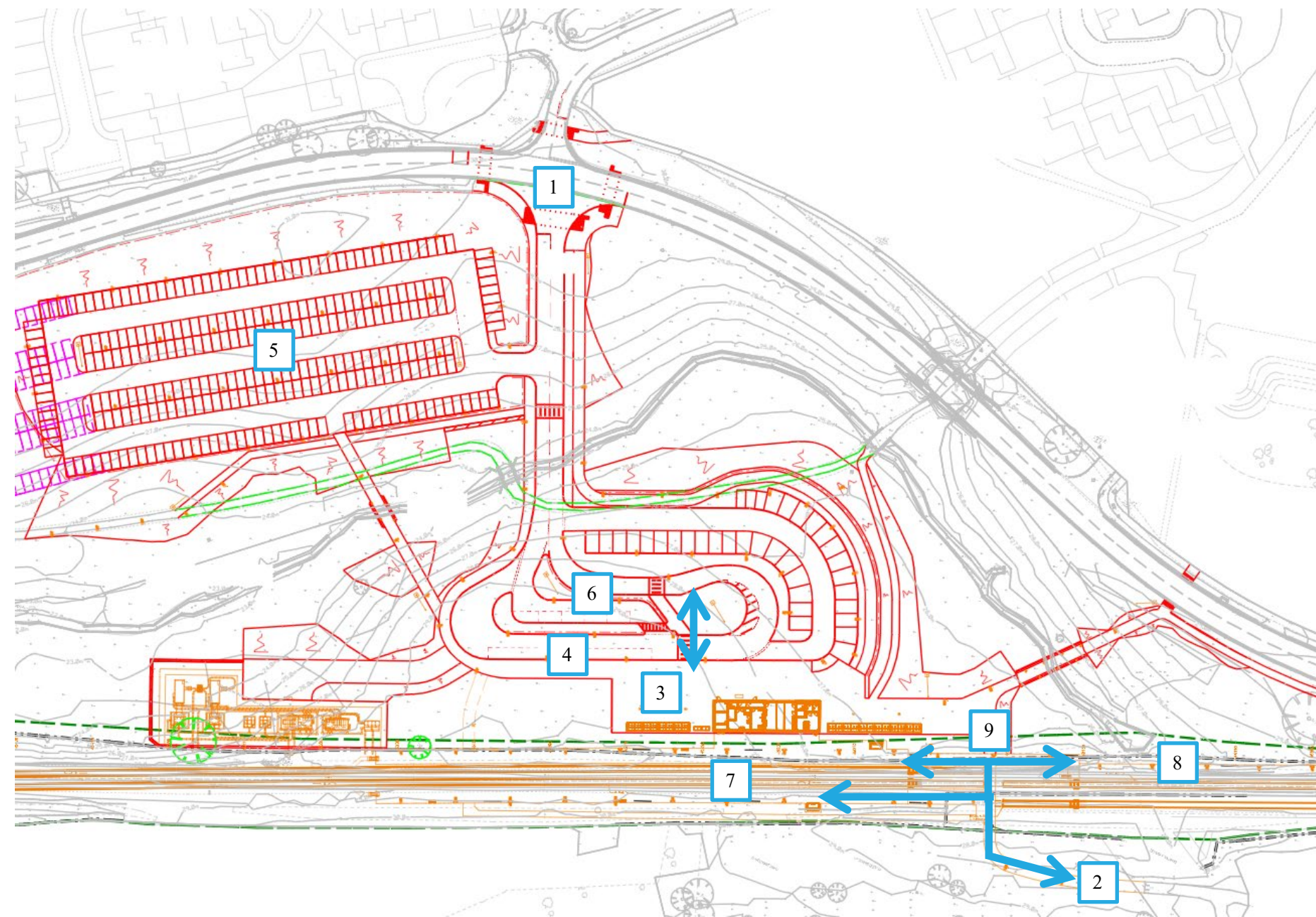


Figure 3 – Headbolt Lane station transport connections

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.1 Assumptions

A number of assumptions have been used to form the basis for the pedestrian analysis to understand the capacity of the station elements to accommodate passengers under different scenarios. The following assumptions have been made to inform the analysis undertaken in this study:

- The timetable will be the same as Kirkby station i.e. in terms of frequency of service and dwell time at the station;
- Rolling stock will comprise of Class 777 and 195 for the Merseyrail and Northern rail services respectively;
- Class 777, 8-car units will operate during the peak periods;
- The proportional split of Kirkby passengers (i.e. boarders and alighters) is reflective of the boarding / alighting split at Headbolt Lane station. This has been derived from the passenger count information undertaken at Kirkby station in Winter 2019;
- The forecast passenger demand outputs from GRIP 2 have been provided to understand the change in passengers numbers forecast to use the station between the station opening in 2024, 2030 and 2040;
- The assessment should be undertaken to demonstrate that the design is capable of safely managing 3 million passengers per annum. This criteria has been used as an upper limit of passengers that will use the station;
- Office for Rail and Road (ORR) estimates that c. 3 million passengers used Kirkby station in 2019. The passenger count information provided (i.e. boarders and alighters for each train service) for Kirkby station is therefore considered to be a representative passenger demand that could use Headbolt Lane to assess the impact of 3 million passengers per annum;
- A 5% of passengers interchange between Merseyrail and Northern rail services. This estimate has been provided by Merseyrail. This rate of interchange has been used for Northern rail also. Passenger movements have been assessed as part of the analysis for the at grade crossing to/from platform 2;
- It has been confirmed by Network Rail that ticket gates *are not* required within the station design (HBL-TQN-021);

and

- The station design has seating and waiting shelters provided across all platforms. These have been excluded from the assessments to provide a worst-case of passengers waiting on the platforms.

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.2 Timetable

This study has been progressed on the basis that Headbolt Lane station will use the same timetable schedule as currently used at Kirkby station. A summary of the key details included in the Kirkby timetable is provided below, with an illustration of the train services during the AM and PM peak periods provided in Figure 4.

- There are a total of 4 Merseyrail trains per hour (tph) (170248-HBL-CRD-REQ-270) between Kirkby and Liverpool Central, resulting in c. 60 train services per day;
- Kirkby station is a terminating station and there is therefore an amount of dwell time between a train service arriving and departing;
- There is approximately 4 minutes between a Merseyrail train service arriving and the next one departing towards Liverpool Central, resulting in a cumulative 16 minutes whereby there is a train is waiting on the platform;
- There are two Northern tph between Kirkby and Manchester Victoria at peak times (i.e. 08:00-09:00), however throughout a typical day there is approximately 1tph on average (1170248-HBL-CRD-REQ-280), resulting in 14 train services per day; and
- The amount of time Northern rail services stopover at the station is variable. For the purposes of the assessment and understanding of the timetable, the following has been derived:
 - 1) AM Peak, 08:00-09:00 (see Figure 4). There is a total of 21 minutes of stopover time at Kirkby station; and
 - 2) PM Peak, 17:00-18:00. There is a total of 8 minutes of stopover time at Kirkby station.

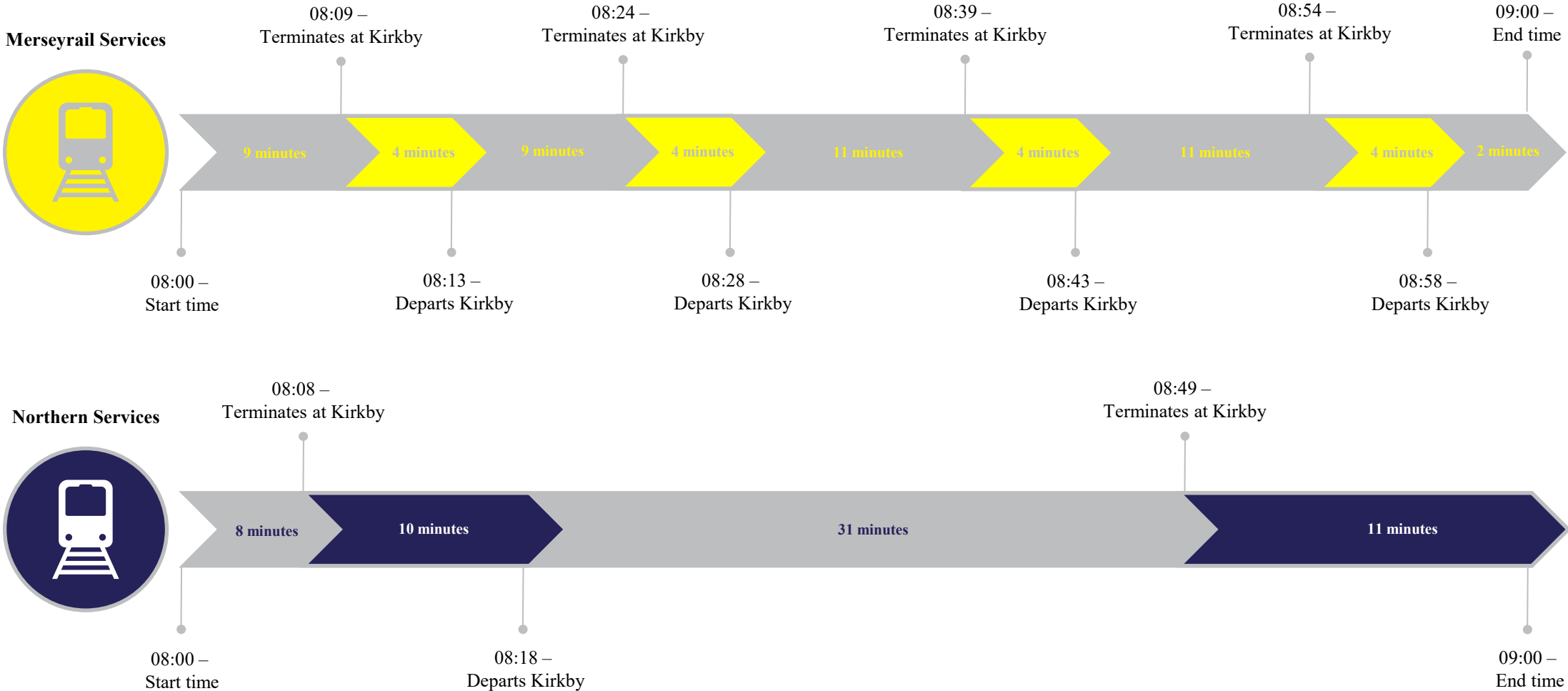


Figure 4 – Kirkby station timetable (08:00-09:00)

4.0 Capacity Assessments

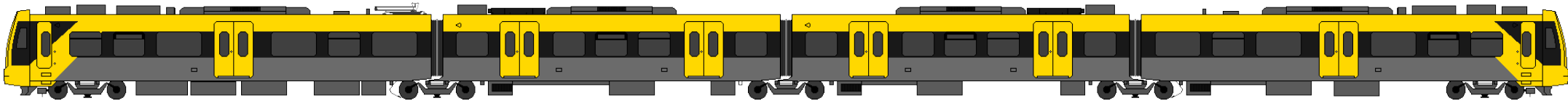
Headbolt Lane Station – Pedestrian Analysis

4.3 Rolling stock

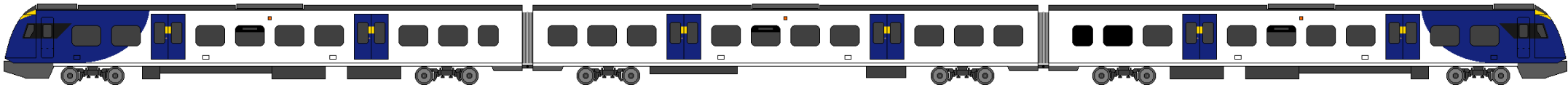
Class 777 trains will be operating on the Merseyrail network, and Class 195 trains will serve the Northern Rail platform at Headbolt Lane station at the time the new Headbolt Lane station is opened. Train specification information has been provided by Merseyrail (HBL-RFI-040) and Network Rail (HBL-RFI-045) to provide context on the following:

- Seated capacity;
- Standing capacity;
- Door dimensions;
- Door locations;
- Car lengths; and
- Total 4 and 8-car train lengths (Meyseyrail) and 3 and 6-car train lengths (Northern Rail).

Information relating to the Class 777 and 195 trains detailed above is provided in Figure 5. The information will be used as part of the station assessments in Section 4.



Class 777	Specification
Seated capacity	184 (4-car), 368 (8-car)
Standing capacity	291 (4-car), 582 (8-car)
Door dimensions	Width 1300mm, Height 1950mm
Door locations	x1 set on each leading cars (Both sides) x2 set each on two middle cars
Car lengths	Leading Car B - 18.13m, Car C - 14.36m, Car D - 14.36m, Car A - 18.13m
Total 4 and 8-car train length (m)	64.98 (4-car), 129.96 (8-car)



Class 195	Specification
Seated capacity	204 (3-car), 408 (6-car)
Standing capacity	142 (3-car), 284 (6-car)
Door dimensions	Width 1300mm, Height 1950mm
Door locations	X2 set on all cars
Car lengths	DMS - 24.03m, MS - 23.35m, DMS - 24.03m
Total 3 and 6-car train length (m)	71.41 (3-car), 142.82 (6-car)

Figure 5 – Class 777 and 195 rolling stock specifications

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.4 Passenger count information

Passenger count information has been provided for the 2019/20 winter period at Kirkby station (HBL-RFI-042). The data covers the following:

- Merseyrail arrivals/departures only;
- Weekday and weekend (both Saturday and Sunday);
- Full day of services (i.e. between 05:00 and 23:00).

The full outputs from the survey are presented in Appendix A, with a summary provided below and in Figures 6 and 7 for the weekday passenger count information:

- There were c. 5,000 Merseyrail passengers using the Kirkby station, comprising of c. 2,600 boarding and c. 2,400 alighting passengers over the course of the surveyed weekday;
- The number of people boarding services was weighted to morning travel i.e. towards Liverpool Central, with 66% of boarding demand using services in the AM period;
- The peak boarding happened between 08:00-09:00 with over 200 people boarding the busiest service (i.e. 08:13);
- Almost 20% of all the daily boarding demand occurred between 08:00-09:00;
- The number of people alighting services was significantly weighted towards the afternoon/evening travel i.e. from Liverpool Central, with 85% of alighting demand using services in the PM period;
- The peak alighting happened between 17:00-18:00 with almost 200 people alighting the busiest service (i.e. 17:24);
- Almost 25% of all the daily alighting demand occurred between 17:00-18:00;
- There were c. 5,000 Merseyrail passengers, comprising c. 2,900 boarding and c. 2,000 alighting passengers recorded on a Saturday. The distribution of passengers boarding and alighting was ‘flatter’ over the course of the Saturday survey; and
- On the Sunday, the amount of passengers using Merseyrail services reduced significantly to c.2,000 comprising of c. 950 boarding and c. 900 alighting passengers.

Merseyrail have estimated that 5% of passengers using Kirkby are also using the Northern Rail services (i.e. they interchange between Merseyrail and Northern rail services). No detailed passenger count information has been provided for Northern Rail services. It has therefore been assumed that 5% of Northern rail passengers interchange onto Merseyrail train services.

As detailed in Section 4.1, ORR estimates that c. 3 million passengers used Kirkby station in 2019. The data provided in Appendix A for the 2019/20 winter period at Kirkby station has therefore been assumed to be representative of the demand that could use the Headbolt Lane station when it is open i.e. the number of people boarding and alighting train services. This information has therefore been used directly in the assessment to demonstrate the capacity of the station to safely operate with 3 million passengers per annum.

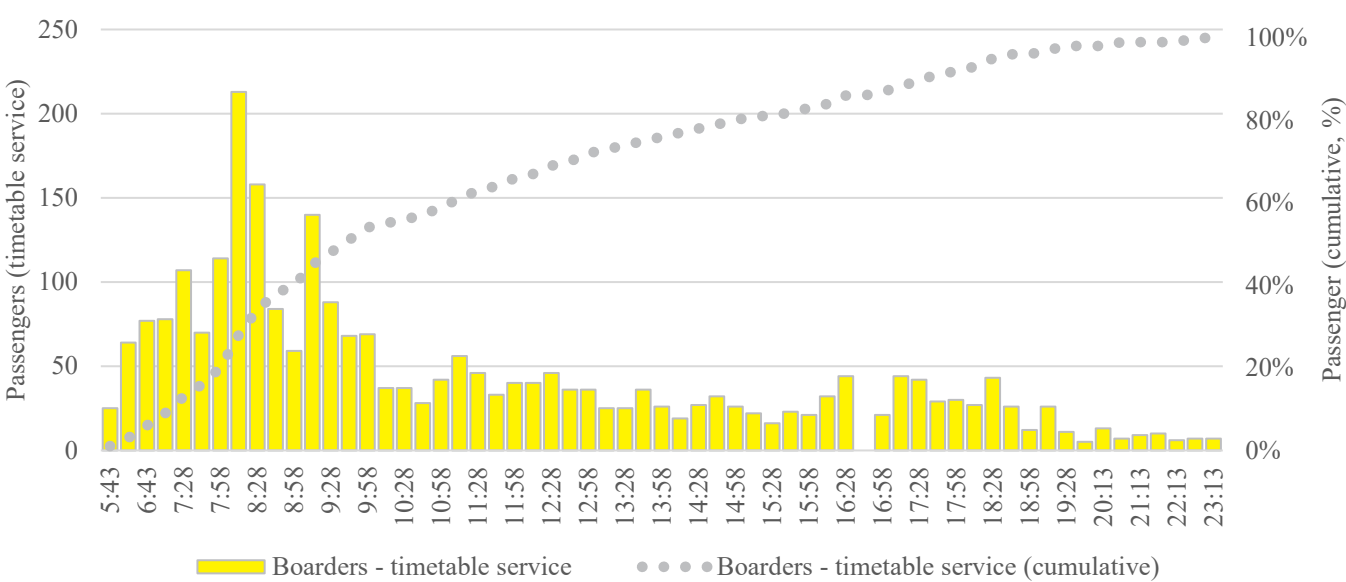


Figure 6 – Weekday boarders by timetable Merseyrail service at Kirkby station (winter 2019 surveys)

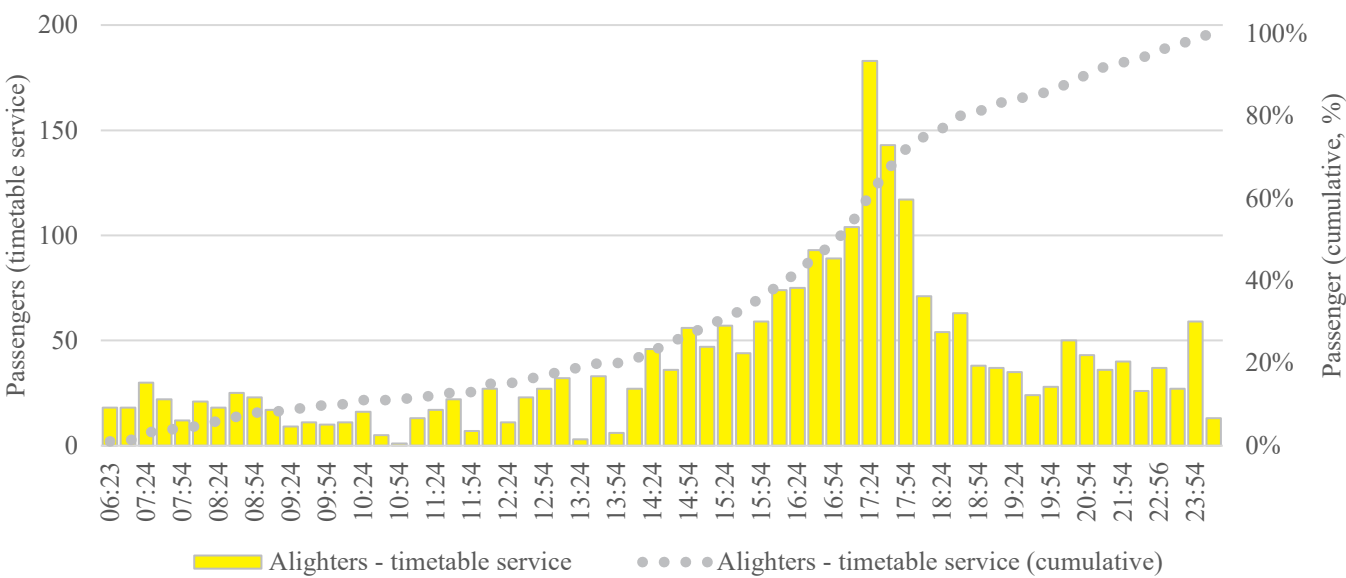


Figure 7 – Weekday alighters by timetable Merseyrail service at Kirkby station (winter 2019 surveys)

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.5 Forecast passenger demand

Forecast passenger demand outputs from GRIP 2 have been provided for Headbolt Lane station. This information covers the following:

- Merseyrail forecast passenger demand – annual only;
- Northern forecast passenger demand – daily and annual; and
- Forecast passenger demand covering 2024, 2030 and 2040.

The annual information has been de-annualised to derive a daily forecast amount of passengers for Merseyrail services. A de-annualisation factor of 313 has been used to reflect the level of busyness being relatively consistent between Monday-Saturday i.e. excluding Sunday passengers. A review of the information is provided below and illustrated in Figure 8:

- At the year of opening (2024), the annual forecast passenger demand for Merseyrail train services is anticipated to be c. 750,000;
- The forecast passenger demand remains broadly static up to 2030, with a minor decrease in demand forecast in 2040, to c. 730,000;
- Using the factor of 313 to derive a typical busy weekday/Saturday daily passenger demand, the daily number of passengers using the Merseyrail train services is between 2,000 – 2,500;
- The annual passenger demand for Northern trains is forecast to be c. 50,000 in 2024. This level of passenger demand is forecast to remain broadly static up to 2030 and 2040; and
- The daily number of passengers using the Northern train services is c. 100 for all assessment years.

The capacity assessments have used the outputs from the proportional split of alighting and boarding passengers, detailed in Section 4.4, with the forecast passenger demand to derive the passenger demand for Headbolt Lane station.

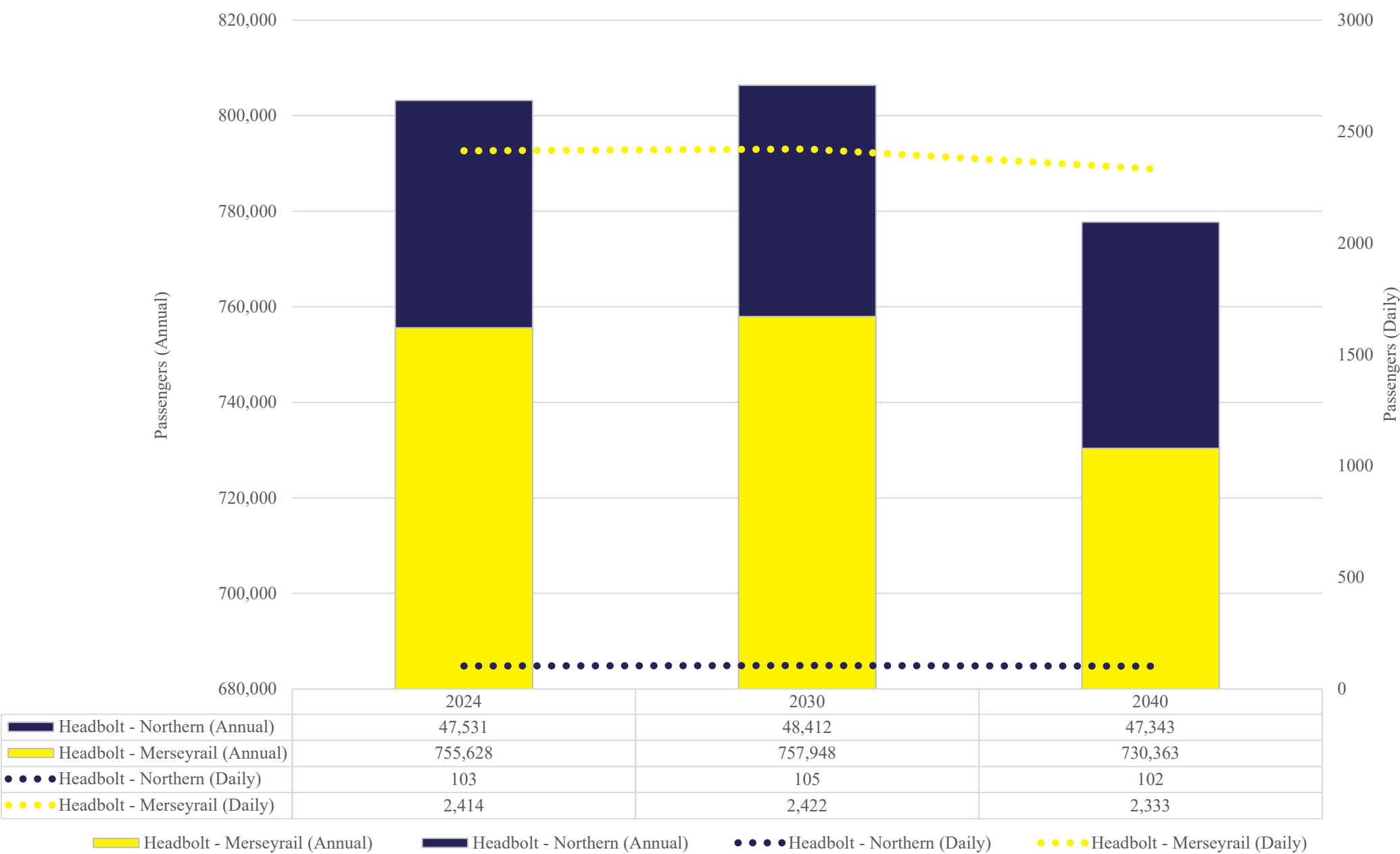


Figure 8 – Forecast passenger demand for Headbolt Lane station

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.6 Assessment criteria

The assessment criteria used for this analysis are in keeping with the overarching principles outlined within Network Rail’s *Station Capacity Planning Guidance (2016)*. The focus for the assessment will be on the following elements of the station and the capacity planning criteria:

- **Platforms** – “Boarding and alighting zone shall accommodate all boarding and alighting passengers at a density of 0.93m² per person (queuing LoS B/C).”
- **Passageways** – “Average flow rate during the peak 5 minutes should not exceed the planning criteria of 40ppmm.”

Perturbation conditions have been assessed for the platforms using a maximum density of 0.28m² per person (queuing LoS E).

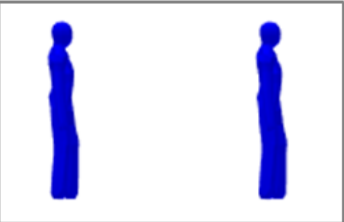
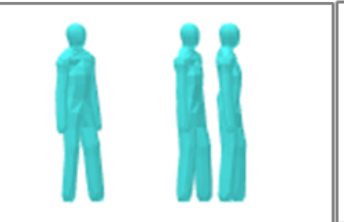
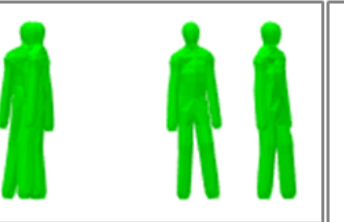
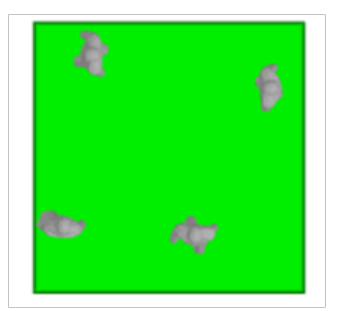
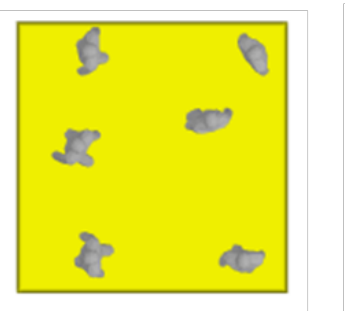
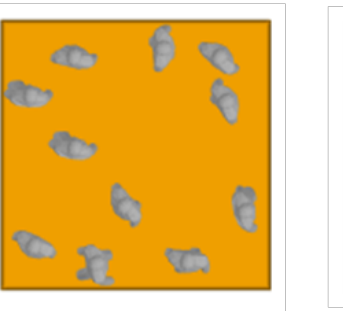
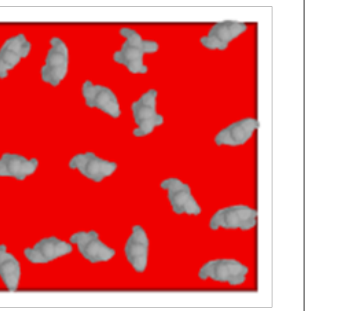
LoS A	LoS B	LoS C	LoS D	LoS E	LoS F
					
					
LoS A – Free circulation	LoS B – Uni-directional flows and free circulation. Minor conflicts if reverse direction or cross flows	LoS C – Slightly restricted circulation and passing. High probability of conflict on reverse and cross flow movements	LoS D – Restricted circulation for majority. Severely restricted reverse and cross flow movement	LoS E – Restricted circulation for all. Extreme difficulty for reverse and cross flow movements	LoS F – Complete breakdown in flow

Figure 9 – Fruin Level of Service and Network Rail planning criteria for stations

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.7 Station design

The station elements that will form the basis for the capacity assessments are as follows:

- 1) Platform capacity for platforms 1 and 2 (Section 4.8 - 4.11);
- 2) Platform capacity for platform 3 (Section 4.12); and
- 3) Platform 1/2 connectivity – at grade crossing (Section 4.13).

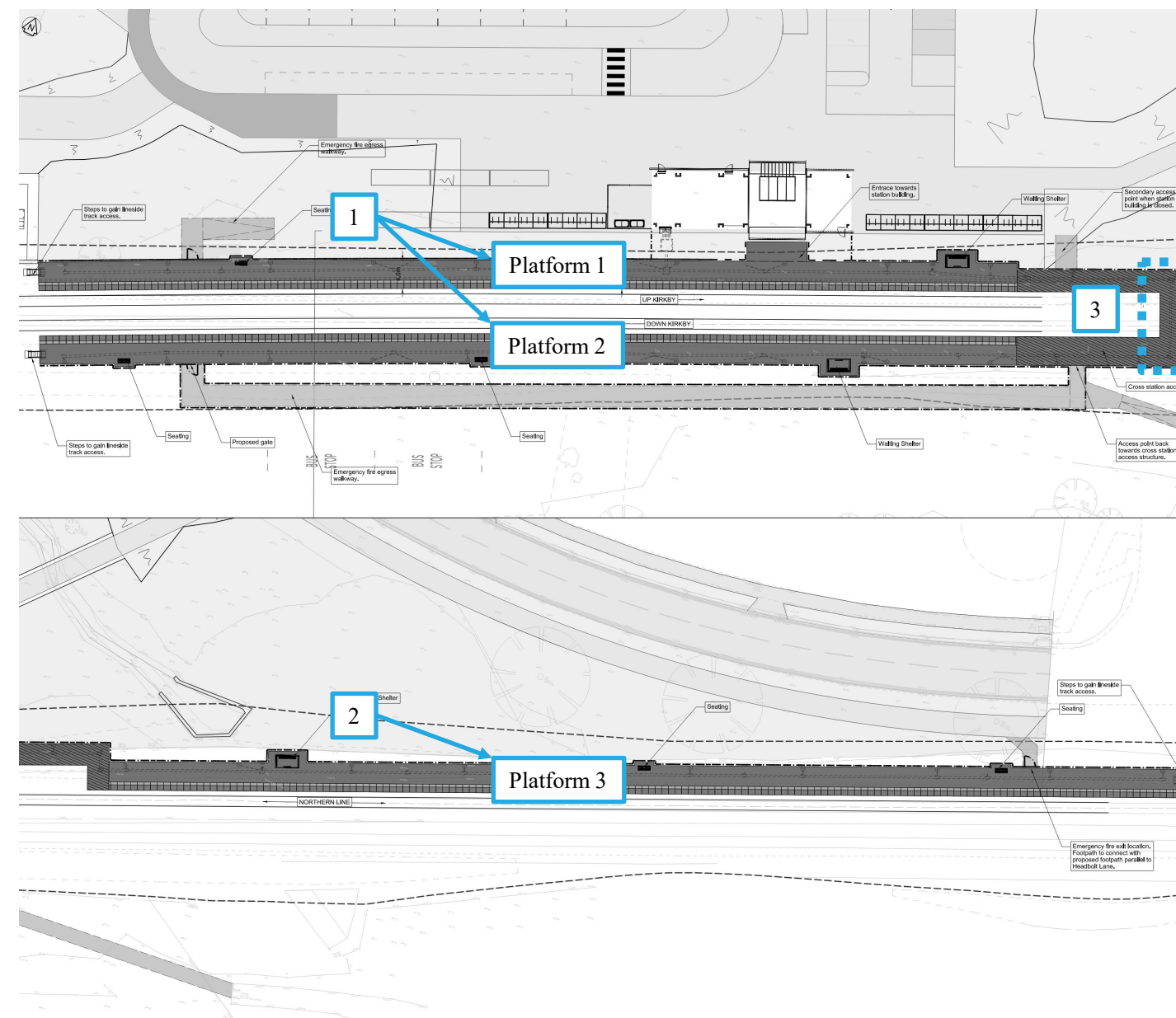


Figure 10 – Headbolt Lane station design

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.8 Platform areas

To inform the assessments of capacity of each platform, the areas available for the following has been measured:

- Full platform area available for Merseyrail passengers on platform 1 and 2; and
- Full platform area available for Northern rail passengers on platform 3.

The station design allows for ingress/egress movements to be undertaken via the station building and the southern access. It is considered that a large proportion of boarding passengers will choose to wait within close proximity to the station building. The capacity assessments have therefore used the following approach to determining the efficacy of each platform to ensure adequate space is provided during the busiest periods of the day and under perturbation conditions:

Platform 1 and 2

- Assess the capacity of platform if all passengers use the space allowing access to car 1-4 i.e. 80m²; and
- Assess the capacity of platform if all passengers use the space allowing access to:
 1. Car 1-5 – 105m²
 2. Car 1-6 – 125m²
 3. Car 1-7 – 145m²
 4. Car 1-8 – 165m²

Platform 3

- Assess the capacity of platform if all passengers use the space allowing access to car 1-3 i.e. 90m² and
- Assess the capacity of platform if all passengers use the space allowing access to:
 1. Car 1-4 – 120m²
 2. Car 1-5 – 150m²
 3. Car 1-6 – 180m²

The station design has seating and waiting shelters provided across all platforms. These have been excluded from the assessments to provide a worst-case of passengers waiting on the platforms.

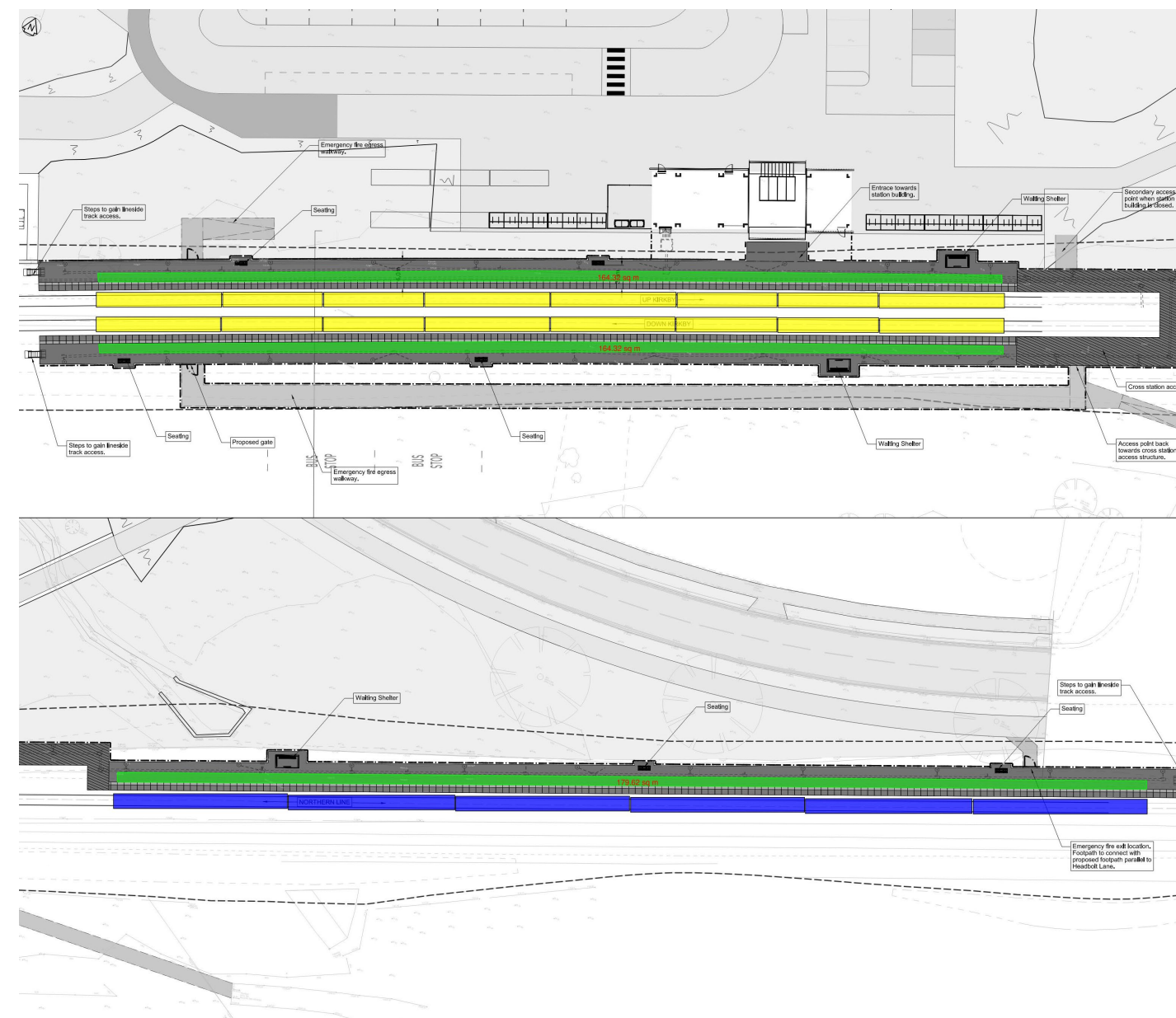


Figure 11 – Headbolt Lane station platform areas

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.9 Platform 1 and 2 capacity

An assessment has been undertaken to identify the platform capacity for Merseyrail services at platform 1 and 2, to assess the potential impacts of crowding in certain areas of the station i.e. the area next to the station building. The assessment has focussed on the busiest part of the day for ingress passenger demand (08:00-09:00) derived from the passenger counts undertaken at Kirkby station in 2019 to reflect the busiest conditions for the build-up of passengers on the platform. The assessment accounts for the impact of the following:

- Passengers arrive over a 15-minute duration;
- The arrival profile assumes c. 90% passengers are on the platform before the train arrives at the station; and
- The terminating train services act as a ‘virtual platform’ and is available to passengers for the duration of the turnaround i.e. 4 minutes.

The analysis provides a summary of the build-up of passengers on either platform 1 or 2. The results show that there could be as many as 190 passengers waiting on either platform 1 or 2 i.e. for the 08:16 Merseyrail service, when using the data directly derived from the Kirkby services.

Using the forecast demand for the 2024, there would be as many as 90 passengers waiting on either platform 1 or 2.

Further analysis has been undertaken in Section 4.10-4.13 to show the build-up of passengers relative to the capacity of the platforms. The assessments also consider the impact of service perturbation, and the impacts of the cancellation of a train service.

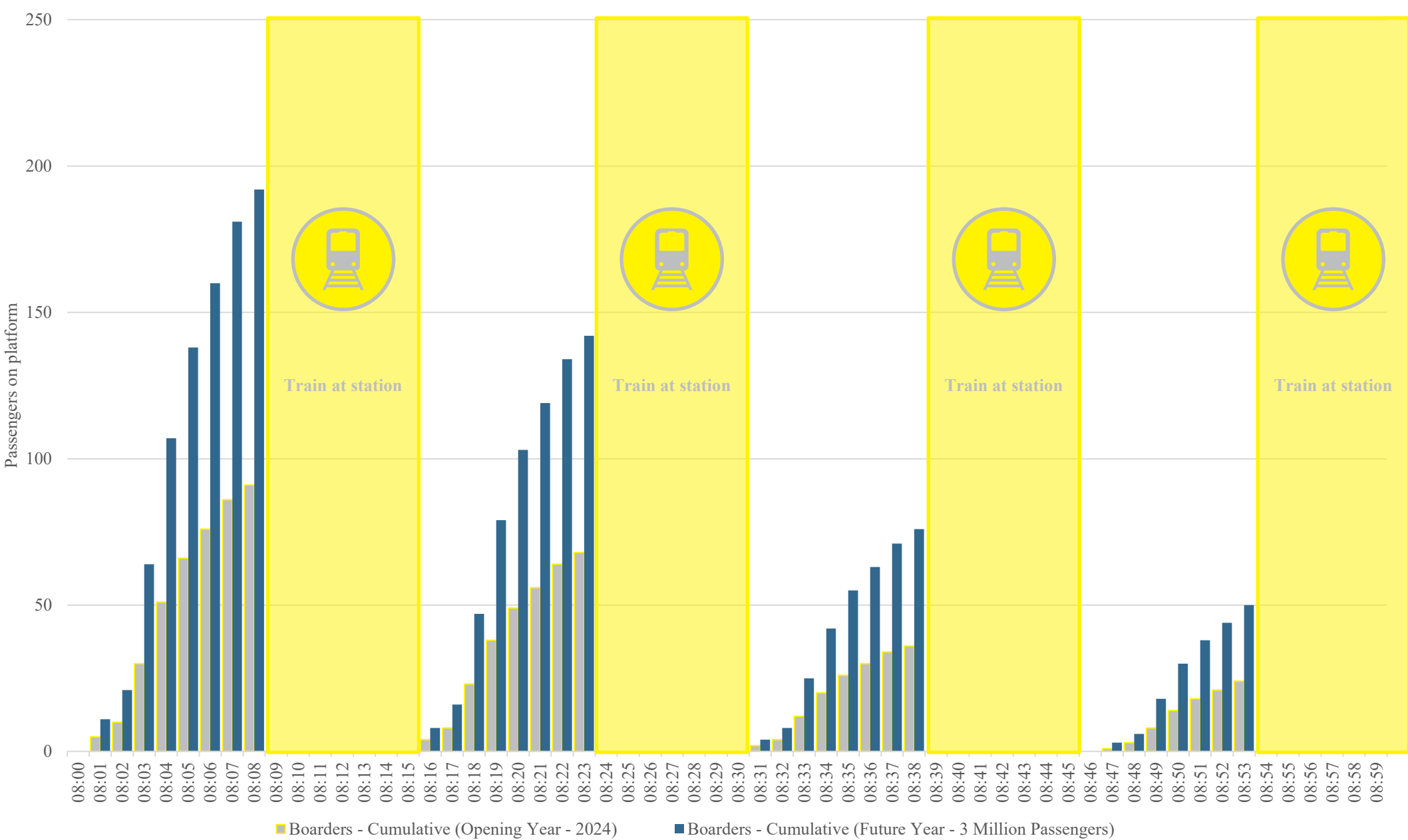


Figure 12 – Cumulative passengers waiting on platform 1/2

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.10 Platform 1 and 2 capacity – normal conditions (opening year)

An assessment has been undertaken to understand the capacity of the platforms using the following criteria to ensure compliance with Network Rail’s SCPG:

- Boarding and alighting zone shall accommodate all boarding and alighting passengers at a density of 0.93m² per person (queuing LoS B/C).

The initial analysis has been undertaken using the forecast demand to provide a summary of the build-up of passengers on the either platform 1 or 2. The results show the following:

- If all passengers were to wait in the area a 4-car train service would stop, the density of the people waiting in this area would exceed LoS B/C for a short period of time i.e. 2 minutes;
- At all other time periods in the peak hour, and throughout the duration of the day, the platforms would operate well within LoS B/C with sufficient capacity for the area near the main building; and
- There is sufficient capacity within the station design to accommodate the forecast number of passengers under normal conditions.

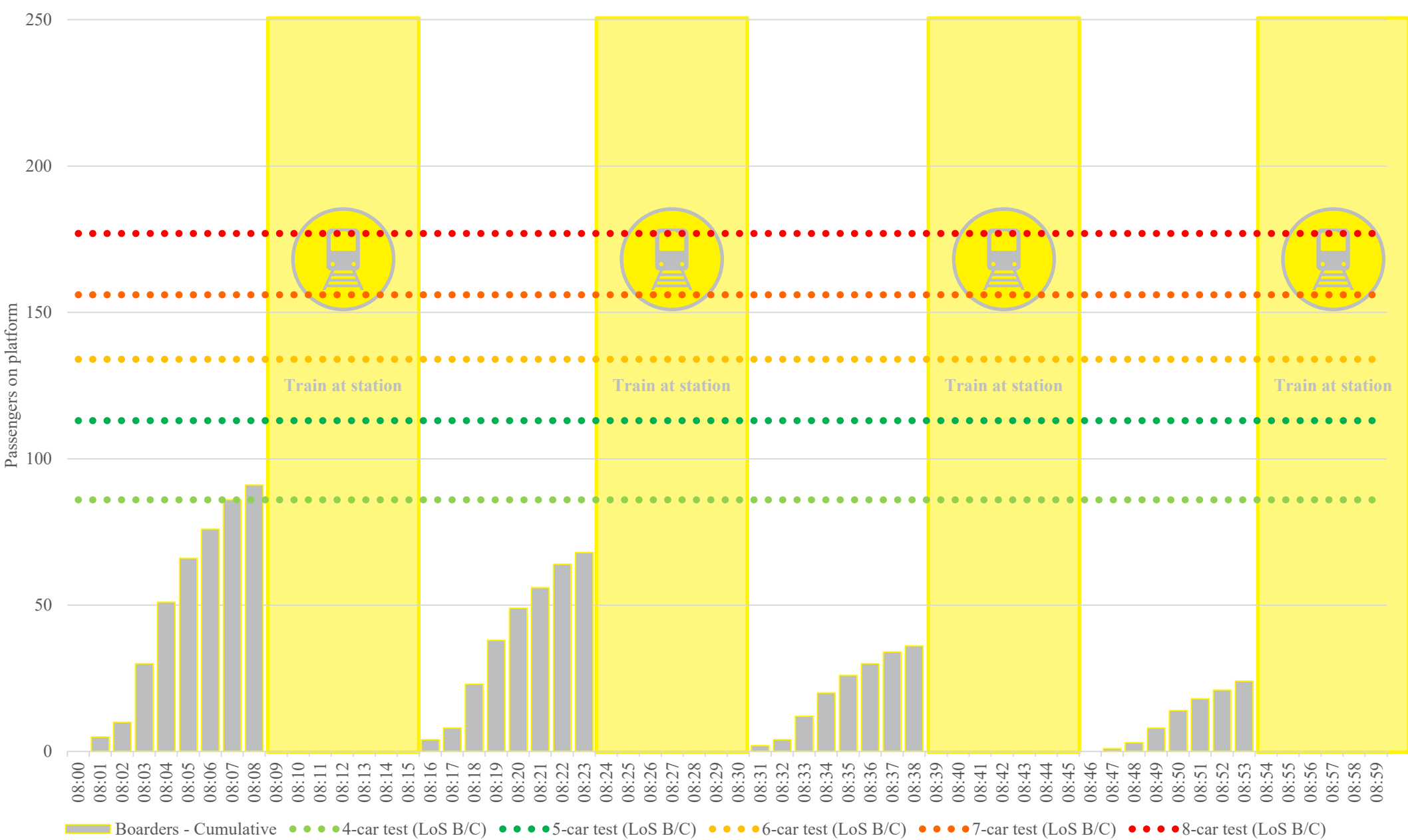


Figure 13 – Cumulative passengers waiting on platform 1/2 normal conditions (Opening year – 2024)

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.11 Platform 1 and 2 capacity – normal conditions (future year)

Analysis has been undertaken using the Kirkby station demand to provide a summary of the build-up of passengers on the either platform 1 or 2 to understand the capabilities of the station to accommodate 3 million passengers per annum. The results show the following:

- There 08:16 service would require the use of the full platform to accommodate waiting passengers;
- There is a potential for small period of time to exceed the LoS B/C i.e. 2 minutes. This is considered to be acceptable due to the small period of time that these conditions are likely to be prevalent;
- At all other time periods in the peak hour, and throughout the duration of the day, the platforms would operate well within LoS B/C with sufficient capacity for the area near the main building;
- When assessing the capacity of the platform using LoS (0.65m² per person) the results show that there is enough capacity in the 6-car waiting area; and
- The results demonstrate that the full platform has capacity to accommodate the busiest service from a platform loading perspective. The exclusion of the waiting areas and seating from the assessment, in addition to c. 90% arriving at the platform before the train arrives, results in a robust analysis to test the platform capacity.

As indicated in Section 4.2, there are periods of time when trains are at the station and passengers can board. However, for approximately 45 minutes per hour there is no train. The detailed design should explore options to provide cover (canopies) for the periods of time when a train is not at the station. This will limit the amount of passengers using the station building during busy periods of the day and will ensure that the platforms are utilised for 8-car services.

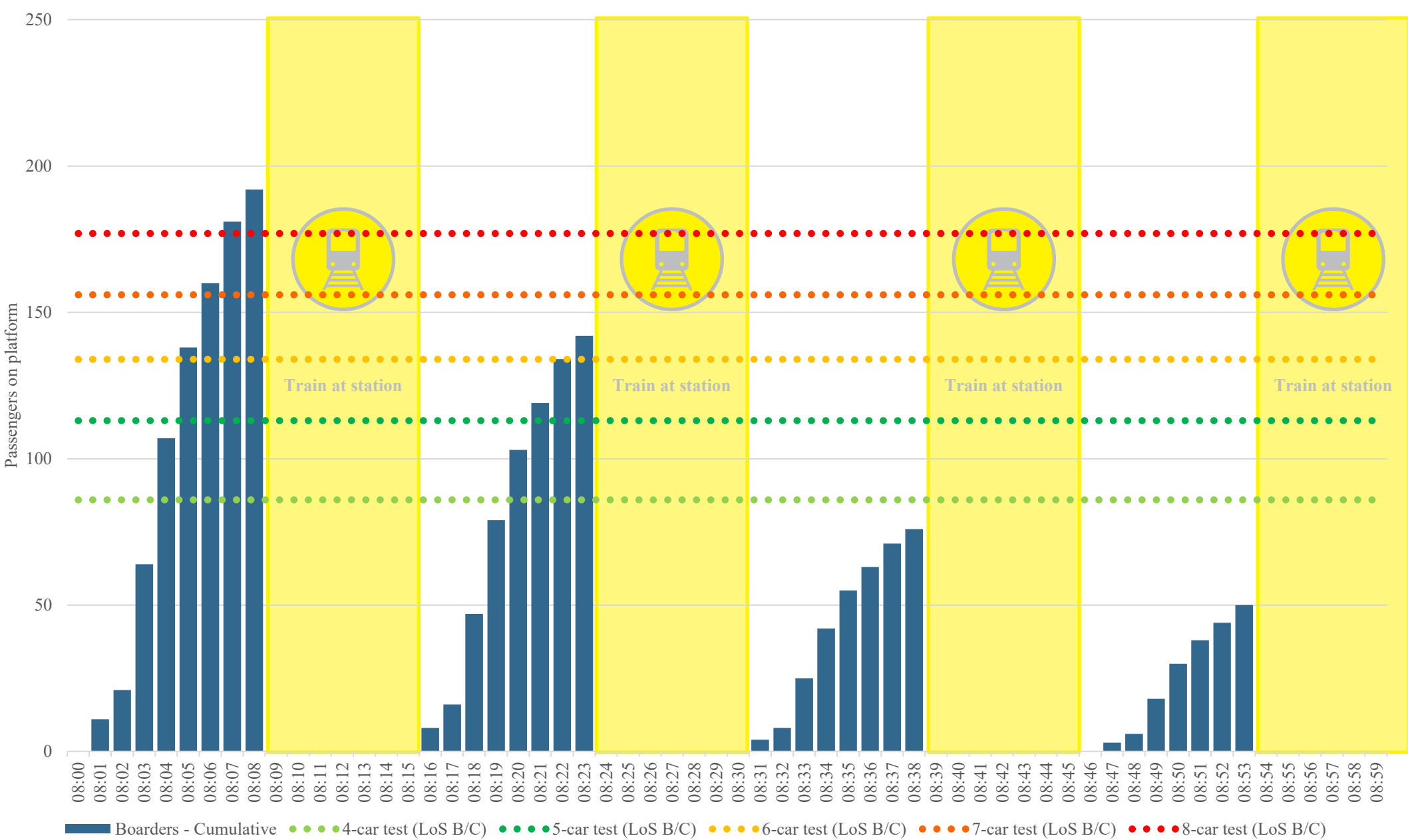


Figure 14 – Cumulative passengers waiting on platform 1/2 normal conditions (Future year – 3 million passengers)

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.12 Platform 1 and 2 capacity – perturbation conditions (opening year)

An assessment has been undertaken to assess the capacity of the station under perturbation conditions. The following approach has been taken to ensure compliance with Network Rail’s SCPG:

- Cancellation of a train service for the busiest 15-minute period and the busiest train service; and
- Maximum density of 0.28m² per person (queuing LoS E).

The analysis using the forecast demand provides a summary of the build-up of passengers on the either platform 1 or 2. The results show the following:

- If all passengers were to wait in the area a 4-car train service would stop, the density of the people waiting in this area would be well within LoS E; and
- There is sufficient capacity for people to wait in the 4-car boarding area, and therefore sufficient capacity across the length of the platform under perturbation conditions.

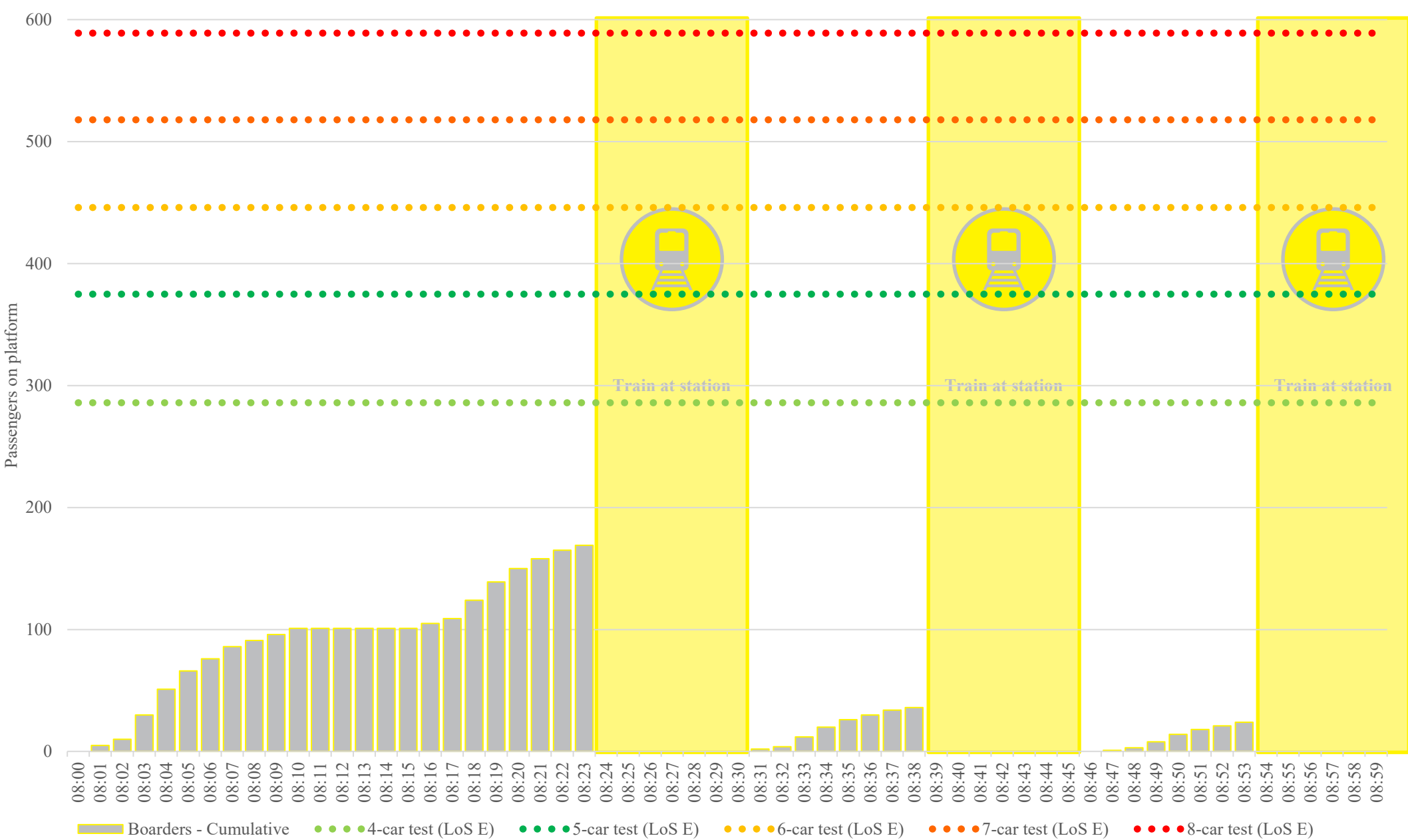


Figure 15 – Cumulative passengers waiting on platform 1/2 perturbation (Opening year – 2024)

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.13 Platform 1 and 2 capacity – perturbation conditions (future year)

The analysis provides a summary of the build-up of passengers on the either platform 1 or 2 to understand the capabilities of the station to accommodate 3 million passengers per annum during perturbation conditions using the Kirkby boarding and alighting passenger count information. The results show the following:

- The results demonstrate that the amount of passengers waiting in the 4-car waiting area would exceed it’s capacity for approximately 5 minutes;
- The 5-car waiting area has enough capacity for passengers waiting on the platform during service perturbation; and
- There is sufficient capacity for people to wait in the 4-car boarding area, and therefore sufficient capacity across the length of the platform under perturbation conditions.

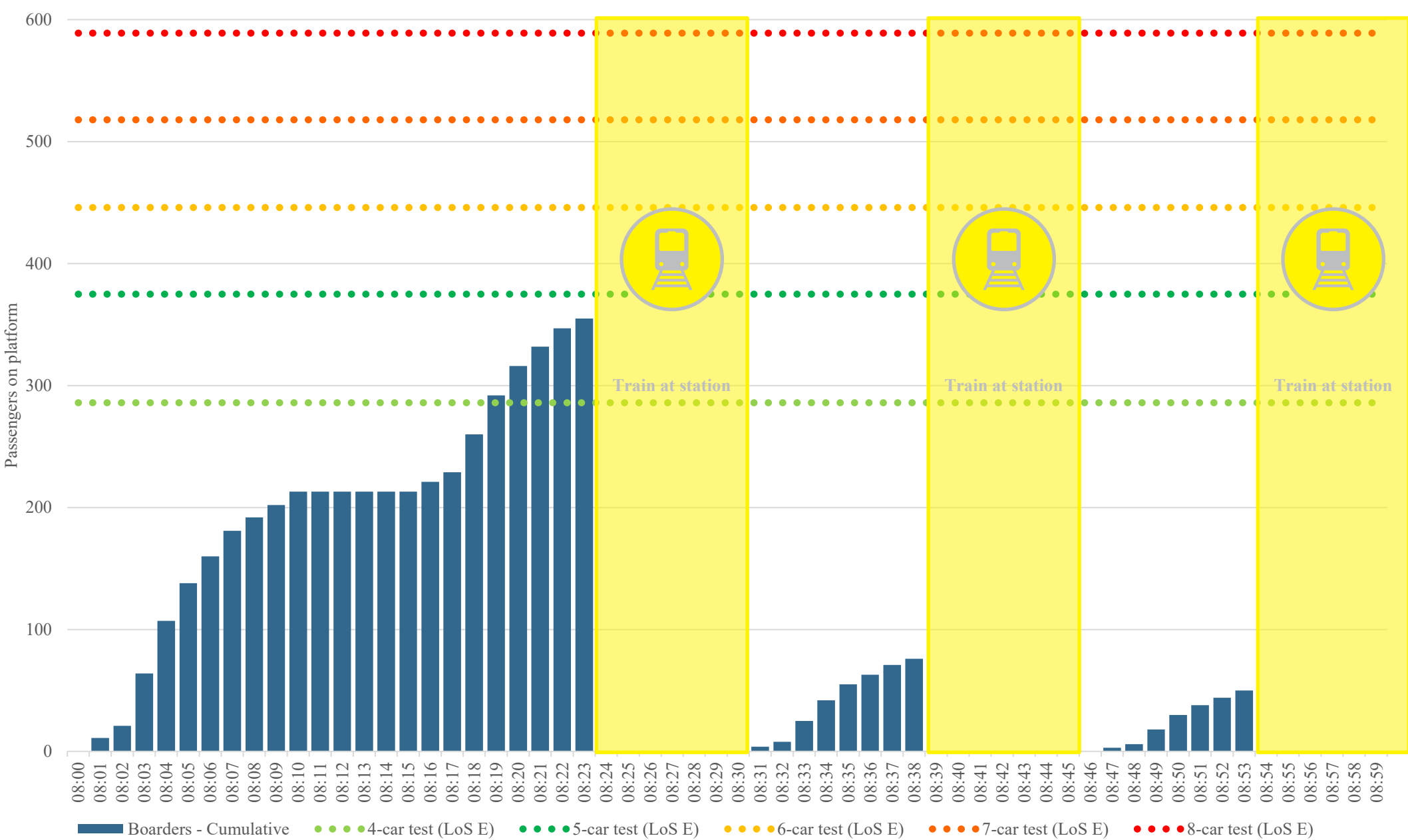


Figure 16 – Cumulative passengers waiting on platform 1/2 perturbation (Future year – 3 million passengers)

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.14 Platform 3 capacity

A review of the forecast daily passenger demand for the Northern rail services indicate that there is c. 100 passengers for all services using the new Headbolt Lane station. When broken down into individual train services, and the associated boarding/alighting profiles using information derived from the Kirkby passenger count information it is clear that no capacity issues are likely to be prevalent with c. 10 passengers for the busiest service.

The platform capacity is similar to that provided for the Merseyrail services. Passenger demand would need to be significantly higher than this to result in issues arising from platform crowding.

Platform 3 therefore has capacity to accommodate the anticipated levels of passengers for Northern rail services.

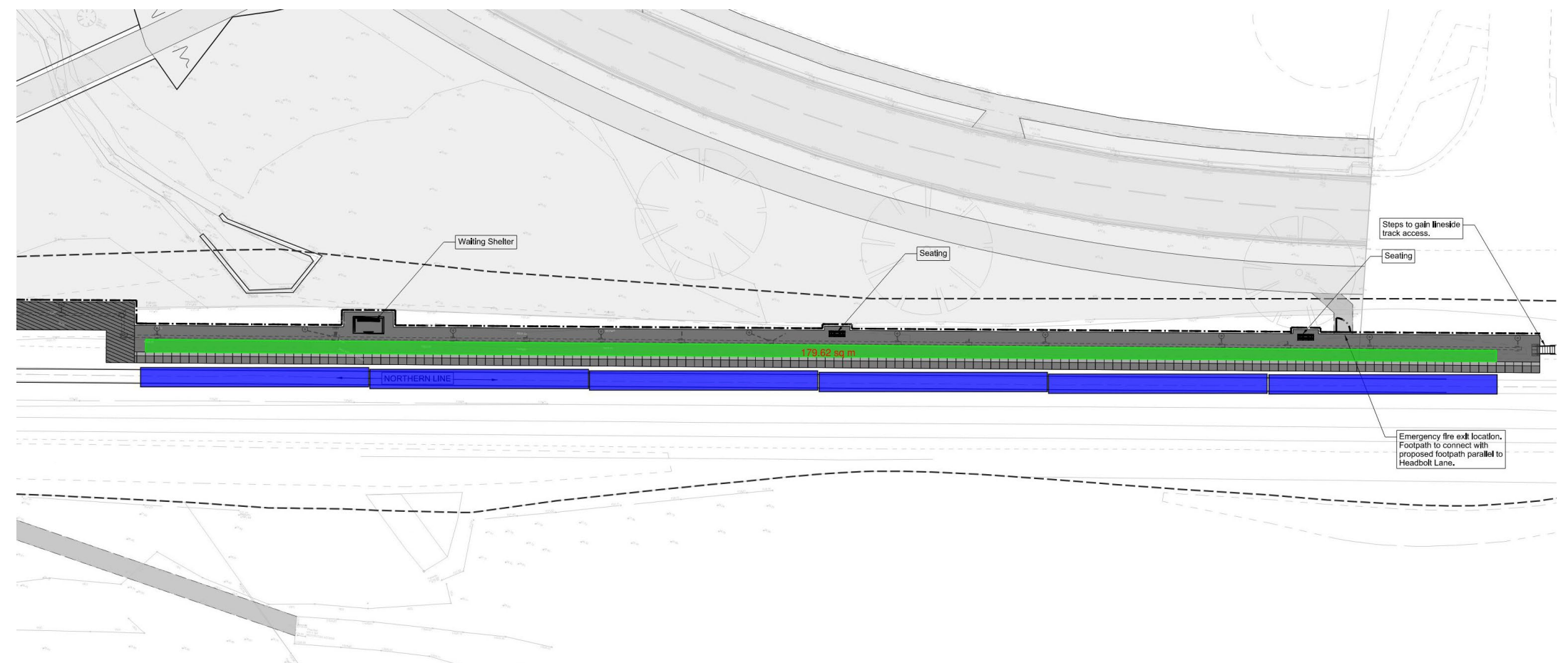


Figure 17 – Platform 3 design

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.15 Platform 1 & 2 – Passageway (opening year)

A cross station access has been provided as part of the station design. The provision of a 3m-wideconnection to/from platform 2 has been assessed using the forecast passenger demand and the following assumptions:

- Passengers will be informed in advance of the change in platform i.e. from platform 1 to 2; and
- The cross station access will be done at-grade i.e. between platforms 1, 2 and 3.

The results show that the provision of a 3 metre cross station access would provide sufficient capacity from the movement of people to/from platform 2 with the calculated passageway width maximum being around 1 metre.

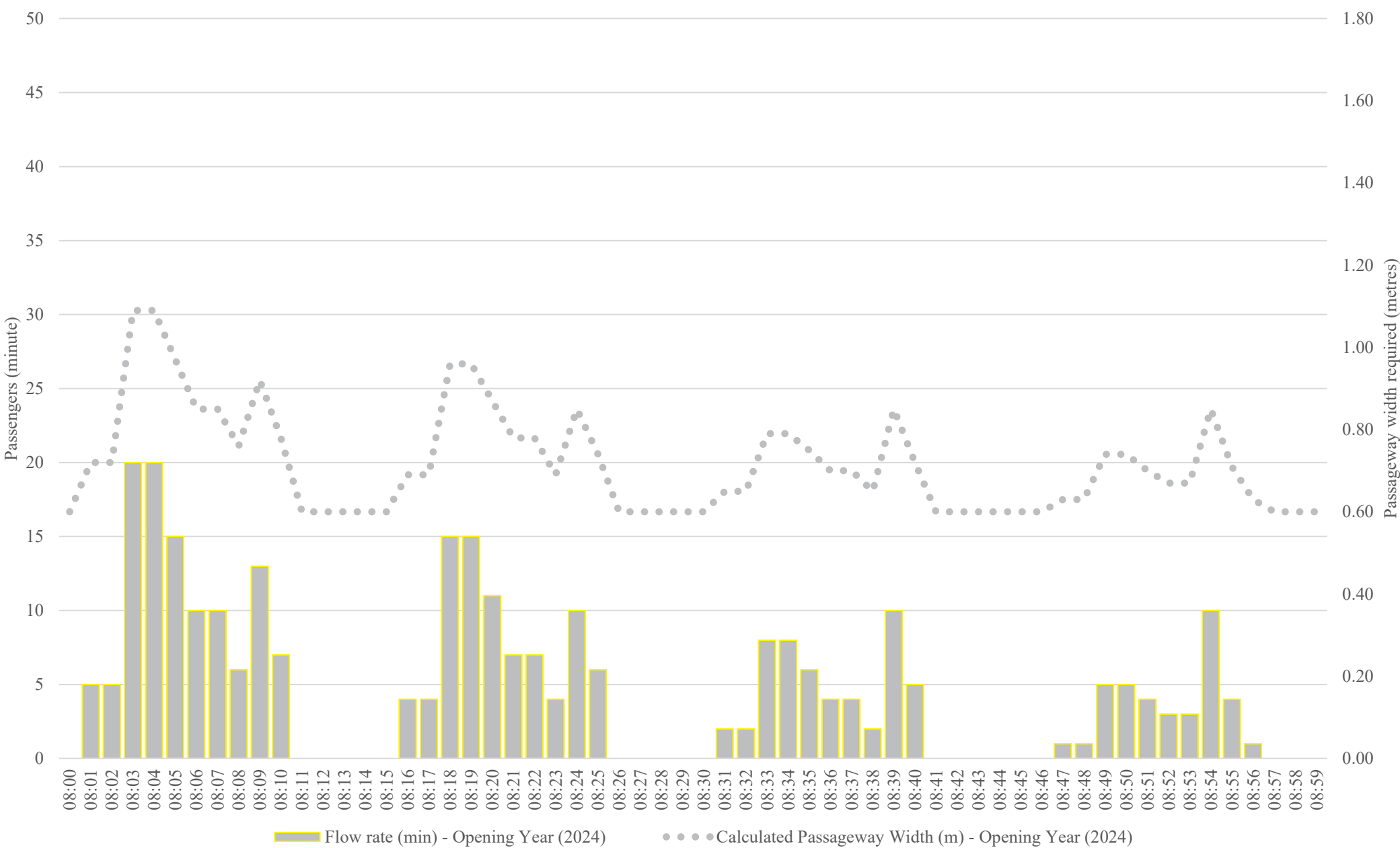


Figure 18 – Cross station (passageway) capacity test (Opening year – 2024)

4.0 Capacity Assessments
Headbolt Lane Station – Pedestrian Analysis

4.16 Platform 1 & 2 – Passageway (future year)

Using the passenger demand to understand the capabilities of the station to accommodate 3 million passengers per annum during perturbation conditions, the passageway has been assessed using the same assumptions used in Section 4.15.

The results show that the provision of a 3 metre cross station access would provide sufficient capacity from the movement of people to/from platform 2 with the calculated passageway width maximum being around 1.7 metres.

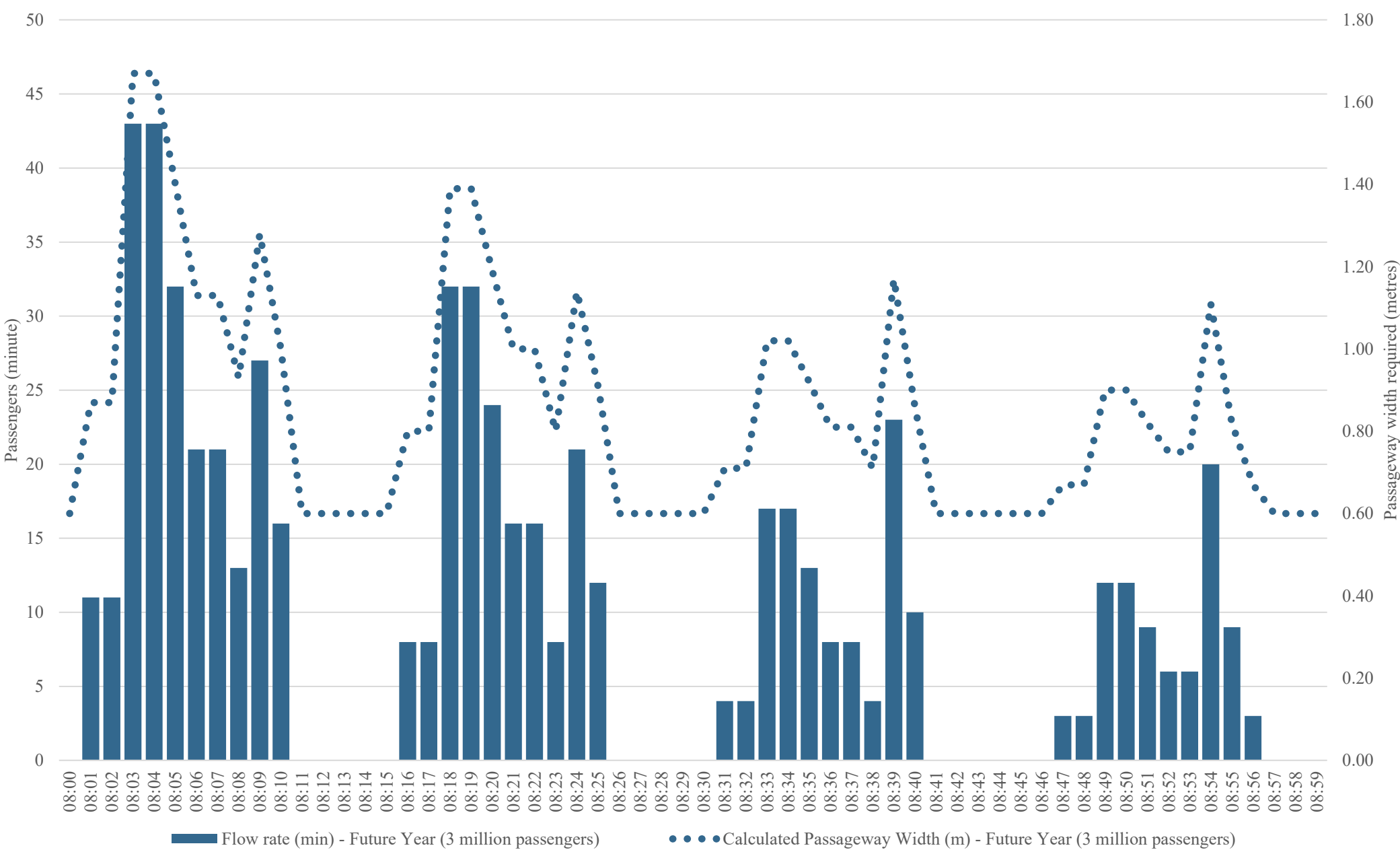


Figure 19 – Cross station (passageway) capacity test (Future year – 3 million passengers)

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.17 Station access routes

Access to Headbolt Lane station will be undertaken from two locations:

- 1) Location 1 – the proposed station comprises the station building / platform and forecourt which includes a 300 space car park, 100 secure and covered bicycle parking spaces, a taxi and pick-up/drop-off area, and 2 bus stops. This will be the primary location for ingress/egress movements to/from the station; and
- 2) Location 2 – access to/from the south via St Kevin's Drive. This provides areas to the south with direct connectivity.

The access to the south is estimated to have small amounts of usage when compared to the main station access due to the connectivity to the station.

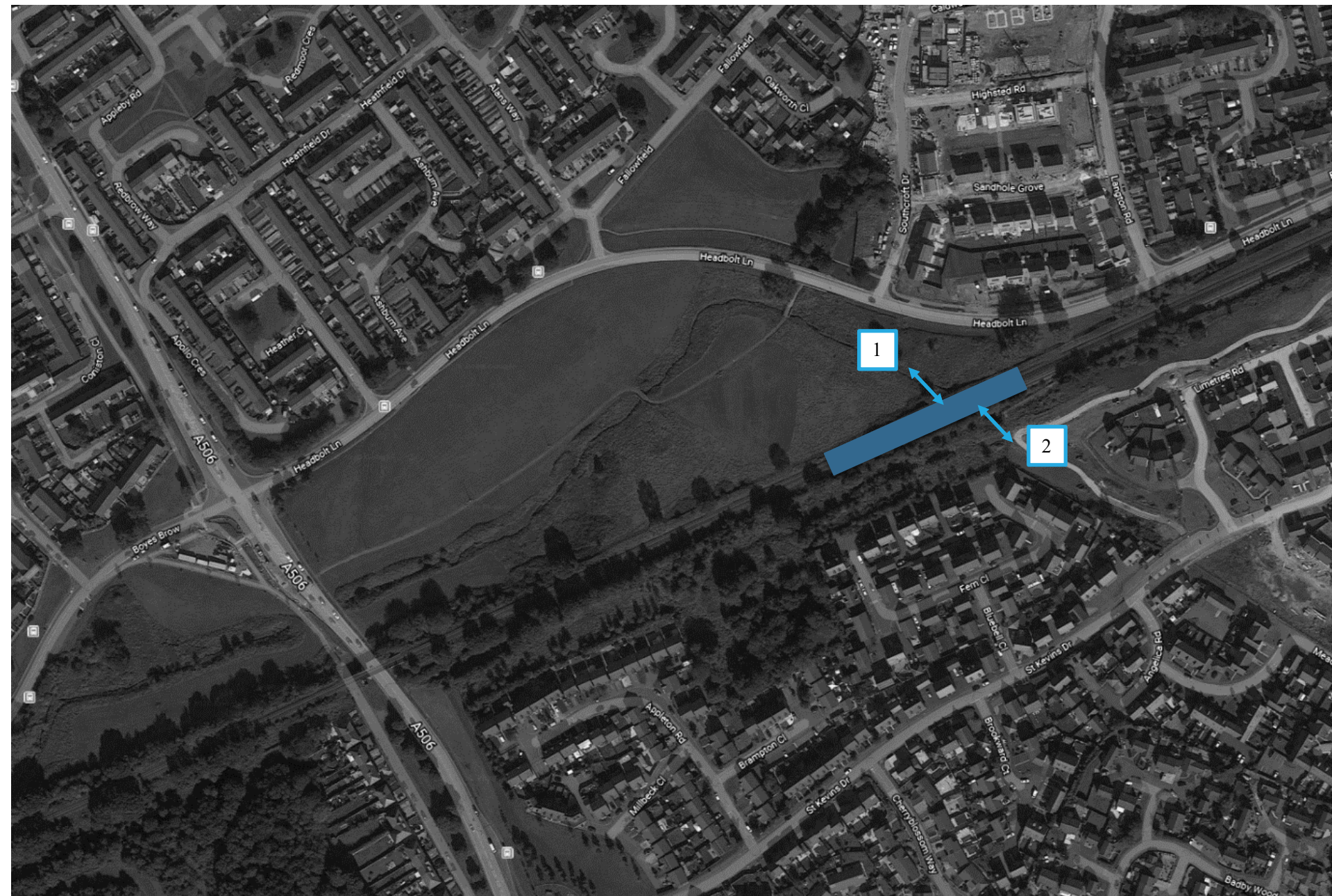


Figure 20 – Headbolt Lane station access

4.0 Capacity Assessments

Headbolt Lane Station – Pedestrian Analysis

4.19 Canopies

The proposed station design does not currently include canopies.

The booking office provides an area of shelter and space for c.4 seats for passengers who require them. However, the station design has been developed with the assumption that the majority of passengers will go directly to the platform upon arrival at the station.

A single waiting shelter is proposed on each platform, each of which has capacity for c.16 passengers. Given the low levels of forecast passenger demand on Platform 3, this is considered to provide sufficient coverage.

However, as demonstrated in Sections 4.9-4.13, during the morning peak period under normal conditions, up to 190 passengers could be waiting on either Platform 1 or 2. A significant number of passengers would be unable to shelter should there be inclement weather conditions.

By not providing additional areas of shelter for passengers, there is a risk of congestion as passengers congregate in covered areas (ie. around waiting shelters, within the station building and around the doorway). This presents an issue in terms of platform operation, which could have a negative impact on passenger experience and safety.

Providing additional covered areas in the form of waiting shelters or canopies would help to improve passenger comfort during adverse weather conditions. High quality waiting facilities could significantly improve the passenger experience at the station, making rail travel a more attractive option.

Shelter and seating is also a key component of inclusive design. Additional sheltered waiting facilities could help to enable a wider range of people to use the station, making rail travel a more inclusive and accessible option.

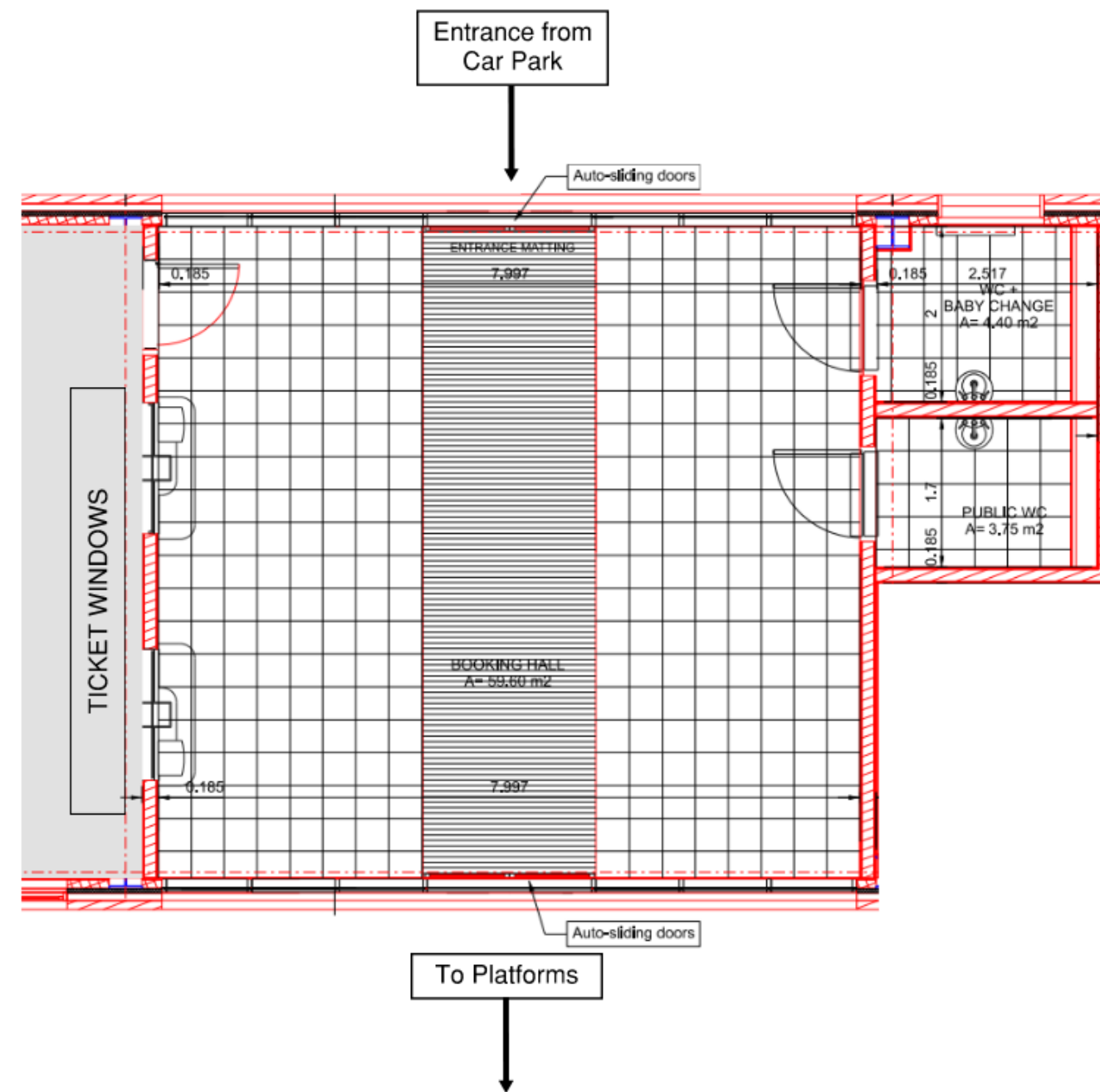


Figure 21 – Booking hall layout – public areas

5.0 Summary and Next Steps

5.1 Conclusion

Summary

The analysis has included a review of the platform capacity and cross-station connection. The analysis has demonstrated that the proposed design has sufficient capacity to accommodate the forecast amount of passengers using the station in future, with space provided within the station building should tickets gates be required in future.

Next Steps

The detailed design should explore the option to provide cover (canopies) for the periods of time when there is no train at the station. This will limit the amount of passengers using the station building during busy periods of the day and will ensure that the platforms are utilised.

Appendix A

Kirkby station 2019 passenger counts

WEEKDAY			
Daily Total	2,640	2,419	
Departs Kirkby	Boarders	Arrives Kirkby	Alighters
5:43	25	06:23	18
6:13	64	06:54	18
6:43	77	07:24	30
7:13	78	07:39	22
7:28	107	07:54	12
7:43	70	08:09	21
7:58	114	08:24	18
8:13	213	08:39	25
8:28	158	08:54	23
8:43	84	09:09	17
8:58	59	09:24	9
9:13	140	09:39	11
9:28	88	09:54	10
9:43	68	10:09	11
9:58	69	10:24	16
10:13	37	10:39	5
10:28	37	10:54	1
10:43	28	11:09	13
10:58	42	11:24	17
11:13	56	11:39	22
11:28	46	11:54	7
11:43	33	12:09	27
11:58	40	12:24	11
12:13	40	12:39	23
12:28	46	12:54	27
12:43	36	13:09	32
12:58	36	13:24	3
13:13	25	13:39	33
13:28	25	13:54	6
13:43	36	14:09	27
13:58	26	14:24	46
14:13	19	14:39	36
14:28	27	14:54	56
14:43	32	15:09	47
14:58	26	15:24	57
15:13	22	15:39	44
15:28	16	15:54	59
15:43	23	16:09	74
15:58	21	16:24	75
16:13	32	16:39	93
16:28	44	16:54	89
16:43	0	17:09	104
16:58	21	17:24	183
17:13	44	17:39	143
17:28	42	17:54	117
17:43	29	18:09	71
17:58	30	18:24	54
18:13	27	18:39	63
18:28	43	18:54	38
18:43	26	19:09	37
18:58	12	19:24	35
19:13	26	19:39	24
19:28	11	19:54	28
19:43	5	20:24	50
20:13	13	20:54	43
20:43	7	21:24	36
21:13	9	21:54	40
21:43	10	22:24	26
22:13	6	22:56	37
22:43	7	23:24	27
23:13	7	23:54	59
		00:14	13

SATURDAY			
Daily Total	2,906	2,023	
Departs Kirkby	Boarders	Arrives Kirkby	Alighters
05:43	14	06:23	8
06:13	11	06:54	3
06:43	13	07:24	3
07:13	26	07:39	6
07:28	10	07:54	8
07:43	25	08:09	7
07:58	13	08:24	16
08:13	44	08:39	7
08:28	45	08:54	7
08:43	22	09:09	5
08:58	40	09:24	2
09:13	35	09:39	6
09:28	41	09:54	14
09:43	44	10:09	5
09:58	35	10:24	1
10:13	64	10:39	4
10:28	57	10:54	15
10:43	46	11:09	16
10:58	42	11:24	2
11:13	67	11:39	11
11:28	124	11:54	17
11:43	52	12:09	4
11:58	70	12:24	16
12:13	60	12:39	30
12:28	116	12:54	19
12:43	75	13:09	37
12:58	107	13:24	23
13:13	87	13:39	24
13:28	96	13:54	37
13:43	113	14:09	44
13:58	51	14:24	6
14:13	83	14:39	9
14:28	141	14:54	24
14:43	68	15:09	31
14:58	57	15:24	1
15:13	54	15:39	49
15:28	63	15:54	47
15:43	68	16:09	43
15:58	64	16:24	27
16:13	27	16:39	22
16:28	46	16:54	44
16:43	29	17:09	67
16:58	18	17:24	31
17:13	58	17:39	125
17:28	56	17:54	75
17:43	39	18:09	42
17:58	38	18:24	7
18:13	58	18:39	82
18:28	24	18:54	52
18:43	47	19:09	55
18:58	37	19:24	22
19:13	49	19:39	22
19:28	21	19:54	70
19:43	23	20:24	76
20:13	16	20:54	72
20:43	23	21:24	57
21:13	5	21:54	84
21:43	14	22:24	72
22:13	12	22:56	82
22:43	13	23:24	59
23:13	10	23:54	102
		00:14	69

SUNDAY			
Daily Total	958	902	
Departs Kirkby	Boarders	Arrives Kirkby	Alighters
08:13	33	08:24	6
08:43	12	08:54	7
09:13	41	09:24	29
09:43	3	09:54	10
10:13	72	10:24	5
10:43	8	10:54	17
11:13	95	11:24	4
11:43	10	11:54	20
12:13	82	12:24	7
12:43	58	12:54	51
13:13	88	13:24	14
13:43	19	13:54	40
14:13	70	14:24	16
14:43	34	14:54	56
15:13	64	15:24	19
15:43	10	15:54	61
16:13	46	16:24	23
16:43	6	16:54	79
17:13	40	17:24	42
17:43	3	17:54	103
18:13	46	18:24	14
18:43	25	18:54	66
19:13	20	19:24	16
19:43	4	19:54	35
20:13	15	20:24	5
20:43	13	20:54	35
21:13	11	21:24	9
21:43	4	21:54	42
22:13	9	22:24	4
22:43	3	22:56	31
23:13	14	23:24	1
		23:54	29
		00:14	6