HALLAM LAND MANAGEMENT LTD

PROPOSED RESIDENTIAL DEVELOPMENT ON LAND SOUTH OF THE B6022 NEWARK ROAD, SUTTON IN ASHFIELD, NOTTINGHAMSHIRE

CONSOLIDATED TRANSPORT ASSESSMENT

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EXECUTIVE SUMMARY

Hallam Land Management Ltd submitted an outline planning application for up to 300 dwellings on land to the south of the B6022 Newark Road, in Sutton in Ashfield, Nottinghamshire (application reference V/2017/0565 – submitted October 2017).

The development would be accessed via a new traffic signal controlled T-junction on Newark Road, and the internal layout would include a loop road arrangement, as agreed in principle with Nottinghamshire County Council (NCC), who are the local highway authority. There would be no vehicular access from Searby Road.

ADC Infrastructure Ltd were appointed by Hallam Land Management to provide transport and highways advice to support the outline application (March 2017). Since the application was submitted, ADC Infrastructure have had extensive correspondence with NCC Highways, including the preparation of a Transport Assessment Scoping Report (May 2017), a Transport Assessment (September 2017), a Transport Assessment Addendum (February 2018), an additional Transport Assessment Addendum (May 2018), a Capacity Assessment Technical Note (February 2019), and a Stage One Road Safety Audit and Response Report for the off-site mitigation schemes (April 2019). Each report was prepared to address comments raised by NCC at each stage. The result of all of this work was that NCC had no objections to the development, subject to planning obligations, conditions and informatives (consultation response dated 3 July 2019).

This Consolidated Transport Assessment report collates the agreed position, including agreed parameters and assessments, into one complete document for ease of reference and understanding. It uses the agreed trip rates, traffic generation, distribution and assignment, assessment year traffic flows, study area junctions, and junction mitigation schemes. This report does not include any new or additional assessment or analysis.

It is concluded that the development site is accessible by all modes of travel and is therefore well located for residential development. There are good opportunities for pedestrian travel, with good infrastructure provided on the desire lines to the north, east and west. There are also good opportunities for cycle travel. Whilst there are no cycle facilities in the vicinity of the site, there is a network of on-road and off-road cycle routes that cyclists can use. There are good opportunities for public transport travel, including both bus and rail. The entire site is within 800m walking distance of the regular bus service 3C running at a 30-minutes frequency. Much of the site is also within walking distance of the hourly Service 90 and hourly Black Cat bus service. Sutton Parkway train station is within walking and cycling distance, and is also accessible via bus service 3C. The station provides secure cycle parking, so there are good opportunities for train travel as part of a multi-modal journey.

As part of the proposed development, and to encourage pedestrian travel, three pedestrian connections would be provided from the site. These include a connection to the footways on Searby Road; a connection to the footway on Sotheby Avenue; and a new footway/cycleway on the southern side of Newark Road. A new traffic signal controlled pedestrian crossing would be provided on Newark Road at the site access junction. Within the site, a footway/cycleway would be provided along the main site access road and along the southern side of Newark Road to connect the development to the off-road cycle lane running parallel to Kirkby Folly Road. The site is within walking distance of a regular bus service, but it is proposed to provide funding contributions towards bus service enhancements and bus stop improvements.

The development will generate 45 pedestrian journeys, nine cycle journeys, 21 bus journeys and three train journeys during a peak hour. These additional trips can be accommodated by the existing infrastructure and the proposed measures.

A Travel Plan has been produced to accompany the planning application, with the aim to manage travel demand in the future. It includes a target for 10% reduction in peak hour vehicle trips. It provides measures and a monitoring regime to further increase the use of sustainable travel modes, and hence create a modal shift away from single occupancy car use.

The development will generate up to 214 two-way vehicle trips in a peak hour. These trips were distributed and assigned to the highway network using 2011 Census data and observed turning movements, as agreed with NCC.

The impact of this traffic on the operation and safety of the highway network was examined, with the following junctions being studied in detail as agreed with NCC as part of the scoping exercise:

1) A38/Penny Emma Way signal controlled junction
2) B6021 Lowmoor Road/Penny Emma Way/Kirkby Folly Road signal controlled junction
3) B6022 Newark Road/Kirkby Folly Road mini-roundabout
4) B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction
5) B6139 Coxmoor Road/Hamilton Road mini-roundabout
6) A611 Derby Road/B6139 Coxmoor Road signal controlled junction
7) A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction
8) A611 Derby Road/B6021 Nottingham Road signal controlled junction
9) A611 Derby Road/A608 Annesley Road signal controlled gyratory
10) A611/Forest Road traffic signal controlled T-junction
11) A38/Station Road traffic signal controlled crossroads
12) A38/Coxmoor Road traffic signal controlled crossroads
13) A617/Hamilton Road traffic signal controlled crossroads.

Each junction was modelled using 2017 and 2027 traffic flows, both without and with the development. These assessments confirmed that most of the existing junctions have capacity to accommodate the additional development traffic without the need for mitigation.

However, interventions are necessary at the following locations:

- Junction 3 - B6022 Newark Road/Kirkby Folly Road mini-roundabout – mitigation required in the form of minor kerb widening to increase the flare length and entry widths as shown in **Drawing ADC1580-DR-004-P8,** provided in the drawings section at the end of the report.
- Junction 4 - B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction – mitigation required in the form of alterations to the signal controlled junction as shown in **Drawing ADC1580-DR-004-P8** provided in the drawings section at the end of the report.
- Junction 5 - B6139 Coxmoor Road/Hamilton Road mini-roundabout – mitigation required in the form of widening to Coxmoor Road (S) and Hamilton Road to provide longer two lane approaches as shown on **Drawing ADC1580-005-P7** provided in the drawings section at the end of the report.

These schemes would satisfactorily mitigate the impact of the development traffic, as agreed with NCC.

In addition, following comments from local residents at the public consultation, the operation of the Newark Road/Searby Road T-junction was assessed, as was the operation of the Sutton Junction level crossing on the B6022 Newark Road/Station Road. It was concluded that the proposed development would not have a severe impact on the operation of the junction or crossing. Nevertheless, in order to improve the operation of the Newark Road/Searby Road T-junction, it is proposed to install yellow hatched box markings across the junction on Newark Road. This will ensure that any vehicles queuing on Newark Road (for example when the level crossing is down) will not block the junction, and will allow vehicles to enter and exit Newark Road more easily. This is shown in **Drawing ADC1580/003 P10 and Drawing ADC1580/006 P2** provided in the drawings folder at the end of the report.

Overall, the proposed development would accord with the aims of the NPPF. The opportunities for sustainable travel would be improved as part of the proposals, and safe and suitable access can be achieved for all people. Appropriate improvements are proposed to mitigate impacts, and thus the development would not result in severe impacts on the operation or safety of the local highway network. Therefore, it would be unreasonable to prevent the development on highways grounds, a conclusion agreed with NCC.

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ADC1580/004 P8	Proposed improvement scheme - Newark Road/Kirkby Folly Road
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ADC1580/005 P7	Proposed improvement scheme – B6139 Coxmoor Road/Hamilton Road
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1.0 INTRODUCTION

1.1 Hallam Land Management Ltd have submitted an outline planning application for up to 300 dwellings on land to the south of the B6022 Newark Road, in Sutton in Ashfield, Nottinghamshire (application reference V/2017/0565). The general and detailed site locations are shown in **Figures 1 and 2** respectively. The illustrative development masterplan is in **Appendix A.**

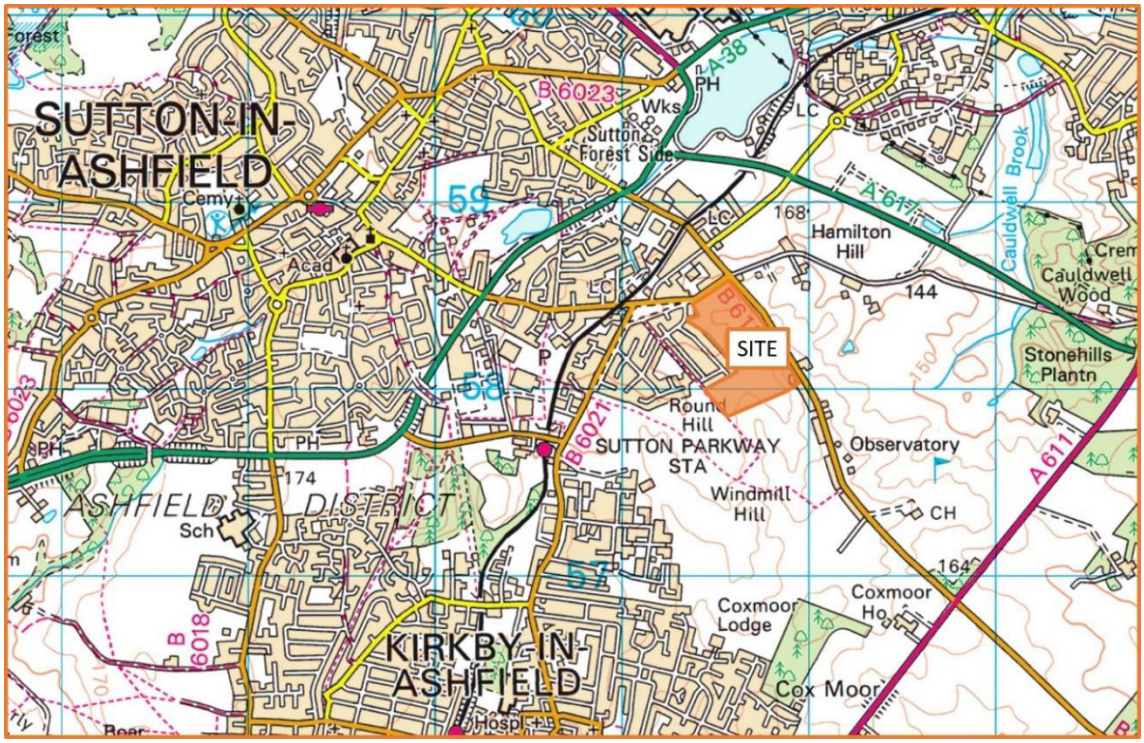

Figure 1: general site location (indicative site boundary)

Figure 2: detailed site location (indicative site boundary)

1.2 The development would be accessed via a new traffic signal controlled T-junction on Newark Road, and the internal layout would include a loop road arrangement, as agreed in principle with Nottinghamshire County Council (NCC), who are the local highway authority. There would be no vehicular access from Searby Road.

1.3 ADC Infrastructure Ltd were appointed by Hallam Land Management to provide transport and highways advice to support the outline application. Since the application was submitted, ADC Infrastructure have had extensive correspondence with NCC Highways, and have prepared a Transport Assessment Scoping Report (May 2017), a Transport Assessment (September 2017), a Transport Assessment Addendum (February 2018), an additional Transport Assessment Addendum (May 2018), a Capacity Assessment Technical Note (February 2019), and a Stage One Road Safety Audit and Response Report for the off-site mitigation schemes (April 2019). Each report was prepared to address comments raised by NCC at each stage. The result of all of this work was that NCC had no objections to the development, subject to planning obligations, conditions and informatives (consultation response dated 3 July 2019).

1.4 This Consolidated Transport Assessment report collates the agreed position, including agreed parameters and assessments, into one complete document for ease of reference and understanding. It uses the agreed trip rates, traffic generation, distribution and assignment, assessment year traffic flows, study area junctions, and junction mitigation schemes. This report does not include any new or additional assessment or analysis.

1.5 A Travel Plan was also submitted with the application. It describes the way sustainable travel will be influenced and managed post planning consent as the development is constructed and occupied, and includes a target to reduce peak hour car trips by 10%. In their consultation response (dated 3 July 2019), NCC included a recommended planning condition to secure the Travel Plan. Hence the report has not been updated.

1.6 This report is structured as follows:

- Section 2 describes the existing conditions in the vicinity of the site. The local highway network is described, including the results of traffic counts and an accident analysis. The existing opportunities for travel to the site by sustainable modes are also examined, including a detailed pedestrian route analysis.
- Section 3 describes the outline development proposals, including the parking provision, the vehicular access proposals and internal loop road layout, and the new infrastructure that would be provided to encourage the use of sustainable travel modes. This includes new pedestrian connections, new pedestrian crossings, a new footway/cycleway, and contributions towards bus stop improvements and enhanced bus services.
- Section 4 summarises the forecast trip generation of the development using agreed robust trip rates from the TRICS database and the agreed modal split from the 2011 Census.
- Section 5 details the agreed distribution pattern and assignment of development traffic on the local highway network, based on 2011 Census data.
- Section 6 presents the agreed 2027 assessment year traffic flows.
- Section 7 assesses the impact of the development on the operation and safety of the agreed study area junctions, and presents the agreed mitigation schemes at the impacted junctions.
- Section 8 presents the summary and conclusions.

1.7 This report has been produced in accordance with *Travel plans, transport assessments and statements in decision-taking*[1].

1.8 It also examines the transport implications of the proposed development taking into account paragraphs 110 and 111 of the NPPF[2], which state that*:*

"110. In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) safe and suitable access to the site can be achieved for all users;

c) the design of streets, parking areas, other transport elements and the content of associated standards reflect current national guidance, including the National Design Guide and the National Model Design Guide: and

d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

111. Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

[1] Travel plans, transport assessments and statements in decision-taking, National Planning Practice Guidance, March 2014

[2] National Planning Policy Framework, Ministry of Housing, Communities and Local Government (July 2021)

2.0 EXISTING CONDITIONS

Site location and existing use

2.1 As shown in **Figures 1 and 2**, the development site is located on the south-eastern edge of Sutton in Ashfield. It is bordered by the B6022 Newark Road to the north, the B6139 Coxmoor Road to the east, fields to the south, and dwellings fronting Searby Road and Sotheby Avenue to the west.

2.2 As shown in **Figure 3**, the site is currently a field, and has a gated field access from Newark Road.

2.3 The majority of the site was proposed for allocation in the 2016 Local Plan (reference SKA3e for 266 dwellings). The proposed development includes this land, and the adjacent field on land directly south of Searby Road. The 2016 Local Plan was subsequently withdrawn from examination in 2018 and the Council published a Regulation 18 Draft Plan for consultation in October 2021. The latest Draft Plan does not include the site as an allocation.

Figure 3: aerial photograph (indicative site boundary)

Highway network

2.4 The proposed development would be accessed from the B6022 Newark Road. The B6022 Newark Road/Station Road runs between the traffic signal controlled junction with the A38 to the west, and the traffic signal controlled junction with the B6139 Coxmoor Road to the east. From the A38, Station Road continues and provides access into Sutton in Ashfield Town Centre. The B6022 also connects with Kirby Folly Road via a mini-roundabout, and the Sutton Junction level crossing on Station Road is directly west of the mini-roundabout. The speed limit along the majority of the B6022 is 30mph, enforced with vehicle activated signs. However, the speed limit changes to the

national speed limit for the most eastern stretch of the road, with the existing speed limit change approximately half-way along the site frontage.

2.5 To the west of the site, Kirkby Folly Road merges with Low Moor Road. Low Moor Road leads into Kirkby in Ashfield Town Centre, provides access to Sutton Parkway train station, and joins Penny Emma Way at a signal controlled T-junction. Penny Emma Way connects to the A38 to the west, which in turn runs between Mansfield to the east and the M1, A52, A50 and M6 to the west. The A38 is therefore a key connecting route to the strategic road network.

2.6 To the east of the site, the B6139 Coxmoor Road runs north-south, between the traffic signal controlled junction with the A38 to the north, and the priority-controlled junction with the B6020 Kirkby Road to the south.

2.7 To the north of the site, Coxmoor Road connects to Hamilton Road at a three-arm mini-roundabout, which in turn connects to the A617 at a traffic signal controlled crossroads. The A617 connects to the A38 to the west and provides access towards Newark to the east.

2.8 To the south, the B6139 Coxmoor Road provides access to the A611 Derby Road at a traffic signal-controlled crossroads. The A611 runs north towards Mansfield or south towards Nottingham. The A611 connects with the A60 to the north, and the A608 to the south, which in turn provides access to the M1 at Junction 27.

2.9 Therefore, the site is well located for access to the local highway network in and around Sutton in Ashfield and Kirkby in Ashfield, and the wider highway network via the A38, A611, A617 and A60. There are three route options between the site and the A38 (via Penny Emma Way, Station Road or Coxmoor Road). There are two route options to the A60 (via the A611 Derby Road to travel north or Coxmoor Road and Kirkby Road to travel south). The main route between the site and the A617 is via Hamilton Road, although vehicles could route via the A611 Derby Road and the A60. Finally, there are two route options to reach the M1 (via the A38 to Junction 28, or via the A611 and A608 to Junction 27).

2.10 The key junctions along these routes form the agreed study area, as agreed with NCC as part of the scoping exercise. The study area junctions are listed below and shown on **Figure 4**. An assessment of the operation of each junction is included in Section 7. In addition to these junctions, following comments from local residents at the public consultation, the impact of the development at the Newark Road/Searby Road T-junction, and the Sutton Junction level crossing on Newark Road/Station Road is also assessed in Section 7.

1) A38/Penny Emma Way signal controlled junction
2) B6021 Low Moor Road/Penny Emma Way/Kirkby Folly Road signal controlled junction
3) B6022 Newark Road/Kirkby Folly Road mini-roundabout
4) B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction
5) B6139 Coxmoor Road/Hamilton Road mini-roundabout
6) A611 Derby Road/B6139 Coxmoor Road signal controlled junction
7) A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction
8) A611 Derby Road/B6021 Nottingham Road signal controlled junction
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13) A617/Hamilton Road traffic signal controlled crossroads.

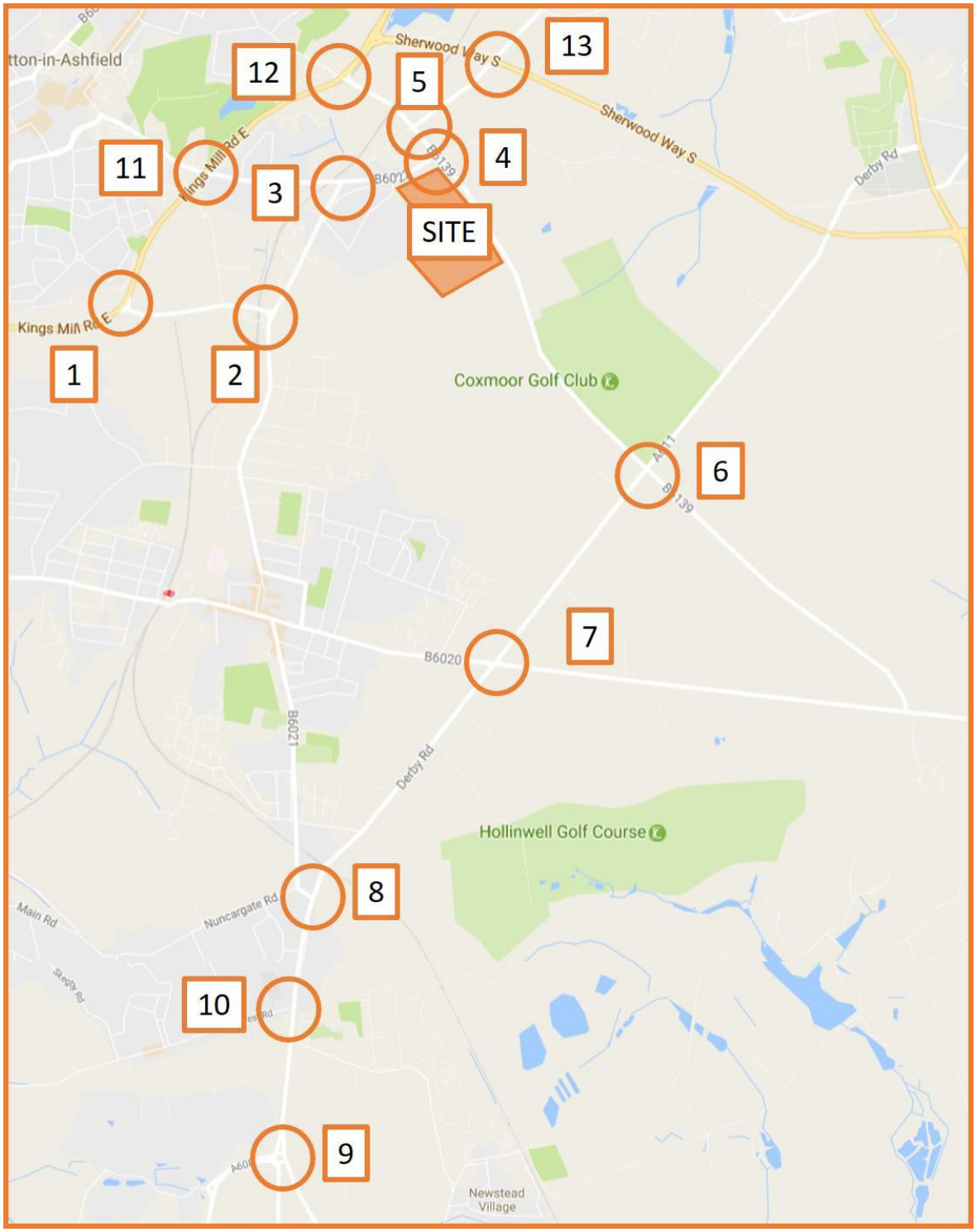


Figure 4: study area junctions

Ashfield Transport Study

2.11 Ashfield District Council commissioned the Ashfield Transport Study (ATS) (October 2016) to assess the impact of the growth within their Local Plan Preferred Approach, as part of the evidence base to support the emerging Local Plan. This includes the delivery of 8,469 homes (including the development that is the subject of this report), as well as employment and retail development, by 2032. The ATS was submitted to the Planning Inspectorate for independent examination on 24 February 2017.

2.12 The ATS includes: a '2015 base year', a '2032 reference case', and a '2032 with development' scenario. The 2032 with development scenarios include all of the local plan allocations, modelled:

- without any transport mitigation;
- with transport mitigation that focuses on Travel Plan/Smarter Choices measures, walking and cycling improvements and public transport enhancements[3]; and
- with highway mitigation measures at specific junctions.

2.13 The ATS examines all of the study area junctions listed above, with the exception of junctions 5 and 13. It includes potential highway mitigation works at all of the study area junctions, with the exception of junctions 1 and 9 above, where it concludes that mitigation is not required. This therefore highlights that several of the study area junctions currently operate with, or are forecast to operate with, congestion and delay.

2.14 No preliminary drawings are provided in the ATS, but the potential mitigation measures include widening and the provision of additional lanes, as well as alterations to the signal stages, at study area junctions 2, 4, 6, 7, 8, and 10. At junction 3, the potential mitigation scheme involves the upgrade of the mini-roundabout to a traffic-signal controlled arrangement. Indicative costs, excluding land acquisition and utilities diversions, are provided for each potential mitigation scheme. These are presented in more detail in Section 7. Nevertheless, this would suggest that some of the indicative mitigation schemes are not possible without third party land beyond the edge of the adopted highway boundary.

2.15 For the A38/Station Road and A38/Coxmoor Road junctions (junctions 11 and 12 above), the ATS concludes that there are limited options for low to moderate improvements, and that extensive mitigation is required (such as grade-separation), which it concludes is not feasible in terms of costs and deliverability. It therefore recommends a 'managed demand' approach to control traffic flows along the entire A617/A38 corridor. This is to ensure that *"there is a consistent level of capacity at all junctions which results in maximising the capacity of the entire corridor without providing improvements at a single location, which could result in the transfer congestions issues further downstream."*

2.16 Ashfield District Council have confirmed that *"the study is strategic and any mitigation measures identified are indicative and provide an estimated cost based on the approximate costs of similar levels of intervention. When the more detailed schemes are developed as part of a planning application or LTP review, then more detailed cost assessment will be required."*

2.17 NCC have previously stated that specific junction improvement schemes have not yet been finalised, but that AECOM have been commissioned to design solutions.

2.18 This context is important when determining the impact of the proposed development traffic in Section 7. This includes whether the additional trips generated directly by the development will have a severe impact on the operation and safety of the highway network and at each of the study area junctions, and thus whether mitigation is required and what form of mitigation is required.

2.19 The planning system no longer requires interventions to mitigate existing capacity issues, to create a nil detriment scenario, or even to mitigate adverse impact. Rather, the threshold is a severe impact and the development traffic increases may not result in a severe impact even when

[3] The ATS includes a 7.5% reduction in traffic to take into account modal shift/transfer to pedestrian/cycle travel. It also includes a 10% reduction in traffic to take into account smarter choices mitigation.

a junction is already operating above capacity. The operation of each study area junction, together with the potential ATS mitigation schemes, is therefore examined further in Section 7.

Traffic flows

2.20 Traffic counts were undertaken at study area junctions 1-5 on Thursday 23 March 2017. All vehicle movements turning at and travelling through the junctions were recorded in 15 minute intervals between 0730-0930 and 1630-1830 hours. The results are in **Appendix B.**

2.21 The highway network peak hours at these junctions were found to be 0745-0845 and 1630-1730 hours. Hence, the observed morning and evening peak hour traffic flows are shown in **Diagrams 1 and 2 in Appendix C**.

2.22 In addition, traffic count data was purchased from NCC from existing traffic counts undertaken on Wednesday 15 March 2017 as part of the ATS for junctions 6-10. Due to the format of the data, the individual junction peak hour traffic flows were extracted, and are replicated in **Diagrams 1 and 2 in Appendix C.**

2.23 For Junctions 11 to 13, NCC agreed the use of traffic flow data from the Transport Assessment prepared in support of the committed Lindhurst development. That Transport Assessment used the MARR Traffic Model to forecast the flows in 2019 and 2026. In both assessment years, that Transport Assessment included a Do Minimum scenario (without the Lindhurst development and infrastructure) and Do Something scenario (with the Lindhurst development and infrastructure). The traffic flows at Junctions 11 to 13 were extracted from the 2026 Do Something scenario. A copy is contained in **Appendix D.**

Accident analysis

2.24 The Transport Assessment Addendum included an accident analysis, which is replicated below. Full accident data was obtained from VIAEM, on behalf of NCC, for the five-year period between 1 January 2012 and 31 July 2017. A total of 104 accidents were analysed, of which 90 were classified as slight severity, 12 were classified as serious severity and the remaining two accidents were fatal. The raw data and a summary report is contained in **Appendix E**.

Junction 1: A38/Penny Emma Way signal controlled junction

2.25 Six slight accidents were recorded at the junction. Two involved a vehicle turning right from the A38(S) into Penny Emma Way, and colliding with a vehicle travelling southbound from the A38 (N). There were no trends amongst the remaining four accidents – with one rear end shunt, one overtaking collision, one loss of control on Penny Emma Way and one loss of control on the A38(N). The proposed development would add 17 vehicle movements through the junction in the morning peak hour, against a background flow of 4508. The development would add 18 vehicles in the evening peak hour against a background flow of 3516. The additional development traffic is therefore unlikely to introduce an accident problem.

Junction 2: B6021 Lowmoor Road/Penny Emma Way/Kirkby Folly Road signals

2.26 Six slight accidents were recorded at the junction. Three of the accidents involved a vehicle turning right into Penny Emma Way from Kirkby Folly Road, across the path of a northbound vehicle on Lowmoor Road. The remaining three accidents were not comparable - one accident involved a car turning left from Penny Emma Way across the path of a northbound vehicle on

Lowmoor Road; one accident involved a rear end shunt; and one accident involved a vehicle colliding with a pedestrian at the crossing.

2.27 Therefore, whilst there is a trend in accidents involving vehicles turning right into Penny Emma Way, three accidents in five years is not a high accident rate. Furthermore, the junction is traffic signal controlled with good visibility. Therefore, these accidents are attributed to driver error.

2.28 The proposed development would add 64 vehicle movements through the junction in the morning peak hour, against a background flow of 3115. The development would add 67 vehicles in the evening peak hour against a background flow of 2551. The additional development traffic is therefore unlikely to introduce an accident problem.

Junction 3: B6022 Newark Road/Kirkby Folly Road mini-roundabout

2.29 A total of 12 accidents occurred at the B6022 Newark Road/Kirkby Folly mini-roundabout. Three PIAs were classified as serious severity with the remaining nine accidents slight in nature.

2.30 Of the three serious accidents, two involved vehicles losing control on the approach to the mini-roundabout. The third involved a vehicle crossing into the opposite carriageway and colliding with an oncoming vehicle. All three accidents are attributed to driver error, with drivers travelling too fast for the conditions at the time.

2.31 Of the nine slight accidents, three involved a vehicle that failed to give-way when turning right from Kirkby Folly Road, and colliding with a vehicle travelling westbound from Newark Road (E). A further accident involved a vehicle turning left from Kirkby Folly Road failing to give-way and colliding with a westbound vehicle.

2.32 Three of the accidents involved rear end shunts on the approach to or exit from the roundabout, although all occurred in different locations.

2.33 The final accident involved a car emerging from a private access across the path of an oncoming motorcycle on Kirkby Folly Road.

2.34 Overall, there have been 12 accidents recorded at the Newark Road/Kirkby Folly Road mini-roundabout in the five year study period. Of these, four involved vehicles emerging onto the mini-roundabout from Kirkby Folly Road, into the path of a westbound vehicle. However, there is good visibility from Kirkby Folly Road, and these accidents are therefore attributed to driver error.

2.35 The proposed mitigation scheme at the junction as part of the proposed development will alter the junction layout and operation, in order to reduce congestion and delay, and to provide pedestrian crossing facilities. This will provide a wider highway benefit. The additional traffic as a result of the proposed development, and the revised junction layout, should not introduce an accident problem.

Junction 4: B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction

2.36 No accidents have been recorded at the junction in the five year study period, although a rear end shunt accident occurred on Newark Road as a vehicle attempted to turn into a closed farm access. The proposed mitigation scheme at the junction as part of the proposed development will alter the junction layout and operation, in order to reduce congestion and delay. The additional traffic as a result of the proposed development, and the revised junction layout, should not introduce an accident problem.

Junction 5: B6139 Coxmoor Road/Hamilton Road mini-roundabout

2.37 Three slight accidents occurred at the junction, although there are no trends in the type or cause of these accidents. One involved a vehicle colliding with a pedestrian. One involved a vehicle that failed to give-way when turning left from Hamilton Road to Coxmoor Road (S) and colliding with a southbound vehicle. The final accident involved a rear end shunt on Coxmoor Road (N). The three accidents are attributed to driver error.

2.38 The proposed mitigation scheme at the junction as part of the proposed development will alter the junction layout and operation, in order to reduce congestion and delay. The additional traffic as a result of the proposed development, and the revised junction layout, should not introduce an accident problem.

Junction 6: A611 Derby Road/B6139 Coxmoor Road signal controlled junction

2.39 Seven accidents occurred at the A611 Derby Road/B6139 Coxmoor Road signal controlled junction. One accident was classified as being of serious severity and the remaining six accidents were slight in nature.

2.40 The serious accident involved a driver disobeying the 'no right turn' from Derby Road (S) and colliding with an oncoming southbound vehicle. One of the slight accidents was also as a result of the manoeuvre.

2.41 Two of the slight accidents involved rear end shunts on the approaches to the junction. The remaining three accidents had no trend in type or cause. One involved a vehicle turning right from Coxmoor Road and colliding with a southbound vehicle on Derby Road. One involved a vehicle losing control and colliding with the traffic signal poles. The final accident involved a vehicle colliding with a pedestrian.

2.42 All seven PIAs are attributed to driver error, with drivers failing to obey the traffic signal controls, travelling too close to the vehicle in front, or travelling too fast.

2.43 The proposed development would add 33 vehicle movements through the junction in the morning peak hour, against a background flow of 2611. The development would add 32 vehicles in the evening peak hour against a background flow of 2677. The additional development traffic is therefore unlikely to introduce an accident problem.

Junction 7: A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction

2.44 Nine PIAs occurred at the A611 Derby Road/B6020 Diamond Avenue/Blidworth Road junction. One PIA was classified as being of serious severity and the remaining eight accidents were slight in nature.

2.45 Eight of the accidents involved rear end shunts on the approaches to the junction. The serious accident, and one of the slight accidents, involved a rear end shunt on the eastbound Diamond Avenue approach to the junction. Two accidents involved a rear end shunt on the Blidworth Road westbound approach to the junction; one occurred on the northbound Derby Road approach and two occurred on the Derby Road southbound approach.

2.46 The remaining accident involved a motorcyclist braking on approach to the junction, and losing control on the wet road surface.

2.47 There is a trend in the type of accidents recorded at the junction, with rear end shunts on all approaches. However, whilst the junction is subject to the national speed limit, there is good forward visibility towards the junction and towards queuing traffic, and therefore the accidents are attributed to driver error.

2.48 The proposed development would add 11 vehicle movements through the junction in the morning peak hour, with an increase of eight vehicles on the A611(N) arm. The background flow on this arm is 831. In the evening peak hour, the development would add 12 movements, with an increase of six vehicles on the A611(S) arm. The background flow on this arm is 856. The proposed development traffic therefore forms only a small increase, and is unlikely to introduce an accident problem.

Junction 8: A611 Derby Road/B6021 Nottingham Road signal controlled junction

2.49 Four slight accidents were recorded at the junction in the five year study period. There were no trends in the type or cause of the accidents. One involved a bus passenger falling as the bus moved off. One involved a rear end shunt on the northbound Derby Road approach. One involved a rear end shunt on the southbound Derby Road approach, as a vehicle stopped to allow a police car passed. The final accident involved a cyclist slipping and losing control on Nottingham Road to the west of the junction. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Junction 9: A611 Derby Road/A608 Annesley Road signal controlled gyratory

2.50 Eleven accidents were recorded at the A611 Derby Road/A608 Annesley Road signal controlled gyratory. Two of the accidents were classified as being of serious severity whilst the remaining nine accidents were slight in nature.

2.51 Two of the accidents, including one of the serious accidents, involved a southbound vehicle on the A611 Derby Road colliding with a pedestrian and a cyclist respectively who were at the crossing.

2.52 The other serious accident involved a northbound vehicle losing control and colliding with the traffic signals and the central island.

2.53 Two slight accidents involved a rear end shunt on the A608 approach to the junction. Two accidents involved bus passengers falling as the vehicle moved off on the A611 exit arm. One accident involved a taxi changing lanes and colliding with a vehicle. One accident involved a driver losing control on the approach to the junction, and one accident involved a motorcyclist losing control on the bend on the approach to the junction. The final accident involved a car crossing the path of a motorcyclist and colliding.

2.54 Overall, there are no trends in the type of accidents recorded at the junction, and all 11 accidents are attributed to driver error. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Junction 10: A611/Forest Road traffic signal controlled T-junction

2.55 Seven accidents occurred at or near the A611 Derby Road/Forest Road junction. Two of the recorded PIAs were classified as being of serious severity with the remaining five accidents slight in nature.

2.56 Of the two serious accidents, one involved a rear end shunt on the northbound approach to the junction. The other involved a southbound vehicle colliding with a pedestrian at the crossing.

2.57 Four of the slight accidents involved vehicles turning out of the private drives on the A611, including the petrol station and the Badger Box car park. The final accident involved a vehicle turning right into Forest Road across the path of a northbound vehicle on the A611.

2.58 Overall, there are no trends in the type of accidents recorded at the junction. All seven accidents are attributed to driver error. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Junction 11: A38/Station Road traffic signal controlled crossroads

2.59 A total of 18 accidents were recorded at the A38 Kings Mill Road/B6022 Station Road junction in the five year study period. Of these, 16 accidents were classified as slight in nature, one was classified as being of serious severity and the remaining accident resulted in a fatality.

2.60 The fatal accident involved a westbound car on Station Road colliding mid-junction with a cyclist. The serious accident involved a cyclist travelling from Station Road colliding with a northbound car on the A38.

2.61 Two accidents occurred on the A38 northbound approach as vehicles attempted to overtake as the lanes merged. A similar accident occurred on the A38 southbound approach. Two accidents involved vehicles turning right from Station Road (W) and colliding with oncoming vehicles from Station Road (E). Four accidents involved rear end shunts on the approaches to the junction, with two on the A38 northbound approach, one on the Station Road (W) approach and one on the Station Road (E) approach.

2.62 The remaining accidents were more random in nature and have no trends. This includes a slight accident involving a bus passenger falling over; a vehicle colliding with a cyclist who crossed three lanes of queueing traffic; a vehicle colliding with a pedestrian when turning right from the A38(S) into Station Road; a vehicle colliding with a pedestrian on the A38(S) arm when the lights were green for traffic; a collision involving a vehicle and an ambulance that entered the junction; and a collision between oncoming vehicles both turning right into A38(N) and A38(S) respectively.

2.63 The junction is a large, busy signal controlled junction, and the 18 accidents recorded in the five year study period does not represent a high accident rate. There are no significant trends in the location or type of accidents recorded within the junction, and the accidents are attributed to driver error. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Junction 12: A38/Coxmoor Road traffic signal controlled crossroads

2.64 A total of 12 accidents were recorded at the junction, with one serious accident and 11 slight accidents.

2.65 The serious accident involved a van colliding with a motorcycle whilst changing lanes when travelling northbound through the junction.

2.66 Five of the accidents involved rear end shunts on the approaches to the junction. Two occurred on the A38(N) southbound approach, one occurred on the A38(S) northbound approach left turn filter lane, and two occurred on the A38(N) southbound approach left turn filter lane.

2.67 The remaining accidents were more random in nature, with no trends in the location or type. One accident involved a driver losing control, one involved a car driver colliding with an HGV driver who had alighted the vehicle, and three involved collisions whilst turning at the junction.

2.68 The junction is a large, busy signal controlled junction, and the 12 accidents recorded in the five year study period does not represent a high accident rate. There are no significant trends in the location or type of accidents recorded within the junction, and the accidents are attributed to driver error. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Junction 13: A617/Hamilton Road traffic signal controlled crossroads

2.69 Eight accidents were recorded at the junction in the five year study period. This includes one fatal accident, one serious accident and six slight accidents.

2.70 The fatal accident involved a car driver under the influence of alcohol entering the junction from Hamilton Road (N) into the path of an eastbound minibus, resulting in the minibus overturning.

2.71 The serious accident involved a car travelling northbound from Hamilton Road colliding with a motorcycle turning right from the A617(W) into Hamilton Road.

2.72 Two accidents occurred within minutes of each other, where a vehicle collided with a cyclist on Hamilton Road, and then collided with a parked cycle when the vehicle pulled away.

2.73 The remaining accidents were more random, with no trends in the location or type of accidents. Two accidents involved a rear end shunt on the A617 eastbound approach, one involved a rear end shunt on the A617 westbound approach, and one involved a vehicle emerging from Hamilton Road against the red signal.

2.74 The junction is a large, busy signal controlled junction, and the eight accidents recorded in the five year study period does not represent a high accident rate. There are no significant trends in the location or type of accidents recorded within the junction, and the accidents are attributed to driver error. The proposed development would add a minimal increase in traffic at the junction, and is unlikely to introduce an accident problem.

Newark Road/Searby Road T-junction

2.75 The Transport Assessment noted that no accidents have been recorded at the Newark Road/Searby Road T-junction. NCC requested that this be confirmed with data from VIAEM. The data in **Appendix E** shows that no accidents have been recorded at the junction in the last five years.

Conclusion

2.76 Overall, the Transport Assessment concluded that *"there are no significant trends in the number, location or frequency of accidents recorded at the study area junctions."* Following a more extensive review of data provided by VIAEM, this conclusion remains valid. It is also concluded that the proposed development is unlikely to introduce an accident problem at any of the study area junctions.

Opportunities for pedestrian travel

2.77 *Guidelines for Providing for Journeys on Foot*[4] describe acceptable walking distances for commuters and school pupils, where up to 500 metres is the desirable walking distance, up to 1,000 metres is an acceptable walking distance, and up to 2,000 metres is the preferred maximum walking distance. **Figure 5** shows the pedestrian catchment area based on a 2,000 metres walking distance from the centre of the site, via footways along the local highway network and traffic-free public footpaths. The catchment area covers the education, employment, health and retail facilities within the south-eastern parts of Sutton in Ashfield, including Sutton Forest Side, New Cross and Round Hill, as well as northern parts of Kirkby in Ashfield.

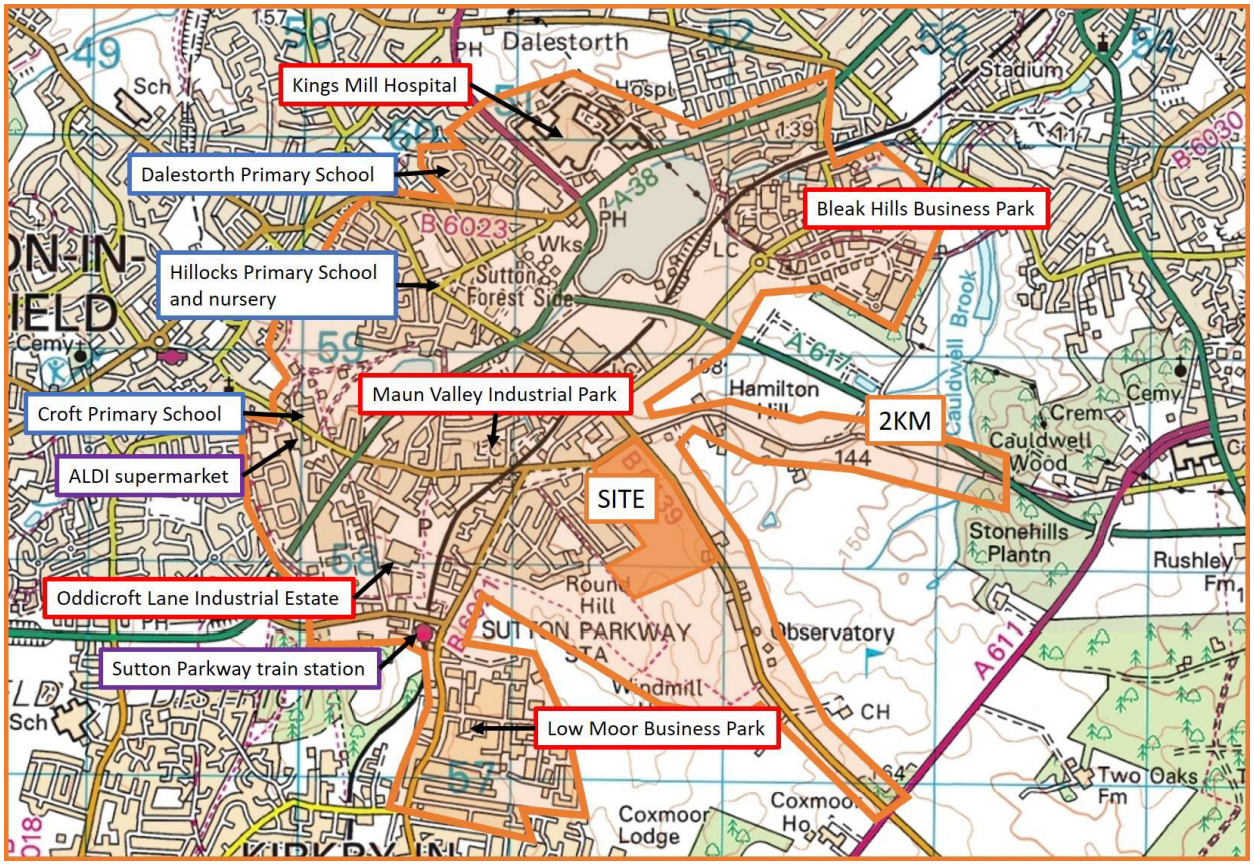


Figure 5: 2km pedestrian catchment area

2.78 The catchment area covers Hillocks Primary School, Croft Primary School and Dalestorth Primary School. The pedestrian catchment area also includes employment opportunities at the Maun Valley Industrial Park, Bleak Hills Business Park and Kings Mill Hospital to the north of the site, and the Oddicroft Industrial Estate and Low Moor Business Park to the west. The catchment area also includes a post office, an ALDI supermarket, Premier convenience store, hairdressers, veterinary surgery and a pub amongst others. Sutton Parkway train station is also within walking distance.

2.79 With regards to pedestrian infrastructure, there is a continuous street-lit footway on the northern side of Newark Road to the north of the site (**Photograph 1**). This runs west towards Sutton in Ashfield town centre, and east to connect to footways on both sides of Coxmoor Road to the north (**Photograph 2**). There is also a footway on the southern side of Newark Road, starting to the west of the Newark Road/Searby Road junction and extending towards the town centre, (**Photograph 3**).

[4] Guidelines for Providing for Journeys on Foot, Institution of Highways and Transportation, 2000

2.80 There are no crossing facilities on Newark Road in the vicinity of the site, or in the vicinity of the Searby Road junction for existing residents. The nearest pedestrian crossing, which has a central island, dropped kerbs and tactile paving, is between the Newark Road/Hamilton Road and Newark Road/Kirkby Folly Road junctions, approximately 250 metres to the west of the site frontage. There are also no pedestrian crossing facilities at the Coxmoor Road/Newark Road/Cauldwell Road junction, but there are currently no desire lines to cross the junction. Improved pedestrian crossing facilities on Newark Road should therefore be provided as part of the development proposals.

2.81 In addition to the infrastructure to the north of the site, there are good quality footways on both sides of Searby Road to the west of the site, as shown in **Photograph 4**, which in turn connect to good quality footways on Sotheby Avenue. These provide a connection to the footways on Newark Road to the north (photograph 3), and Farndon Road to the south (**Photograph 5**). These, in turn, connect to the footways on Kirkby Folly Road.

2.82 There is therefore a network of good quality footways connecting the site to the key facilities within the pedestrian catchment area.

2.83 There is also a signed, unsurfaced traffic-free public footpath along the western boundary of the site, which connects to Searby Road, Sotheby Avenue and further north to Kirkby Folly Road (**Photograph 6 and 7**). From here, there is a footway and a footway/cycleway on Kirkby Folly Road and Low Moor Road south towards the station, or north towards Station Road (**Photograph 8**). There are pedestrian crossing facilities with dropped kerbs, tactile paving and guardrailing at the Low Moor Road/Penny Emma Way traffic signal controlled junction on the desire line to the south and west.

Photograph 1: footway on Newark Road (looking west) along site frontage

Photograph 2: footways on both sides of Coxmoor Road (N) (looking north)

Photograph 3: footways on both sides of Newark Road (looking west from Searby Road)

Photograph 4: footways on Searby Road (looking south towards site)

Photograph 5: footways on Farndon Road

Photograph 6: public footpath between site and Sotheby Avenue

Photograph 7: public footpath between Sotheby Avenue and Kirkby Folly Road

Photograph 7: footways on Kirkby Folly Road/Low Moor Road

Opportunities for cycle travel

2.84 Cyclists are typically prepared to cycle up to 5km for non-leisure journeys, such as those to school or work. **Figure 6** shows the cycle catchment area based on a 5km distance from the centre of the site. It covers all of Sutton in Ashfield, Kirkby in Ashfield and large parts of Mansfield.

2.85 **Figure 7** shows an annotated extract of NCC's cycle map[5]. This shows that there are currently no cycle routes in the vicinity of the site, but that there are various on-road and off-road cycle routes on the desire lines to the north, east and west. There is an off-road cycle route via a segregated footway/cycleway along Kirkby Folly Road and Low Moor Road connecting to the station, which can be reached from the site via Searby Road, Sotheby Avenue and Farndon Road (shown in

[5] cycling-in-sutton-in-ashfield.pdf (nottinghamshire.gov.uk)

photograph 7 above), or via the Newark Road carriageway. There is also an on road cycle route along Hamilton Road, connecting to off-road cycle facilities on Hamilton Road and the A617 to the north.

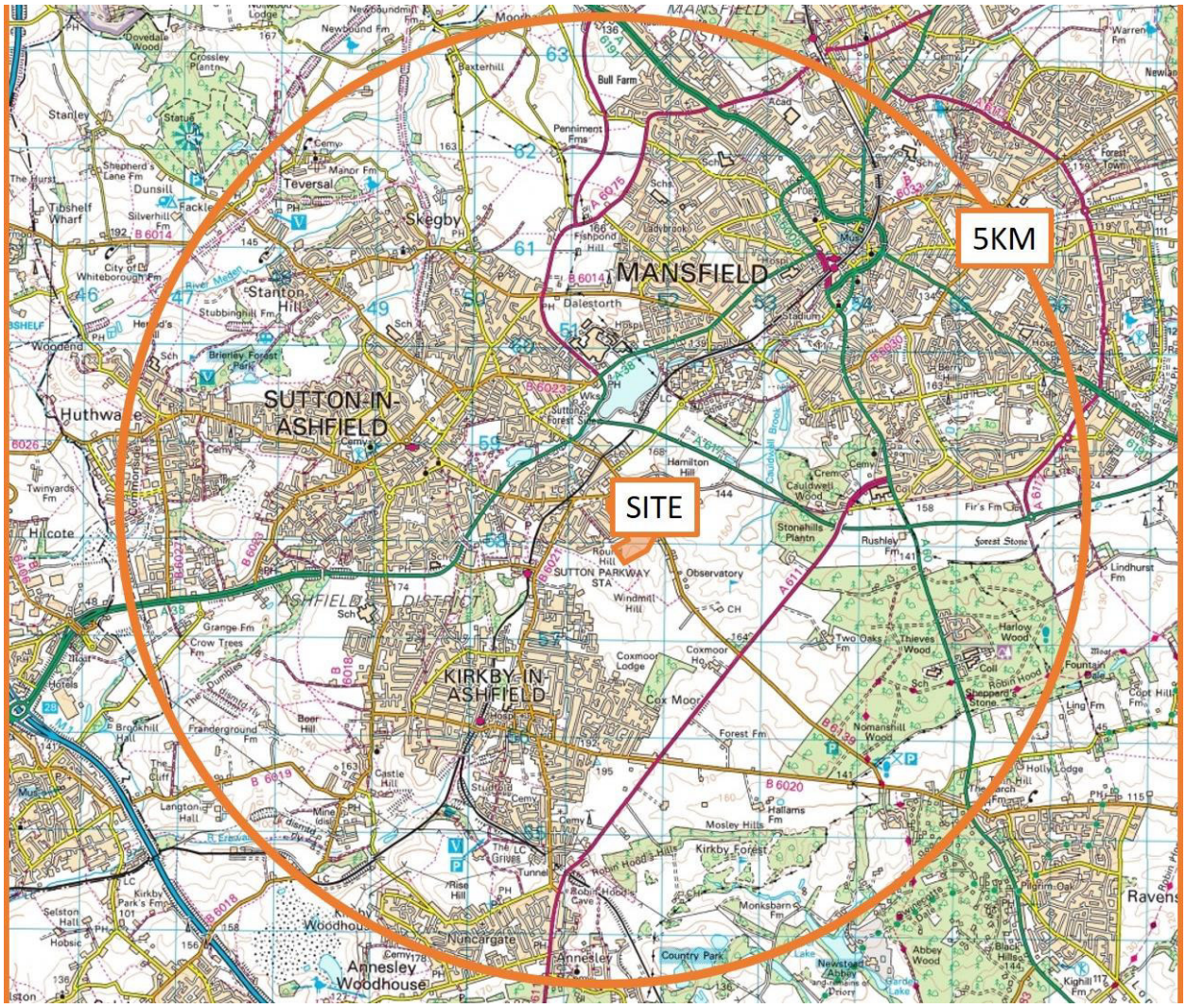


Figure 6: 5km cycle catchment area

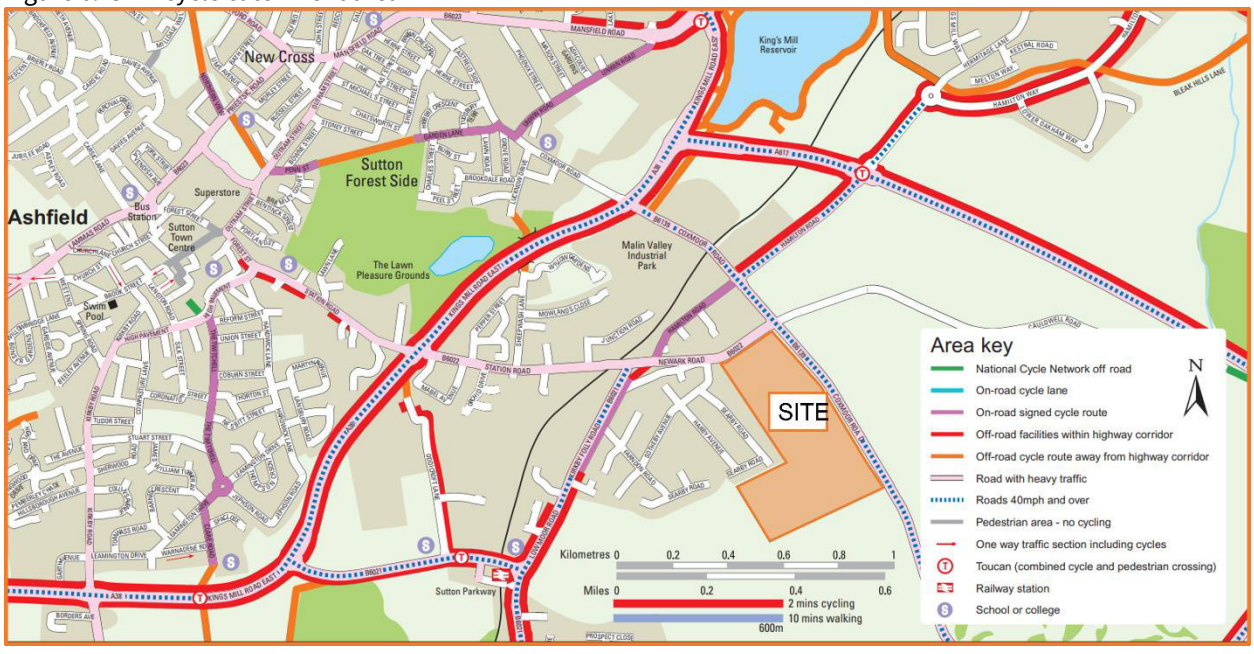


Figure 7: extract of NCC's cycle map

Opportunities for bus travel

2.86 As shown in **Figure 8**, the nearest bus stops to the site are on Sotheby Avenue and Kirkby Folly Road.

2.87 The bus stops on Sotheby Avenue provide access to Trent Barton Service 3C, which runs between Nottingham and Mansfield every 30 minutes from Monday to Saturday, and hourly on Sundays.

2.88 The two bus stops on the northern part of Sotheby Avenue comprise a simple flag and pole with raised kerbs, and are approximately 560 metres from the furthest development plot on the southern corner of the site (taking into account that the masterplan includes a vegetation corridor along the eastern boundary of the site due to the gradient of the land).

2.89 The Nottinghamshire Highway Design Guide states that *"generally walking distances to bus stops in urban areas should be a maximum of 400m and desirably no more than 250m. In rural areas, the walking distance should not be more than 800m."*

2.90 Clearly, the majority of the site is within the recommended 400 metres walking distance of a bus stop, but some of the development plots are up to 560 metres from the nearest bus stops. This should not be problematic, given that the 400 metres walking distance is guidance only.

2.91 As shown in **Figure 8,** the bus stops are accessible via the footways on Searby Road, or via the site frontage to Sotheby Avenue. There are therefore two possible pedestrian routes through to the bus stops, and public transport users at the site would take the shortest route available to them.

2.92 Further west, there are also bus stops on Kirkby Folly Road, which include shelters with seating and timetable information, but do not include raised kerbs. These bus stops provide access to:

- Trent Barton Service 90, running between Sutton in Ashfield and Ripley at an hourly frequency from Monday to Saturday. There are no services on Sunday.
- Trent Barton Black Cat service, running between Derby and Sutton in Ashfield at an hourly frequency from Monday to Saturday. There are no services on Sundays.

2.93 The majority of the site is within 800 metres walking distance of the bus stops for these services. Only the most south-eastern part of the site is beyond 800 metres walking distance of Service 90 and the Black Cat service. However, this part of the site is within 800 metres of the regular and frequent Service 3C, as identified above.

2.94 NCC have confirmed that there are no current plans to amend any of these bus services. NCC also confirmed that a bus service previously ran between Searby Road and Sutton in Ashfield town centre, but this was withdrawn in 2008 due to lack of passengers.

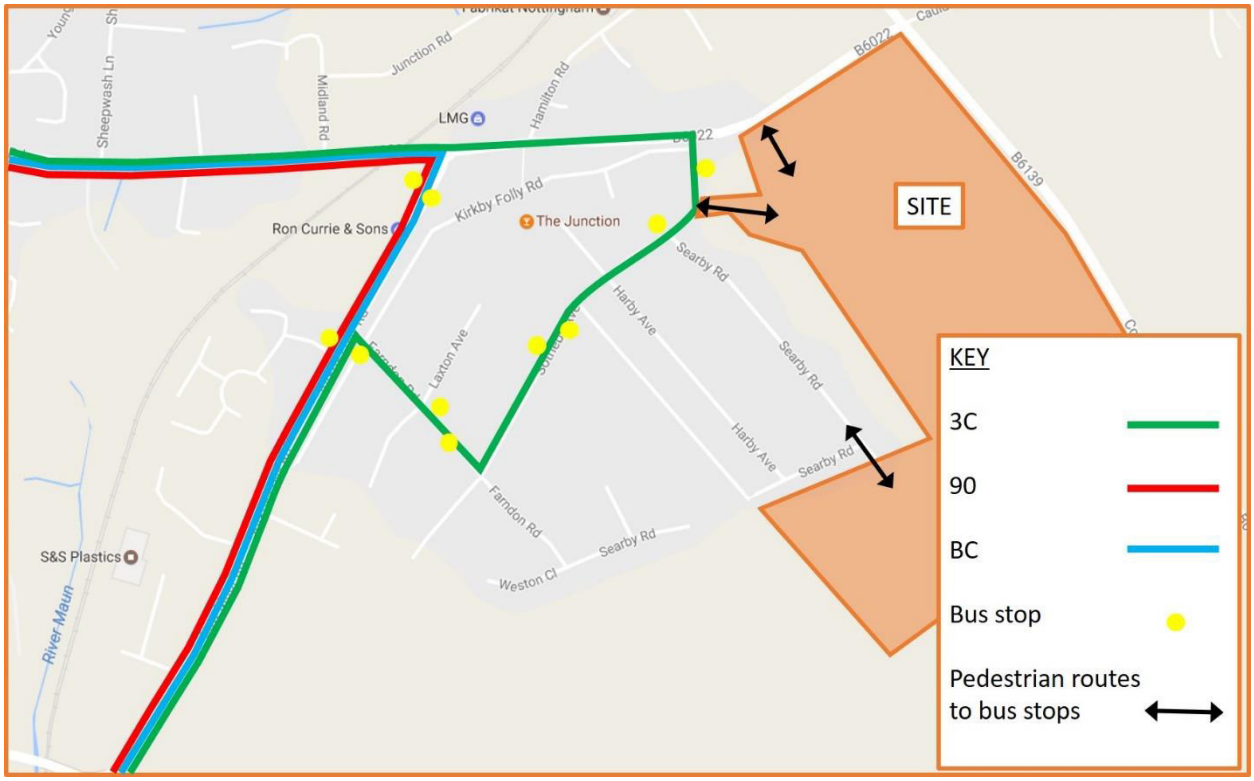


Figure 8: local bus services

Opportunities for train travel

2.95 Sutton Parkway train station is within walking and cycling distance of the proposed development site, and there are secure cycle parking spaces at the station. Bus Service 3C also runs past the train station. Therefore, there are excellent opportunities for rail travel as part of a multi-modal journey including walking, cycling or bus travel. From the station, there are regular services to Mansfield, Kirkby in Ashfield and Nottingham.

Summary

2.96 Overall, the site is accessible by all modes of travel and is therefore well located for residential development.

2.97 There are good opportunities for pedestrian travel, with good infrastructure provided on the desire lines to the north, east and west. A new pedestrian crossing should be provided on Newark Road as part of the development to facilitate pedestrian trips to and from the north, east and west. A pedestrian connection should also be provided between the site and Searby Road and Sotheby Avenue to accommodate the desire line to the west.

2.98 There are good opportunities for cycle travel. Whilst there are no cycle facilities in the vicinity of the site, there is a network of on-road and off-road cycle routes that cyclists can use. Newark Road is a busy road and may deter cyclists travelling to and from the site. A new footway/cycleway should therefore be provided. Alternatively, cyclists could route via Searby Road and Sotheby Avenue, and join the off-road cycle route along Kirkby Folly Road/Low Moor Road to the west.

2.99 There are good opportunities for public transport travel, including both bus and rail. The entire site is within 800m walking distance of the regular bus service 3C running at a 30-minutes frequency. Whilst the bus stops currently only comprise flag and poles, there is limited space

available to upgrade these to include shelters. Much of the site is also within walking distance of the hourly Service 90 and hourly Black Cat bus service.

2.100 Sutton Parkway train station is within walking and cycling distance, and is also accessible via the bus Service 3C. The station provides secure cycle parking, so there are good opportunities for train travel as part of a multi-modal journey.

3.0 PROPOSED DEVELOPMENT

Development proposals

3.1 The outline development proposals comprise up to 300 residential dwellings with associated parking. A copy of the illustrative masterplan is contained in **Appendix A** (note that this is different to the version of the masterplan issued in previous reports).

Car parking

3.2 The planning application is in outline, and therefore the number of car parking spaces that would be provided cannot be confirmed at this stage. Nevertheless, the residential car parking spaces would be provided in line with the likely car parking demand, to avoid the development leading to excessive on-street parking both within the site and on the local highway network, in accordance with NCC's parking policy[6]. The likely provision is 1 to 2 spaces for each of the smaller dwellings, and three spaces for the largest dwellings.

Access

3.3 The planning application is in outline, with all matters reserved except for access. As agreed with NCC, the proposed development would be accessed via a single junction on Newark Road. It is not proposed to provide any vehicular connections to Searby Road, and only a pedestrian access is proposed. It is also not proposed to provide any vehicular connections to Coxmoor Road, due to the topography of the site and the gradient constraints.

3.4 **Drawing ADC1580/003 P10** shows the proposed signal controlled layout on Newark Road. As agreed with NCC, the site access road measures 7.3m in width, with a 2m footway on the eastern side and a 4m wide footway/cycleway on the western side. This 'overwide' design provides additional space for maintenance/emergency access in the event that the site access road becomes blocked.

3.5 The location and layout of the proposed signal controlled junction has been designed to co-ordinate with the operation of the adjacent Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction to the north-east of the site, which will also be improved as part of the site access design. This mitigation includes increasing the flare lengths on Coxmoor Road (N) and Coxmoor Road (S), and separately signalling the left turn from Coxmoor Road (S). This is shown in **Drawing ADC1580/003 P10.** To avoid any queuing blocking back between the two junctions, two westbound lanes would be provided on Newark Road as shown in the drawing. The existing speed limit change would also be relocated further east on Newark Road, as shown in the drawing. Street lighting will be provided along the site frontage on Newark Road, and will be specified at the detailed design stage.

3.6 Swept path analysis of a max legal HGV and a pantechnicon were prepared, as shown in **Drawing ADC1580-DR-051 P2.** As shown, the proposed junction layout can satisfactorily accommodate the largest vehicles.

3.7 The junction was the subject of a Stage One Road Safety Audit and associated Response Report, as shown in **Appendix F.** The proposed junction layout is therefore considered safe and suitable to serve the proposed development, as agreed with NCC.

[6] http://site.nottinghamshire.gov.uk/travelling/parking/parkingpolicy/

Internal layout

3.8 The application is in outline only, with all matters reserved except for the access from Newark Road. It is intended that the internal layout would include a loop road arrangement, with the shortest practical distance between the access junction and the start of the loop. The additional road and footway/cycleway width would extend from Newark Road to the start of the loop, where the internal road would then be 6.2 metres with 2m footways. The internal layout has not been tracked for a refuse vehicle or bus, given the outline nature of the application, but the layout would ultimately be designed to accommodate a bus and refuse vehicle as part of the Reserved Matters applications.

3.9 Away from the main loop roads, the internal layout would include a mix of shared space roads, accessways and private driveways. There would be no more than five dwellings from each private drive. The internal layout would be designed to ensure that service vehicles can enter, manoeuvre and exit the site in a forward gear, with the provision of appropriate turning heads and provision for refuse and emergency service vehicles.

3.10 The roads would have a 20mph design speed. A swept path analysis of the internal road layout has not been prepared given the illustrative nature of the masterplan for the outline planning application. However, the road widths would be designed in accordance with Table DG1 of the Nottinghamshire Highway Design Guide. All details, such as the length of private drives, the traffic calming requirements within the layout, the provision of footways and service strips, the provision of swept path assessments etc will be addressed at the reserved matters stage.

3.11 As requested by NCC, the internal layout would future proof for any further development to the south-west of the site, with a road connection through to the south-western boundary of the site. However, that does not form part of this application, and therefore has not been assessed. It is not proposed to safeguard land for an access to Coxmoor Road, as this is not deliverable due to the topography.

Accessibility

3.12 To encourage pedestrian travel, three pedestrian connections would be provided. These include a connection to the footways on Searby Road; a connection to the footway on Sotheby Avenue; and a new 3m footway/cycleway on the southern side of Newark Road with new pedestrian crossings on Newark Road at the site access junction. These pedestrian connections are shown in the illustrative masterplan in **Appendix A**. In addition, the proposed infrastructure on Newark Road is shown in **Drawing ADC1580/003 P10**.

3.13 Within the site, cyclists would be encouraged to cycle on the carriageways, and it is not proposed to provide designated cycle lanes. However, the new off-road footway/cycleway along the main site access and along the southern side of Newark Road would connect to a new signed cycle route along Kirkby Folly Road (minor), which in turn connects to the off-road cycle lane running parallel to Kirkby Folly Road (major). This would provide a continuous route towards the station. This can be provided within the limits of the adopted highway boundary and land within the Client's control, and does not require third party land. The proposal is shown in **Drawing ADC1580/003 P10 and Drawing ADC1580/006 P2**. Cycle storage would be available in garages.

3.14 With regards to bus travel, as detailed in Section 2, the existing bus stops on the Sotheby Avenue are within 800 metres walking distance of the entire site, and would be accessible via the proposed pedestrian access points. The bus stops provide access to a regular half-hourly service.

3.15 Nevertheless, Transport and Travel Services have noted *"generally walking distances to bus stops in urban areas should be a maximum for 400m and desirably no more than 250m."* NCC Transport and Travel Services have therefore stated that *"should the nearest bus stop infrastructure be further away than the distances in the guidelines, then TTS will request that new bus stops are installed within the relevant distances via developer contributions, and/or seek developer contributions to provide appropriate local bus service enhancements and associated infrastructure to serve the site."*

3.16 NCC Transport and Travel Services have suggested that Service 3C could be diverted in a loop along Harby Avenue and Searby Road, with developer funding contributions. Alternatively, they suggest that a bespoke service linking Searby Road and Sutton in Ashfield town centre could be provided.

3.17 As part of the original Transport Assessment, Trent Barton were contacted to determine the potential to divert Service 3C via Harby Avenue and Searby Road. Trent Barton confirmed that they *"would be willing to consider the diversion".* They have confirmed that to accommodate the diversion, an additional vehicle would be required to serve the route due to the tight running times, and have suggested an approximate cost of £150,000 per year for an additional vehicle. The Transport Assessment therefore proposed to provide funding contributions towards the provision of the diverted bus service via Searby Road, and the provision of new bus stops closer to the site. Nottinghamshire County Council Planning has subsequently requested an indicative bus contribution of £150,000 (letter dated 19 August 2020).

3.18 NCC Highways have requested improvements to the closest bus stops to the site, as follows:

- ASO324 Kirkby Folly Road – real time bus stop pole and display, including associated electrical connections, and raised boarding kerbs
- ASO551 Kirkby Folly Road – real time bus stop pole and display, including associated electrical connections, and raised boarding kerbs
- ASO566 Searby Road – real time bus stop pole and display, including associated electrical connections
- ASO567 Searby Road – real time bus stop pole and display, including associated electrical connections.

This is agreed, and these improvements will be included as part of the development proposals. The letter from NCC Planning refers to a contribution of £31,000 for bus stop improvements.

4.0 TRIP GENERATION

Traffic generation

4.1 The forecast traffic generation of the proposed development was calculated using the 'privately owned houses' category of the TRICS 7.3.4 database. All sites located in England, with the exception of Greater London, were selected. Sites with 100 to 700 dwellings were selected, and only edge of town and suburban sites were selected. All weekend surveys were deselected. The TRICS outputs are contained in **Appendix G**, and the 85th percentile trip rates and resultant traffic generation of 300 dwellings are shown in the table below. The trip rates and resultant traffic generation have been agreed with NCC.

4.2 The impact of these additional trips are examined in Section 7. This results in a robust assessment, as the effects of the proposed sustainable travel infrastructure detailed in Section 3, and the effects of the Travel Plan, are not taken into account.

Proposed vehicle trip rates and traffic generation		arrive	depart	two-way
trip rates (per dwelling)	AM peak hour	0.177	0.523	0.700
	PM peak hour	0.439	0.274	0.713
vehicle trips (300 dwellings)	AM peak hour	53	157	210
	PM peak hour	132	82	214

Modal split and person trip generation

4.3 As detailed in the Scoping Study, the proportion of trips by each mode was calculated using the 2011 National Census 'Method of travel to Work' data (dataset QS701EW). The site is located in the Sutton in Ashfield East ward, and it is reasonable to assume that new residents at the development will display similar travel patterns to existing residents in the area. A copy of the dataset is contained in **Appendix H.**

4.4 The resultant modal split[7] and person trip generation is summarised below, based on the worst case evening peak hour traffic generation in the table at paragraph 4.1. The modal split and resultant trip generation were agreed with NCC.

	on foot	bicycle	bus	train	motorcycle	car driver	passenger	taxi
	14.0%	2.8%	6.4%	1.0%	0.9%	66.5%	8.1%	0.2%
peak hour	45	9	21	3	3	214	26	1

4.5 Section 2 details the existing infrastructure in the vicinity of the site, and Section 3 details the proposed infrastructure, including new pedestrian connections to Searby Road and Sotheby Avenue, a new footway/cycleway along Newark Road, a new signal controlled pedestrian crossing on Newark Road, a new signed cycle route along minor Kirkby Folly Road, and contributions towards bus stop improvements and bus service enhancements. The existing and proposed infrastructure has the capacity to accommodate the additional 45 walking trips and 9 cycle trips.

[7] The weblink for the modal split data for the Sutton in Ashfield East ward: http://www.neighbourhood.statistics.gov.uk/dissemination/LeadTableView.do?a=5&b=13693973&c=sutton+in+ashfield+east&d=14&e=61&g=6455993&i=1001x1003x1032x1004&m=0&r=1&s=1492511073432&enc=1&dsFamilyId=2567

4.6 The bus Service 3C runs every 30 minutes in each direction on Sotheby Road within walking distance of the site, and a further two bus services in each direction per hour (hourly Service 90 and hourly Black Cat service) on Kirkby Folly Road. These eight buses would need to accommodate 21 bus passengers, an average of 3 passengers per bus. The existing and proposed routes would have the capacity to accommodate this demand.

5.0 VEHICLE DISTRIBUTION AND ASSIGNMENT

5.1 The original Transport Assessment distributed the development traffic to the highway network using the 2011 National Census 'location of usual residence and place of work by method of travel to work' dataset (reference WU03EW) for the 'Ashfield 007' MSOA.

5.2 However, NCC subsequently requested that Census data be used to distribute traffic turning into and out of the site access junction, but that an alternative distribution pattern, based on observed turning flows, was used at all off-site junctions.

5.3 The revised distribution patterns at the off-site junctions were therefore calculated using observed turning proportions from the traffic counts undertaken in 2017 as part of the Transport Assessment, and were presented in the Transport Assessment Addendum (document reference ADC1580 TA Addendum V2).

5.4 However, NCC subsequently requested a revised distribution of traffic at the Coxmoor Road/Newark Road/Cauldwell Road junction (junction 4), to show 36% of trips travelling along Newark Road to and from the north and 24% travelling along Newark Road to and from the south. Then, at Junctions 5 and 6, the figures coming to/from Junction 4 were factored by the observed turning proportions, as agreed with NCC. This was therefore completed in the Additional Transport Assessment (document reference ADC1580 Additional TA Addendum v3).

5.5 The revised morning and evening peak hour distribution patterns and resultant development traffic assignment are shown in **Diagrams 3 and 5 in Appendix C**. These are also shown pictorially at Junctions 4, 5 and 6 in **Appendix I** for ease of understanding.

5.6 The revised development traffic flows were added to the '2027 background' traffic flows from the Transport Assessment. These are replicated in **Diagrams 7 and 8 in Appendix C** for ease of reference**.** The resultant '2027 with development' traffic flows are shown in **Diagrams 9 and 10 in Appendix C.** These flows are used in the following chapters to assess the highway impact of the development traffic at the off-site study area junctions.

5.7 These flows have been agreed with NCC, in an email dated 23 March 2018.

6.0 ASSESSMENT TRAFFIC FLOWS

Study area

6.1 As shown in **Figure 4**, the study area agreed with NCC includes the following junctions:

1. A38/Penny Emma Way signal controlled junction
2. B6021 Lowmoor Road/Penny Emma Way/Kirkby Folly Road signal controlled junction
3. B6022 Newark Road/Kirkby Folly Road mini-roundabout
4. B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction
5. B6139 Coxmoor Road/Hamilton Road mini-roundabout
6. A611 Derby Road/B6139 Coxmoor Road signal controlled junction
7. A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction
8. A611 Derby Road/B6021 Nottingham Road signal controlled junction
9. A611 Derby Road/A608 Annesley Road signal controlled gyratory.
10. A611/Forest Road traffic signal controlled T-junction.
11. A38/Station Road traffic signal controlled crossroads
12. A38/Coxmoor Road traffic signal controlled crossroads
13. A617/Hamilton Road traffic signal controlled crossroads.

6.2 In addition, following comments from local residents at the public consultation, the operation of the Newark Road/Searby Road T-junction is assessed, as is the operation of the Sutton Junction level crossing on the B6022 Newark Road/Station Road.

Observed traffic flows

6.3 As detailed in Section 2, traffic count data for each junction listed in Section 6.1 (excluding junctions 11-13) was obtained from traffic counts undertaken in 2017. The observed traffic flows are shown in **Diagrams 1 and 2 in Appendix C.**

6.4 In addition, a separate traffic count was undertaken at the Newark Road/Searby Road T-junction on Thursday 29 June 2017 between 0730-0930 and 1600-1830 hours. The observed peak hours were 0800-0900 and 1630-1730 hours. The traffic count results and the junction diagrams are contained in **Appendix J.**

Assessment year background traffic flows and committed development

6.5 As agreed with NCC, the assessment year is 2027 (10 years after registration of the planning application). The observed traffic flows were therefore growthed to 2027 levels using TEMPRO (version 7, dataset 72), which includes links to the National Traffic Model. In the ten-year period, the background traffic is forecast to grow by approximately 15%. The agreed TEMPRO growth rates for all roads in Ashfield 007 are:

- 2017 to 2027 AM peak hour 1.1509
- 2017 to 2027 PM peak hour 1.1477.

The resultant 2027 background traffic flows are shown in **Diagrams 7 and 8 in Appendix C.** The traffic flows for the Newark Road/Searby Road junction are shown in the diagrams in **Appendix J.**

6.6 In addition to the background growth, it is necessary to include traffic flows associated with any committed developments within the 2027 assessment year traffic flows. The NPPG states that *"it is important to give appropriate consideration to the cumulative impacts arising from other committed development (i.e. development that is consented or allocated where there is a reasonable degree of certainty will proceed within the next three years). At the decision-taking*

stage this may require the developer to carry out an assessment of the impact of those adopted Local Plan allocations which have the potential to impact on the same sections of transport network as well as other relevant local sites benefitting from as yet unimplemented planning approval."

6.7 However, whilst NCC initially requested that a number of committed development schemes be considered, it was subsequently agreed as part of the Scoping Study that none of those schemes added traffic to the proposed study area junctions. Therefore, it was agreed with NCC that none of those committed developments needed to be included in the 2027 background flows.

2027 with development traffic flows

6.8 The assigned development traffic in **Diagrams 4 and 6** were added to the 2027 background flows. The '2027 with development' traffic flows are shown in **Diagrams 9 and 10 in Appendix C.** The traffic flows for the Newark Road/Searby Road junction are shown in the diagrams in **Appendix J.**

7.0 HIGHWAY IMPACT

Introduction

7.1 This section presents the results of the assessments at each of the study area junctions, extracted from the Transport Assessment, subsequent two Transport Assessment Addendums, and the Technical Notes. It therefore presents the latest assessments for each junction, and where necessary, the junction mitigation schemes, as agreed with NCC.

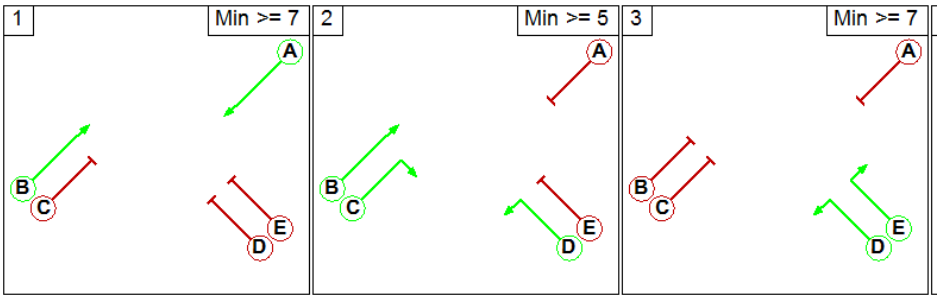
7.2 It is highlighted that the Transport Assessment included detailed modelling of Junctions 1 to 10, and a qualitative assessment of Junctions 11 to 13. As detailed earlier, NCC then raised comments on the distribution and assignment of the development traffic, and revised traffic flows were presented in the Transport Assessment Addendums. The focus of the Transport Assessment Addendums and subsequent Technical Notes was on the key impacted Junctions 3-6. Therefore, Junctions 1 and 2, and 7-10 were not remodelled. This is considered further in the sections below.

Junction 1 - A38/Penny Emma Way signal controlled junction

7.3 As noted in the Ashfield Transport Study (ATS) (October 2016), the A38/Penny Emma Way junction *"is a signalised three arm junction with non-signalised pedestrian crossing facilities on the Penny Emma Way arm of the junction. Each arm is split into two movements with all arms having a total of three lanes on the approach. The A38 North has a filter lane for left turning flows which gives way on entering Penny Emma Way. The A38 South has one signalised filter lane for right turning flows and two lanes for forward movements. The B6021 has a segregated filter lane for left turning movements and two lanes for right turning movements."*

7.4 A model of the junction, shown in **Figure 9**, was built using LinSig and tested with the 2017 and 2027 traffic flows as part of the original Transport Assessment. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and three stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix K**.

Figure 9: existing A38/Penny Emma Way junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	0%	33.69	90%	25
	PM	90	29.0%	18.83	69.7%	13.9
2027 background	AM	90	-14.7%	98.17	103.2%	55.8
	PM	90	12.5%	24.40	80%	19.6
2027 with development	AM	90	-15.7%	111.08	104.1%	55.8
	PM	90	12.4%	25.00	80.1%	19.6

7.5 The junction was operating at capacity (accepted as all links at or below 90% degree of saturation) in the morning peak hour, and with spare capacity in the evening peak hour in 2017. By 2027, the junction is forecast to operate with a negative PRC (indicating that one or more links is operating with a degree of saturation above 90%) in the morning peak hour, but continues to operate with spare capacity in the evening peak hour.

7.6 The Transport Assessment concluded that the addition of the proposed development traffic had a minimal impact on the operation of the junction. In the morning peak hour, the degree of saturation changed by 0.9% from 103.2% to 104.1%, whilst the total delay increased by just 13 seconds. The Transport Assessment concluded that this is not a severe impact. In the evening peak hour, the junction continued to operate with spare capacity.

7.7 Based on the traffic flows from the original Transport Assessment, the development would have generated 32 and 33 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate just 17 and 18 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore no further assessment is required.

7.8 Furthermore, it is worth highlighting that the junction operates under MOVA control, which would adjust the green times on a cycle-by-cycle basis, depending on demand, to allow the most efficient operation of the junction. Therefore, the junction would operate better than is forecast by LinSig and summarised in the table above.

7.9 Therefore, no mitigation measures are required as a result of the development. This accords with the conclusion of the ATS, which is that *"no mitigation strategy is required at this junction."*

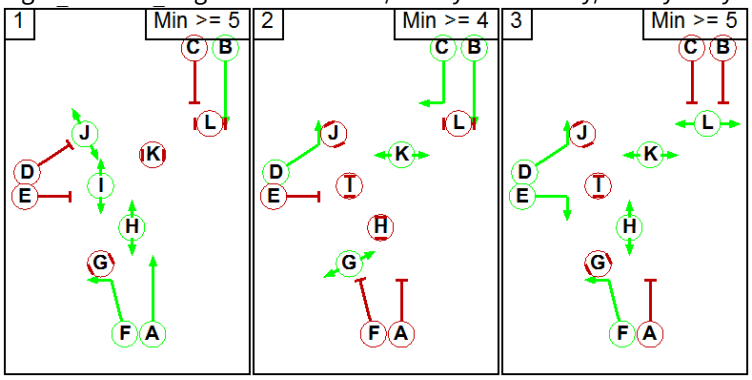
Junction 2 - B6021 Low Moor Rd/Penny Emma Way/Kirkby Folly Rd signal junction

7.10 As noted in the ATS, *"the Penny Emma Way and Low Moor Road junction is a signalised T-Junction with signalised pedestrian crossing facilities across Penny Emma Way and Low Moor Road North. B6021 Low Moor Road provides a north to south arterial route which widens to two lanes at the*

junction to provide segregated turning lanes. Penny Emma Way provides two right turning lanes and a left turning flare at the junction."

7.11 A model of the junction, shown in **Figure 10**, was built using LinSig and tested with the 2017 and 2027 traffic flows as part of the original Transport Assessment. Signal plan data was obtained from NCC, including the cycle time, intergreens, and three stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix L**.

Figure 10: existing Low Moor Road/Penny Emma Way/Kirkby Folly Road junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	1.7%	26.11	88.5%	17.7
	PM	90	19.8%	13.78	75.1%	12.1
2027 background	AM	90	-12.9%	64.40	101.6%	45.1
	PM	90	6.1%	18.69	84.8%	16.2
2027 with development	AM	90	-16.2%	88.82	104.5%	58.9
	PM	90	2.3%	20.54	88.0%	19.3

7.12 The Transport Assessment concluded that the junction was operating within acceptable limits (all links at or below 90% degree of saturation) in both peak hours in 2017. In the 2027 background scenario, the junction was forecast to operate with a negative PRC (one or more links operation above the 90% degree of saturation in the morning peak hour) but with capacity in the evening peak hour.

7.13 The Transport Assessment concluded that the addition of the proposed development traffic resulted in the worst case approach arm (Low Moor Road (S)) operating at a 3% higher degree of saturation, and with the maximum queue length increasing by 14 PCUs. The total delay at the junction increases by 25 seconds in the morning peak hour. This Transport Assessment concluded that this is not a severe impact. In the evening peak hour, the junction continued to operate with spare capacity.

7.14 Based on the traffic flows from the original Transport Assessment, the development would have generated 68 and 70 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate 64 and 67 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore, no further assessment is required.

7.15 Furthermore, it is worth highlighting that the junction operates under MOVA control, which would adjust the green times on a cycle-by-cycle basis, depending on demand, to allow the most efficient operation of the junction. Therefore, the junction would operate better than is forecast by LinSig and summarised in the table above.

7.16 Overall, no mitigation is required at this junction.

Junction 3 - B6022 Newark Road/Kirkby Folly Road mini-roundabout

7.17 The existing junction is shown in **Figure 11**. As part of the original Transport Assessment and subsequent Addendums, the existing junction layout was modelled using Junctions 8 ARCADY software and the 2017 observed, 2027 background, and 2027 with development traffic flows. The ARCADY output is contained in **Appendix M.** Based on those results, shown in the table below, the Transport Assessment concluded that the proposed development would have an impact at the junction, and that mitigation options should therefore be examined.

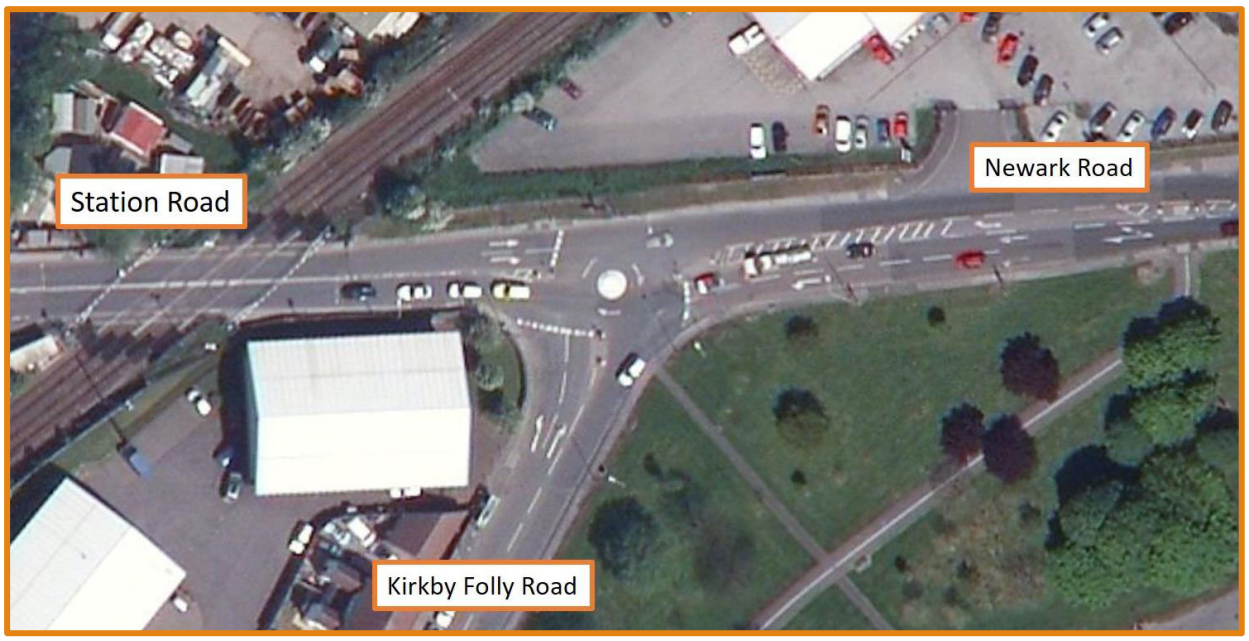


Figure 11: existing Newark Road/Kirkby Folly Road mini-roundabout

	AM			PM		
	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC
	2017 Observed – existing layout					
Newark Rd (E)	6.38	24.19	88%	1.79	8.35	64%
Kirkby Folly Rd	5.85	33.19	87%	130.17	555.18	127%
Newark Rd (W)	1.05	8.96	51%	0.83	8.83	46%
	2027 Background – existing layout					
Newark Rd (E)	30.82	93.22	102%	2.86	11.76	75%
Kirkby Folly Rd	22.74	104.53	102%	280.03	1188.48	148%
Newark Rd (W)	1.67	12.51	63%	1.06	9.76	52%
	2027 With development – existing layout					
Newark Rd (E)	56.91	153.41	108%	3.34	13.27	78%
Kirkby Folly Rd	28.34	124.64	104%	332.20	1422.15	154%
Newark Rd (W)	1.76	13.01	64%	1.12	10.05	53%

7.18 The most heavily congested movements are:

- Newark Road (E) in the morning, where the queue increases from 31 to 57 vehicles, because of 62 additional development vehicles on that approach
- Kirby Folly Road in the evening, where the queue increases from 280 to 332 vehicles, because of 43 additional development vehicles on that approach.

7.19 The Transport Assessment proposed a potential highway improvement scheme, which altered the junction from a mini-roundabout to a three-arm signal-controlled T-junction. However, NCC made comments on the proposed arrangement, raising concerns about the potential safety implications of queues forming across the adjacent level crossing, due to the proximity of the traffic signals to the level crossing. NCC also noted that the proposed signal-controlled junction did not include formal pedestrian crossing facilities, and stated that an improved junction layout without formal pedestrian crossing facilities would not be acceptable.

7.20 As a result, the subsequent Transport Assessment Addendum presented alternative options including relocating the signal junction further east away from the level crossing, an enlarged roundabout, and an improved mini-roundabout that included a bypass lane from Newark Road

(E) to Kirkby Folly Road. These improvement schemes were discounted for various reasons relating to highway safety and the loss of important local greenspace and trees.

7.21 Therefore, the subsequent Capacity Assessment Technical Note presented a revised mitigation scheme. Junction modelling shows that the impact of the proposed development on Newark Road (E) and Kirkby Folly Road could be mitigated with minor kerb widening to increase the flare length and entry widths, thereby allowing more traffic through the give way line. Only one extra vehicle a minute needs to pass over the give-way line to achieve a nil-detriment position.

7.22 The mitigation scheme is shown on **Drawing ADC1580-DR-004-P8** in the drawings folder at the end of this report**,** and this was subject to a Stage One Road Safety Audit as shown in **Appendix F**. The proposed works also improve pedestrian crossing facilities via enlarged refuges on Kirkby Folly Road and Newark Road (W). The swept path analysis of a maximum legal articulated vehicle is also shown on **Drawing ADC1580-DR-052-P2**. The effect of the mitigation scheme has been modelled using Junctions 8 ARCADY and tested with the 2027 with development traffic flows. The results are summarised in the table below, and the ARCADY measurements and outputs are in **Appendix N**.

	AM			PM		
	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC
	2027 with development – improved layout					
Newark Rd (E)	22.68	67.69	99%	2.46	9.65	71%
Kirkby Folly Rd	15.53	73.14	98%	268.02	1055.23	144%
Newark Rd (W)	1.69	12.51	63%	1.16	10.43	54%

7.23 As shown, the scheme would provide a better than nil detriment solution, and would mitigate the development traffic impact on Newark Road (E) and Kirkby Folly Road with reduced queuing and delay. In the morning peak hour, the queues on Newark Road (E) would reduce from 31 to 23 vehicles, and the delay would reduce by 25 seconds to 68 seconds. The queue length on Kirkby Folly Road would reduce from 23 to 16 vehicles, and the delay would reduce by 32 seconds to 73 seconds.

7.24 In the evening peak hour, the queue on Kirkby Folly Road would reduce from 280 to 269 vehicles and the delay would reduce by 133 seconds to 1055 seconds.

7.25 Therefore, this proposed junction arrangement mitigates the traffic flow, provides benefit to the pedestrians crossing the junction, and addresses any potential safety issues. The proposed junction arrangement was found acceptable to NCC. The highway works would be provided in full as part of the proposed development, and secured via a suitably worded planning condition.

Junction 4 - B6139 Coxmoor Rd/Newark Rd/Cauldwell Rd signal controlled junction

7.26 The existing junction arrangement was modelled using LinSig version 3.2.40 and the 2017 observed, 2027 background, and 2027 with development traffic flows. The model was adjusted to take into account the queuing that blocks back from the Hamilton Road junction as presented in the ARCADY model of the existing mini-roundabout. The model of the existing junction is provided at **Appendix O** and the results shown in the table below. The results show that the existing junction would operate above the accepted 90% practical reserve capacity threshold with long delays through the junction in both the 2017 and 2027 scenarios.

Existing layout	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	270	-35.1%	156.27	121.6%	106.7
	PM	270	-32.6%	73.61	119.4%	64.4
2027 background	AM	270	-40.7%	422.14	126.6%	182.9
	PM	270	-42.8%	118.05	128.5%	95.7
2027 with development	AM	270	-47.2%	506.78	132.5%	241.3
	PM	270	-53.1%	155.28	137.8%	122.8

7.27 The table below shows the forecast queueing on all arms at the existing junction in the three modelled scenarios.

Coxmoor Road/Newark Road/Caudwell Road existing layout - Queue Lengths						
	Peak	Coxmoor Road (N)	Caudwell Road	Coxmoor Road (S)	Newark Road	Total
2017 Observed	AM	64.5	0.7	106.7	14.7	186.6
2027 Background		182.9	0.8	147.4	180.8	511.9
2027 With Dev		216.1	0.8	165.0	241.3	623.7
2017 Observed	PM	15.7	0.9	64.4	7.8	88.8
2027 Background		27.6	0.9	95.7	13.2	137.4
2027 With Dev		31.5	0.9	122.8	19.3	174.5

7.28 In the 2017 scenario, long queues are shown on both Coxmoor Road (N) and Coxmoor Road (S) that block back to the Hamilton Road junction to the north and beyond the dip and hurry call loop in the Coxmoor Road (S) carriageway. In the 2027 Background scenario, with the addition of 10 years traffic growth, the forecast queues lengthen. Hence, the existing junction does not have the capacity to accommodate current and future levels of traffic growth.

7.29 An improvement scheme was designed to accommodate the additional development traffic, as shown in **Drawing ADC1580-003 P10** contained in the drawings folder at the end of this report. The layout was subject to a Stage One Road Safety Audit, as shown in **Drawing ADC1580-003 P10** and associated Response Report, as shown in **Appendix F.** The improved Coxmoor Road/Newark Road/Caudwell Road junction was modelled using LinSig and the 2027 with development traffic flows. The proposed model continues to replicate the anticipated queuing on the exit of Coxmoor Road (N) associated with the Hamilton Road mini-roundabout. The LinSig results are in **Appendix P**, and are summarised in the table below.

Improved layout	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2027 with development	AM	90	-38.4%	189.88	124.5%	118.8
	PM	90	-7.3%	53.6	96.5%	34.7

7.30 As shown, whilst the proposed junction is still forecast to operate above the 10% reserve capacity threshold in both the morning and evening peak hours, the total delay through the junction is significantly improved. A greater than nil-detriment scenario is achieved. With the mitigation works in place, the total delay in the morning peak hour through the junction improves by 232 PCUhr (from 422 to 190) compared to the 2027 background scenario. In the evening peak hour, total delay through the junction improves by 64 PCUs/hr (from 118 to 54).

7.31 The table below provides a comparison of the forecast queuing on all arms of the junction at the proposed junction with the development in place compared to the 2027 background scenario and existing layout.

Coxmoor Road/Newark Road/Caudwell Road - Queue Lengths Comparison						
	Peak	Coxmoor Road (N)	Caudwell Road	Coxmoor Road (S)	Newark Road	Total
2027 Background (existing layout)	AM	182.9	0.8	147.4	180.8	511.9
2027 With Dev (improved layout)		118.8	0.3	68.3	8.4	195.8
2027 Background (existing layout)	PM	27.6	0.9	95.7	13.2	137.4
2027 With Dev (improved layout)		34.7	0.4	17.3	13.6	66.0

7.32 Clearly, the proposed improvement scheme provides significant improvements over the existing arrangement, with total queuing at the junction reducing from 512 to 196 PCUs in the morning peak hour and from 137 to 66 PCUs in the evening peak hour.

7.33 The results demonstrate that the proposed improvement would deliver a better than nil detriment improvement to junction performance, mitigating the impact of the development and providing additional capacity back into the network. The proposed junction arrangement was found acceptable to NCC. The highway works would be provided in full as part of the proposed development, and secured via a suitably worded planning condition.

Junction 5 - B6139 Coxmoor Road/Hamilton Road mini-roundabout

7.34 The existing junction is shown in **Figure 12**. As part of the Transport Assessment, the existing junction layout was modelled using Junctions 8 ARCADY software and the 2017 observed, 2027 background, and 2027 with development traffic flows.

Figure 12: Existing B6139 Coxmoor Road/Hamilton Road mini-roundabout

7.35 Based on the ARCADY results provided at **Appendix Q** and shown in the table below, the Transport Assessment concluded that the proposed development would have an impact at the junction, and that mitigation options should be examined.

	AM			PM		
	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC
	2017 Observed – existing layout					
Coxmoor Rd (N)	1.60	13.23	62%	2.49	19.73	72%
Hamilton Rd	3.83	24.31	80%	8.25	46.42	91%
Coxmoor Rd (S)	3.98	16.61	81%	16.51	57.23	97%
	2027 Background – existing layout					
Coxmoor Rd (N)	3.12	22.93	77%	5.04	35.78	85%
Hamilton Rd	13.47	74.13	97%	43.09	183.46	109%
Coxmoor Rd (S)	10.84	40.63	94%	77.94	226.34	112%
	2027 With development – existing layout					
Coxmoor Rd (N)	3.50	25.56	79%	6.05	41.87	88%
Hamilton Rd	15.88	84.85	99%	56.94	235.94	114%
Coxmoor Rd (S)	16.65	58.37	97%	87.48	261.45	114%

7.36 The Transport Assessment presented a potential highway improvement scheme, which upgraded the junction from a mini-roundabout to a traffic signal-controlled T-junction. The Transport Assessment concluded that the scheme offered a significantly better than nil detriment solution, with reduced queuing and delay on all arms in both peak hours.

7.37 However, NCC stated (7 January 2019) that "*the only way that the junction can be made to work remotely tolerably is to have the right turn from Coxmoor Road to Hamilton Road running as a gap seeking turn with a right turn indicative arrow facility. However, the numbers involved are at a level where we should be full signalling the turn and the gap seeking element is of significant concern to*

Road Safety. A fully signalised right turn would remove the gap seeking element, making it safer, but unfortunately the capacity of the junction then becomes unacceptable."

7.38 NCC therefore requested that another form of improvement be investigated (enlarged mini, full roundabout, etc). Whilst a traffic signal junction is still considered the best form of mitigation as it helps to formally control queues from Hamilton Road, through the Coxmoor Road/Newark Road and towards the Kirkby Folly Road mini-roundabout, through an overly congested network of junctions, NCC's request has been taken on board. Hence, an enlarged mini-roundabout has been examined.

7.39 Three options were examined:

- Option 1: widening to the Hamilton Road arm to allow a lengthened two-lane approach and widened exit onto Coxmoor Road (S).
- Option 2: widening to Coxmoor Road (S) and Hamilton Road to provide a lengthened two-lane approach on both arms and wider exits on Coxmoor Road in both directions.
- Option 3: enhanced widening to Coxmoor Road (S) and Hamilton Road to provide longer two-lane approaches. This option uses the maximum footprint available within adopted highway land.

7.40 The capacity and hence potential highway benefits were assessed using Junctions 8 ARCADY software and the 2027 with development traffic flows. The results of the ARCADY assessments are in **Appendix R**, and the results are summarised in the table below.

	AM			PM		
	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC
	Option 1: Hamilton Road only					
Coxmoor Rd (N)	2.30	16.40	70%	3.12	20.79	77%
Hamilton Rd	2.22	11.70	69%	4.01	18.34	81%
Coxmoor Rd (S)	17.52	60.25	98%	88.19	249.51	114%
	Option 2: Smaller Scheme					
Coxmoor Rd (N)	2.35	16.74	71%	3.69	24.84	80%
Hamilton Rd	2.22	11.70	69%	4.01	18.31	81%
Coxmoor Rd (S)	7.64	26.83	90%	42.14	111.21	104%
	Option 3: Max Scheme					
Coxmoor Rd (N)	2.36	16.80	71%	4.18	28.33	82%
Hamilton Rd	2.11	11.11	68%	3.71	16.90	80%
Coxmoor Rd (S)	3.85	13.08	80%	10.61	31.93	93%

7.41 Option 1 would provide an improvement to the overall capacity, queuing and delay of Hamilton Road. However, Coxmoor Road (S) would continue to operate above capacity with long queues blocking back to the Coxmoor Road/Newark Road/Caudwell Road junction and hence impacting the operation of the signal junction.

7.42 Option 2 would significantly increase the capacity of both Coxmoor Road (S) and Hamilton Road and would provide a better than nil-detriment mitigation scheme. However, the queues on Coxmoor Road (S) are forecast to reach 42 vehicles in the evening peak hour. A queue of 42 vehicles equates to around 242m and hence vehicles would still block back through the Coxmoor Road/Newark Road/Caudwell Road junction, creating further delay at the signal junction to the south.

7.43 Option 3 further reduces queuing and delay on Coxmoor Road (S) and provides a junction that operates with acceptable spare capacity with the development in place. Option 3 also reduces the impact on the queuing and delay on the Coxmoor Road/Newark Road/Caudwell Road junction to the south. The layout of Option 3 is shown on **Drawing ADC1580-005-P7** and the swept path analysis of a maximum legal articulated vehicle at the junction is shown on **Drawing ADC1580-DR-053-P2**. Both drawings are contained in the drawings folder at the end of this report.

7.44 Overall, the Option 3 improvement offers benefits to the traffic flow whilst maintaining the pedestrians crossing facility at the junction, and addresses any potential safety issues. The layout was subject to a Stage One Road Safety Audit and associated Response Report, as shown in **Appendix F.** The proposed junction arrangement was found acceptable to NCC. Therefore this improvement scheme would be provided in full as part of the proposed development, and be secured via a suitably worded planning condition.

Junction 6 - A611 Derby Road/B6139 Coxmoor Road signal controlled junction

7.45 As noted in the ATS, *"the Coxmoor Road / A611 Derby Road junction is a four arm signalised junction. The A611 Derby Road (north) and Coxmoor Road have single lane approaches which flare out to two lanes as they approach the junction, whilst A611 Derby Road (south) is a single lane at the junction."* The right turn from the A611 to Coxmoor Road (E) is banned.

7.46 A model of the junction, shown in **Figure 13**, was built using LinSig and tested with the 2017 and 2027 traffic flows, as presented in the Additional Transport Assessment Addendum. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and four stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix S**.

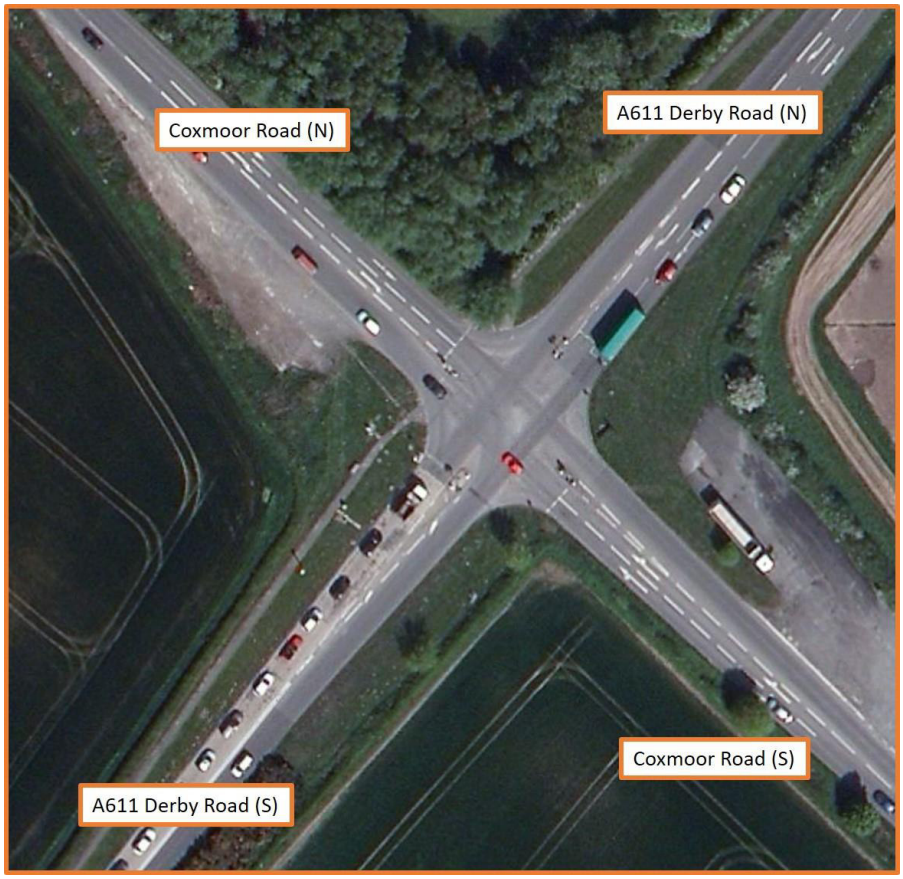
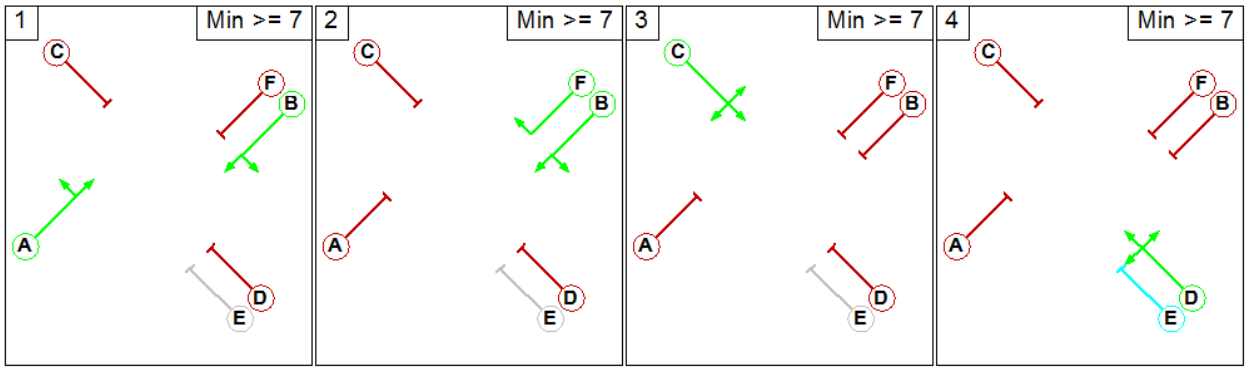


Figure 13: existing A611/Coxmoor Road junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	-30.1%	126.13	117.1%	87.3
	PM	90	-25.9%	100.45	113.3%	71.9
2027 background	AM	90	-49.8%	246.79	134.8%	158.4
	PM	90	-44.6%	214.78	130.1%	133.9
2027 with development	AM	90	-53.2%	268.68	137.9%	172.4
	PM	90	-46.6%	239.14	131.9%	140.4

7.47 The junction operated with a negative PRC (indicating one or more links is operating above the 90% degree of saturation) in both the morning and evening peak hours in 2017. This is significantly exacerbated with the 15% growth in the 2027 background traffic flow scenario, and the queue lengths and delay almost double.

7.48 The addition of the proposed development traffic results in the degree of saturation increasing by approximately 3.4% in the morning peak hour and 2% in the evening peak hour. In the morning peak hour, the queue length on Derby Road (W), as the worst case approach arm, increases by 15 PCUs to 172, and the total delay at the junction increases by 22 seconds. In the evening peak hour, the queue length increases by six PCUs to 140 on Derby Road (W), and the total delay at the junction increases by 24 seconds. In both respects, this is not a severe impact.

7.49 The proposed development adds a worst case of 38 vehicles to the Coxmoor Road (N) southbound approach in the morning peak hour, and 19 vehicles on that approach in the evening peak hour. This equates to approximately one additional vehicle per cycle. This is not a significant increase.

7.50 Furthermore, it is worth highlighting that the junction operates under MOVA control, which would adjust the green times on a cycle-by-cycle basis, depending on demand, to allow the most efficient operation of the junction. Therefore, the junction would operate better than is forecast by LinSig and summarised in the table above.

7.51 Overall, the proposed development would not result in a severe impact on the operation of the junction, and no mitigation measures are required at this junction as a result of the proposed development.

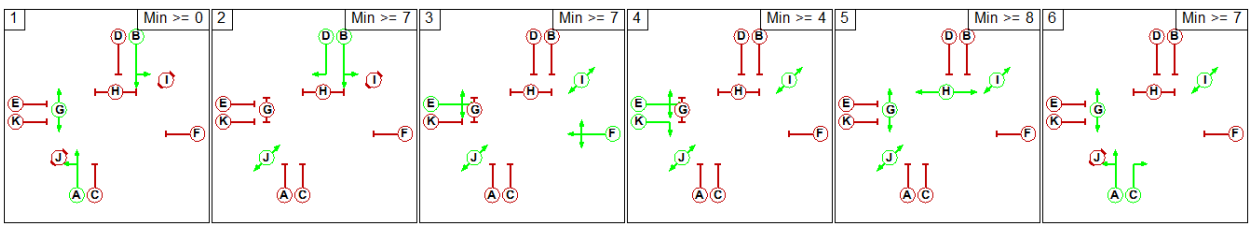
Junction 7 - A611 Derby Rd/Diamond Avenue/Blidworth Rd signal controlled junction

7.52 As noted in the ATS, *"the B6020 Diamond Avenue, Blidworth Road and A611 Derby Road junction is a four armed signalised junction that provides signalised pedestrian crossings across two arms. The*

B6020 is a single carriageway route with one lane on Blidworth Road and two lanes on Diamond Avenue. The A611 Derby Road provides two lanes in either direction with one lane being dedicated to right turning flows and one being dedicated for ahead and left turning flows."

7.53 A model of the junction, shown in **Figure 14**, was built using LinSig and tested with the 2017 and 2027 traffic flows as part of the original Transport Assessment. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and six stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix T**.

Figure 14: existing A611/Diamond Avenue/Blidworth Road signal controlled junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	-59.5%	310.03	143.5%	153.6
	PM	90	-65.5%	389.68	148.9%	166.8
2027 background	AM	90	-83.7%	500.14	165.3%	225.0
	PM	90	-89.9%	589.63	170.9%	234.5
2027 with development	AM	90	-83.7%	581.13	165.3%	229.9
	PM	90	-91.4%	607.99	172.3%	231.3

7.54 The original Transport Assessment concluded that the junction operated with queueing and delay in both the morning and evening peak hours in 2017. This is exacerbated by the 15% growth in the 2027 background scenario, with significant increases in the maximum queue length and delay.

7.55 However, the Transport Assessment concluded that the addition of the proposed development traffic had a minimal impact on the PRC, degree of saturation and the associated queuing and delay. In the morning peak hour, the degree of saturation stays the same, whilst the queue length on the worst case arm (A611 S) increases by just four PCUs. In the evening peak hour, the degree of saturation changes by just 2% and the queue length reduces. The proposed development therefore does not result in a severe impact on the operation of the junction, and no mitigation measures are required.

7.56 Based on the traffic flows from the original Transport Assessment, the development would have generated 33 and 44 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate just 16 and 18 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore, no further assessment is required.

7.57 Furthermore, it is worth highlighting that the junction operates under MOVA control, which would adjust the green times on a cycle-by-cycle basis, depending on demand, to allow the most efficient operation of the junction. Therefore, the junction would operate better than is forecast by LinSig and summarised in the table above.

7.58 Overall, the proposed development would not result in a severe impact on the operation of the junction, and no mitigation measures are required at this junction as a result of the proposed development.

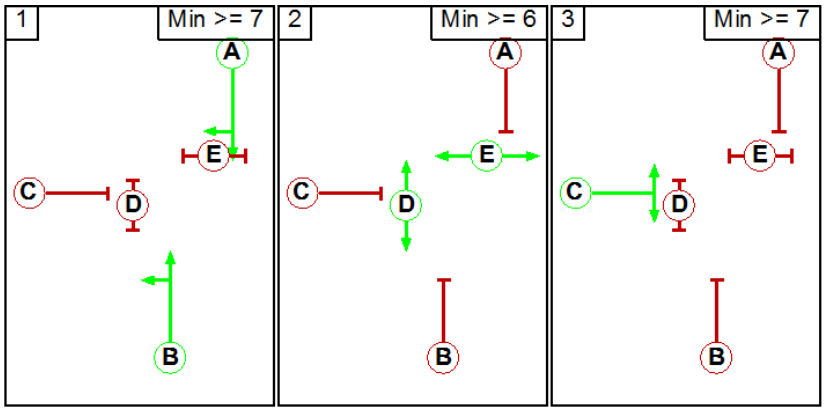
Junction 8 - A611 Derby Road/B6021 Nottingham Road signal controlled junction

7.59 As noted in the ATS, *"the A611 Derby Road and B6021 Shoulder of Mutton Hill is a three armed signalised junction that provides signalised pedestrian crossings across Derby Road to the north and Nottingham Road. The A611 is a single carriageway route with one lane in either direction, providing a right turning lane for southbound traffic turning into Shoulder of Mutton Hill. Shoulder of Mutton Hill provides one lane at the junction with left and right turning movements all coming from the same lane."*

7.60 A model of the junction, shown in **Figure 15**, was built using LinSig and tested with the 2017 and 2027 traffic flows in the original Transport Assessment. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and three stage

sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix U**.

Figure 15: existing A611/Nottingham Road junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	-21.7%	85.68	109.5%	73.1
	PM	90	-21.7%	83.78	109.6%	72.1
2027 background	AM	90	-40%	200.88	126.0%	150.1
	PM	90	-39.9%	211.60	125.9%	156.0
2027 with development	AM	90	-41.1%	209.56	126.9%	154.4
	PM	90	-39.9%	228.41	125.9%	167.1

7.61 The original Transport Assessment concluded that the junction operated with a negative PRC (indicating one or more links is operating above the 90% degree of saturation) in both peak hours in 2017. The 15% growth in traffic flow by the 2027 background scenario exacerbates this, and there would be significant increases in the maximum queue length and delay.

7.62 However, the original Transport Assessment concluded that the proposed development has a minimal impact on the operation of the junction. In the morning peak hour, the degree of saturation increases by 0.9%, with the queue length on the worst case approach (A611 S) increasing by just four PCUs and the total delay at the junction increasing by nine seconds. In the evening peak hour, the degree of saturation remains the same, whilst the queue increases by 13 vehicles and the total junction delay increases by 16 seconds, to 228 seconds. The Transport Assessment concluded that this is not a severe impact, and no mitigation measures are required as a result of the proposed development.

7.63 Based on the traffic flows from the original Transport Assessment, the development would have generated 33 and 34 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate just 11 and 16 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore, no further assessment is required.

7.64 Furthermore, it is worth highlighting that the junction operates under MOVA control, which would adjust the green times on a cycle-by-cycle basis, depending on demand, to allow the most efficient operation of the junction. Therefore, the junction would operate better than is forecast by LinSig and summarised in the table above.

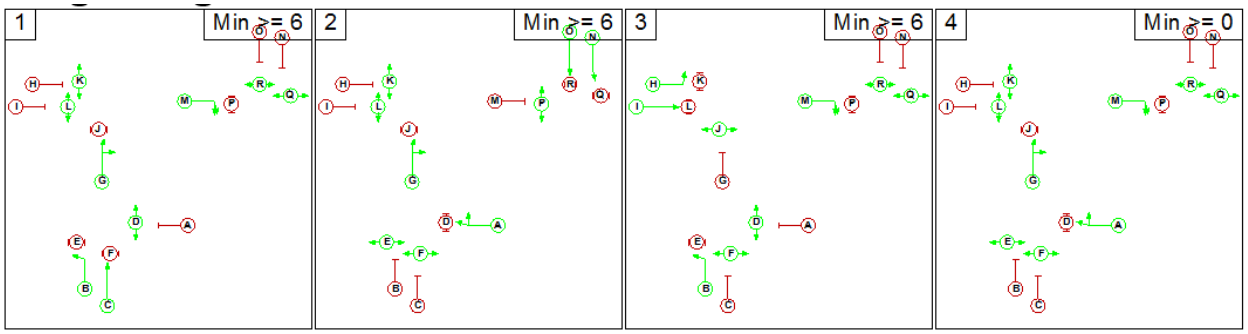
7.65 Overall, no mitigation measures are required at the junction as a result of the development.

Junction 9 - A611 Derby Road/A608 Annesley Road signal controlled gyratory

7.66 As noted in the ATS, *"the A611 Annesley Road/A608 Mansfield Road junction is a three armed signalised roundabout that provides signalised pedestrian crossings across each arm. The A611 Annesley Road is a dual carriageway as it passes through the Annesley Forest and approaches the roundabout. A608 Mansfield Road is also a dual carriageway route. The A611 Derby Road is a single carriageway route that widens from a single lane to two lanes on the approach to the junction."*

7.67 A model of the junction, shown in **Figure 16**, was built using LinSig and tested with the 2017 and 2027 traffic flows as part of the original Transport Assessment. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and four stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix V**.

Figure 16: existing A611 Derby Road/A608 Annesley Road roundabout



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	60	-14.9%	80.84	103.4%	54.2
	PM	60	-15.8%	70.70	104.2%	48.5
2027 background	AM	60	-42.1%	337.35	127.9%	214.7
	PM	60	-37.4%	190.69	123.6%	161.5
2027 with development	AM	60	-42.1%	339.88	127.9%	214.7
	PM	60	-37.1%	190.45	123.4%	160.2

7.68 The Transport Assessment concluded that the junction operated with a negative PRC in both peak hours in 2017. The 15% growth in traffic flow by the 2027 background scenario exacerbates this, and the maximum queue and delay significantly increases.

7.69 However, the Transport Assessment concluded that the proposed development has a minimal effect on the PRC, degree of saturation, the queue length and the delay. Therefore, the Transport Assessment concluded that the development traffic would not have a severe impact on the operation of the junction, and no mitigation measures are required as a result of the proposed development.

7.70 Based on the traffic flows from the original Transport Assessment, the development would have generated 33 and 34 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate just 10 and 13 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore, no further assessment is required.

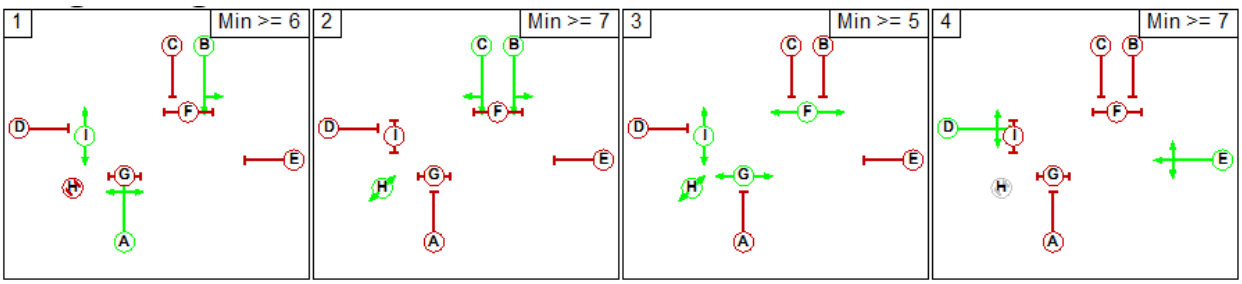
7.71 Overall, no mitigation measures are required at the junction as a result of the proposed development.

Junction 10 - A611/Forest Road traffic signal controlled T-junction

7.72 As noted in the ATS, *"the A611 Derby Road, Forest Road and School Hill junction is a four-armed signalised junction with pedestrian crossings on all arms. The A611 is a single carriageway route with two lanes in each direction for ahead flows in both lanes with right turning traffic incorporated into the northern arm. Forest Road has two lanes, whilst School Hill has a single lane used to access a small residential area."*

7.73 A model of the junction, shown in **Figure 17**, was built using LinSig and tested with the 2017 and 2027 traffic flows as part of the original Transport Assessment. Signal plan data was obtained from NCC to understand how the junction operates, including the cycle time, intergreens, and four stage sequence shown below. The results are summarised in the table below, and the LinSig outputs and signal plan data are in **Appendix W**.

Figure 17: existing A611/Forest Road signal controlled junction



	peak	cycle time	PRC	total delay (PCUhr)	Degree of Saturation	longest MMQ (PCUs)
2017 base	AM	90	-32.6%	249.41	119.3%	95.9
	PM	90	-16.7%	91.56	105.1%	39.6
2027 background	AM	90	-52.6%	459.29	137.4%	170.9
	PM	90	-33.9%	260.62	120.5%	91.9
2027 with development	AM	90	-53.4%	476.64	138.1%	181.8
	PM	90	-33.9%	277.81	120.5%	97.6

7.74 The Transport Assessment concluded that the junction operated with a negative PRC in both peak hours in 2017. The 15% growth in traffic flow by the 2027 background scenario exacerbates this, and the maximum queue length and total delay significantly increases.

7.75 However, the Transport Assessment concluded that the proposed development has a minimal impact on the operation of the junction. In the morning peak hour, the degree of saturation increases by 0.7%, with the queue length increasing by just 11 PCUs and the delay increasing by 18 seconds. In the evening peak hour, the degree of saturation remains the same, whilst the queue increases by 6 PCUs and the delay increases by 17 seconds, to 278 seconds. The Transport Assessment concluded that this is not a severe impact, and no mitigation measures are required as a result of the proposed development.

7.76 Based on the traffic flows from the original Transport Assessment, the development would have generated 32 and 34 additional PCU movements through the junction in the morning and evening peak hours respectively. Following NCC's request to alter the distribution and assignment of development traffic, the development would now generate just 10 and 15 two-way PCU movements through the junction. As a result, the impacts of the development would be less than modelled above, and the conclusion remains that the development would not result in a severe impact. Therefore, no further assessment is required.

7.77 Overall, no mitigation measures are required at the junction as a result of the development.

Junction 11 - A38/Station Road traffic signal controlled crossroads

7.78 The ATS notes that *"The A38 Kings Mill Road East / Station Road junction is a four arm signalised junction with pedestrian crossings on all approaches. Station Road is a single lane approach from both arms, whereas the A38 is a single lane carriageway that flares out to four arms as it approaches the junction."* The junction layout is shown in **Figure 18.**

Figure 18: existing A38/Station Road signal controlled crossroads

7.79 A total of 20 additional two-way vehicles will route through the junction in the morning peak hour and 18 two-way in the evening peak hour as a result of the proposed development. All of these will route between Station Road (W) and Station Road (E) or vice versa. This is a minimal increase, and well below the threshold for assessment of 30 two-way trips.

7.80 In the morning peak hour, the highest increase in traffic would be on Station Road (E), where there would be 12 additional vehicles entering the junction. In the evening peak hour, the highest increase would be on Station Road (W), where there would be 10 additional vehicles entering the junction.

7.81 Based on the junction operating on a 90 second cycle time (as in the ATS LinSig), there are 40 cycles per hour. An increase of 10 to 12 vehicles on an entry arm in an hour therefore equates to

one additional vehicle approximately every four cycles. This is not sufficient to warrant assessment or mitigation. This conclusion was also reached in the Transport Assessment Addendum and agreed with NCC.

7.82 Overall, no further assessment or mitigation is required at this junction as a result of the proposed development.

Junction 12 - A38/Coxmoor Road traffic signal controlled crossroads

7.83 As noted in the ATS, *"the A38 / Coxmoor Road junction is a four arm signalised junction. Coxmoor Road has single lane approaches from both arms which flare out to two lanes at the junction, whereas the A38 is a single lane carriageway that flares out to three lanes as it approaches the junction."* The junction layout is shown in **Figure 19.**

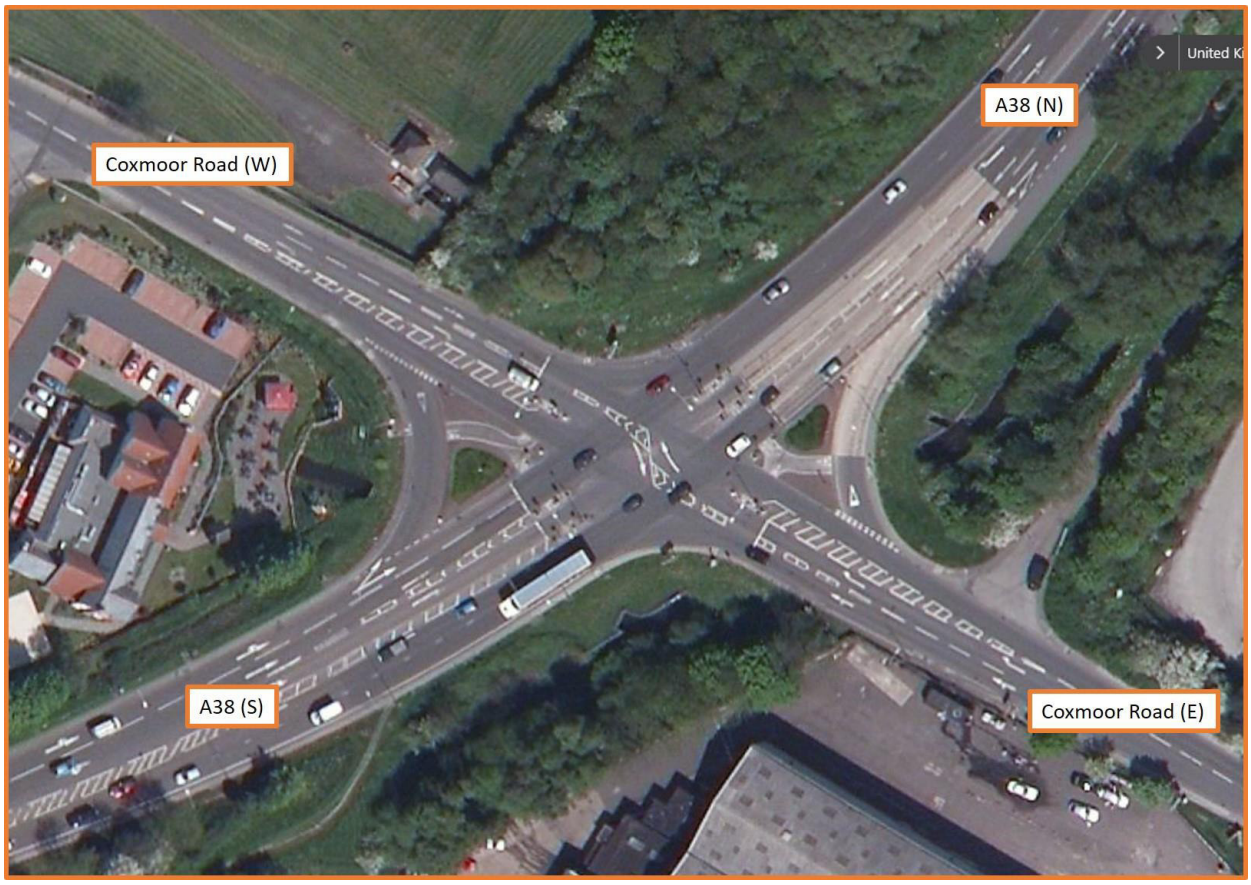


Figure 19: existing A38/Coxmoor Road signal controlled crossroads

7.84 As discussed with NCC as part of the Transport Assessment Addendum, traffic flow data at the junction was available from the Transport Assessment prepared in support of the committed Lindhurst development. That Transport Assessment used the MARR Traffic Model to forecast the flows in 2019 and 2026. In both assessment years, that Transport Assessment included a Do Minimum scenario (without the Lindhurst development and infrastructure) and Do Something scenario (with the Lindhurst development and infrastructure).

7.85 The traffic flows at Junction 12 were extracted from the 2026 Do Something scenario, in Appendix F of that Transport Assessment. A copy is contained **Appendix D**, and the traffic flows are replicated in **Figures 20 and 21** below for the morning and evening peak hour.

7.86 **Figures 20 and 21** also show the morning and evening proposed development traffic at the junction, and the percentage change.

7.87 As shown, the proposed development would add 34 two-way movements through the junction in the morning peak hour, and 35 in the evening peak hour. This is a minimal increase when compared with the background flows of 1773 and 973.

7.88 The highest increase in entry flows to the junction occurs on Coxmoor Road (E), where there would be 26 in the morning peak hour and 12 in the evening peak hour. This equates to approximately one additional vehicle every two cycles.

7.89 This increase in traffic is not severe, and is not sufficient to warrant further assessment or mitigation. This was agreed with NCC.

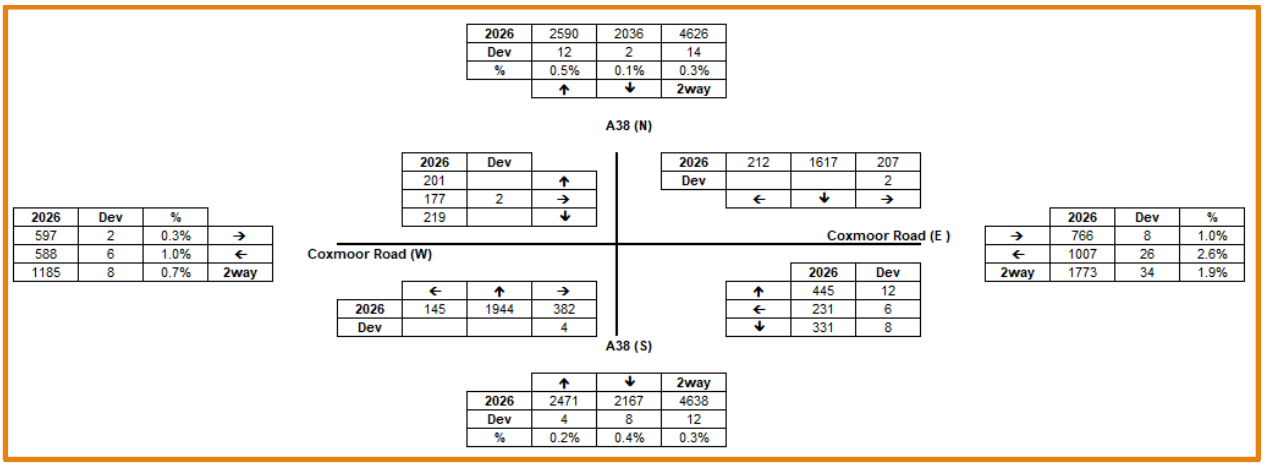


Figure 20: junction 12 – AM peak hour

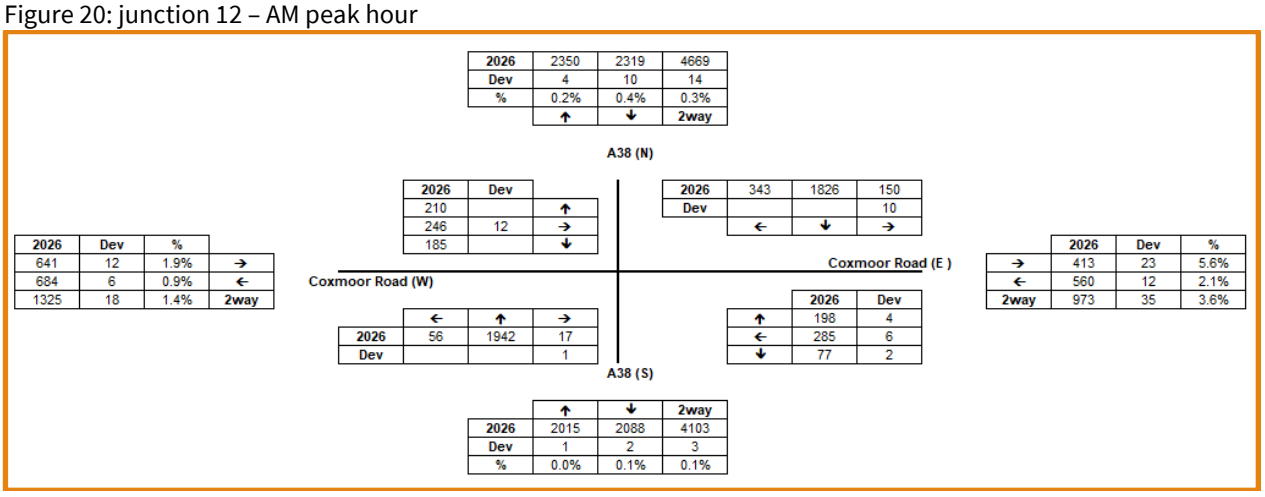


Figure 21: junction 12 – PM peak hour

Junction 13 - A617/Hamilton Road junction

7.90 The existing A617/Hamilton Road signal controlled junction is shown in **Figure 22.**

7.91 As with junction 12 above, traffic flow data at the junction for the 2026 Do Something scenario is available from the Transport Assessment prepared in support of the committed Lindhurst development. A copy is contained **Appendix D** and the traffic flows are replicated in **Figures 23 and 24** below for the morning and evening peak hour.

Figure 22: A617/Hamilton Road junction

7.92 **Figures 23 and 24** also show the morning and evening proposed development traffic at the junction, and the percentage change.

7.93 As shown, the proposed development would add 57 two-way movements through the junction in the morning peak hour, and 60 in the evening peak hour. This is not a significant increase when compared with the background flows, and equates to a 3.2% and 3.9% increase.

7.94 The highest increase in entry flows to the junction occurs on Hamilton Road (S), where there would be 45 in the morning peak hour and 24 in the evening peak hour. This equates to one additional vehicle per cycle in the morning peak hour, and one additional vehicle every two cycles in the evening peak hour.

7.95 This increase in traffic is not severe, and is not sufficient to warrant further assessment or mitigation. This was agreed with NCC as part of the Transport Assessment Addendum.

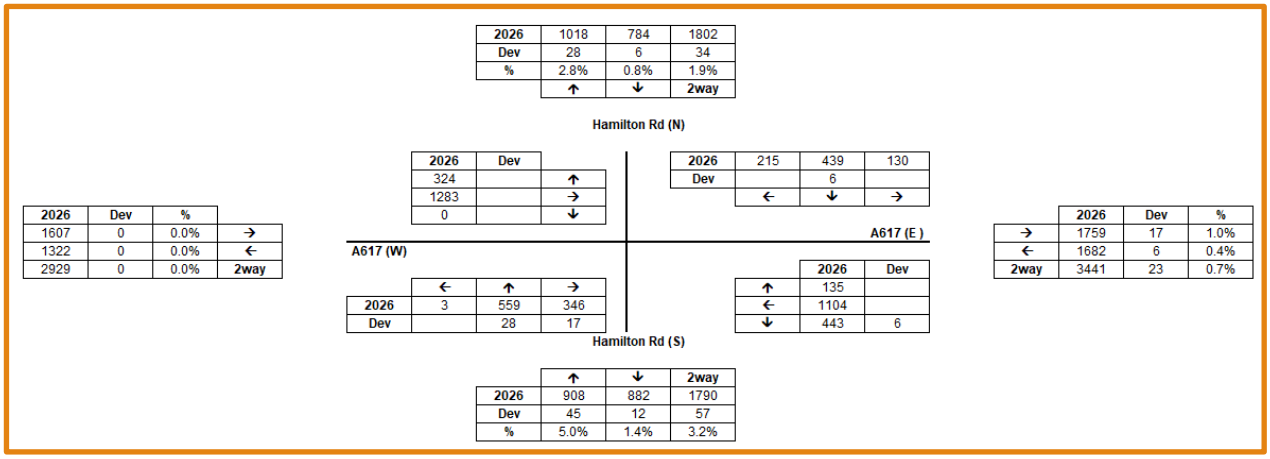


Figure 23: Junction 13 – AM peak hour

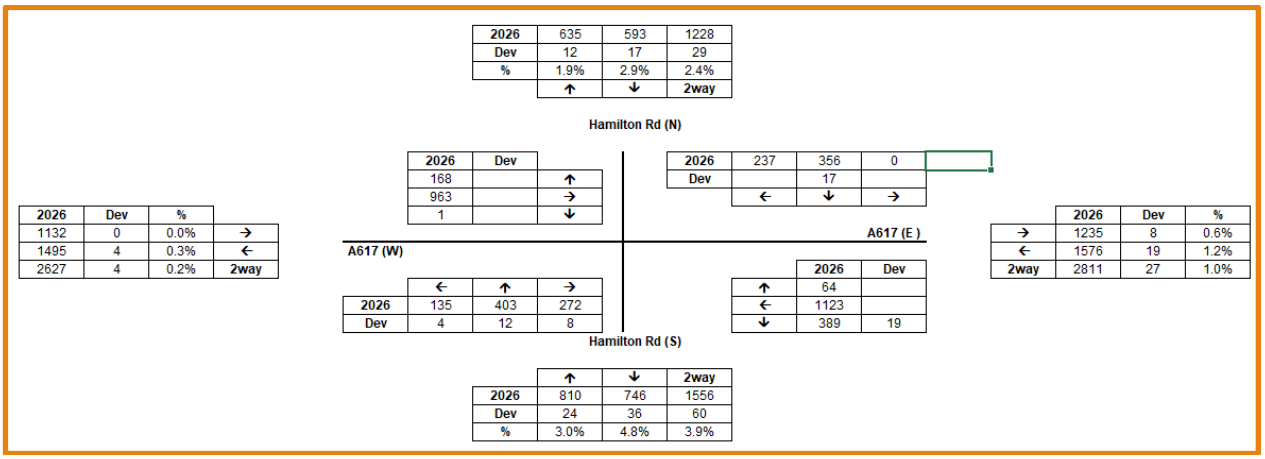


Figure 24: Junction 13 – PM peak hour

Newark Road/Searby Road T-junction

7.96 During the public consultation, local residents stated that they currently experience long delays when trying to exit Searby Road, and raised concerns that this would be exacerbated with the additional development traffic passing the junction on Newark Road. Residents therefore asked whether the junction could be improved with traffic signal controls.

7.97 A PICADY assessment was therefore undertaken within the original Transport Assessment to demonstrate how the junction operated in 2017, and how it would operate in 2027 both without and with the development in place. The PICADY results are summarised in the table below and the output is contained in **Appendix X.**

	peak		Searby Rd (left turn)	Searby Rd (right turn)	Newark Rd (W) (ahead and right turn)
2017 base	AM	RFC	12%	24%	6%
		max queue (veh)	0.13	0.31	0.09
		max delay (secs)	9.01	20.47	4.77
	PM	RFC	5%	22%	14%
		max queue (veh)	0.06	0.28	0.35
		max delay (secs)	8.60	20.46	4.08
2027 background	AM	RFC	1%	36%	8%
		max queue (veh)	0.01	0.54	0.14
		max delay (secs)	9.38	31.31	4.60
	PM	RFC	7%	33%	20%
		max queue (veh)	0.07	0.49	0.70
		max delay (secs)	9.71	31.49	3.94
2027 with development	AM	RFC	17%	41%	8%
		max queue (veh)	0.20	0.68	0.16
		max delay (secs)	12.02	39.63	4.59
	PM	RFC	7%	38%	22%
		max queue (veh)	0.08	0.58	0.83
		max delay (secs)	10.27	37.92	3.86

7.98 The original Transport Assessment concluded that the junction operated well below the 85% RFC in 2017, and will continue to do so in 2027. In both peak hours, there are delays of approximately

20 seconds for vehicles waiting to turn right from Searby Road, which will increase to 31 seconds by 2027, and to approximately 40 seconds in 2027 with the development in place. In all cases, the queue is less than one vehicle. The introduction of traffic signal controls, with a 90 second cycle time, would therefore not assist and are not required.

7.99 Furthermore, with the proposed improvements at the Newark Road/Kirkby Folly Road mini-roundabout to the west of the junction, and the proposed improvements at the Coxmoor Road/Newark Road/Cauldwell junction to the east, together with the proposed site access junction, queueing on Newark Road passed the Searby Road junction should reduce and be better controlled with standardised delays. Also, the traffic signals would result in platooning of traffic along Newark Road, and thus increase the gaps in the traffic for vehicles to turn out of Searby Road. The effects of this cannot be modelling in PICADY, but it means that the delay would be lower than recorded above.

7.100 Nevertheless, in order to improve the operation of the junction, it is proposed to install yellow hatched box markings across the junction on Newark Road. This will ensure that any vehicles queuing on Newark Road (for example when the level crossing is down) will not block the junction, and will allow vehicles to enter and exit Newark Road more easily. This is shown in **Drawing ADC1580/003 P10 and Drawing ADC1580/006 P2** contained in the drawings folder at the end of this report.

Sutton Junction level crossing on Newark Road

7.101 At the public consultation, local residents highlighted that the barriers at the Sutton Junction level crossing on Newark Road come down “a long time” in advance of a train approaching, and that this causes “significant queuing and delay” on Newark Road and Kirkby Folly Road. Local residents raised concerns that the congestion and delay would be exacerbated with the additional development traffic, and asked if alterations could be made to the level crossing timings as part of the development to mitigate this.

7.102 Therefore, to factually evidence and understand how the level crossing operates, it was surveyed between 7am-7pm on Thursday 26 June 2017. The survey recorded the time the barriers came down, the time the train arrived at and then cleared the crossing, and the time the barriers were raised. From this information, it was possible to determine how long the barriers were down before the train arrived, how long it took for the train to clear the crossing, and how long it took for the barriers to be raised again. The results are contained in **Appendix Y.**

7.103 On average, the barriers were lowered four times per hour. On average, the barriers were lowered 2 minutes and 51 seconds prior to the train arriving at the crossing. The train then took an average of 3 seconds to clear the crossing, and the barriers were raised on average 10 seconds after the train had cleared the crossing. The average total delay was therefore 3 minutes and 4 seconds.

7.104 The shortest time between the barriers closing and reopening was 1 minute and 48 seconds, whilst the longest time was 4 minutes and 49 seconds. The average delay was broadly similar for northbound and southbound trains (3 minutes and 13 seconds for northbound trains, and 2 minutes and 54 seconds for southbound trains).

7.105 It is therefore accepted that the level crossing introduces delay, and thus reduces the capacity of the road network. The trains pass through the crossing quickly, and the barriers are raised shortly afterwards. The main issue is therefore the length of time that the barriers are lowered in advance of the train arriving, as noted by the residents.

7.106 As part of the original Transport Assessment, Network Rail were therefore contacted to discuss the potential for alterations to the rail signal timings, to reduce the time that the barriers were lowered in advance of the train arriving at the crossing. This would provide a wider highway benefit, as well as helping to mitigate any adverse impact associated with the development traffic.

7.107 However, Network Rail confirmed that it would not be possible to alter the timings. Three reasons were given, including both safety and operational reasons. In summary, due to trains accelerating away from Sutton Parkway station, the location of the signals in relation to the level crossing, and the 40mph line speed on this part of the route, the timings cannot be altered. Network Rail notes that *"the only immediate means of reducing the barrier down time would be to raise the 40mph limit, but this in itself would be extremely costly (in excess of £5 million, as it would include the upgrade of Sutton Forest level crossing to full barrier…), and there is no business case for Network Rail to increase the line speed at this time. The line itself was re-signalled in the past few years…so again there is no justification from our point of view to re-visit this".* Network Rail conclude that *"the cost of re-signalling is likely to be financially prohibitive"* and that *"it is unlikely that a railway solution can be provided".*

Summary

7.108 The following study area junctions have been modelled in 2017 and 2027, both without and with the development in place. In conclusion:

1. A38/Penny Emma Way signal controlled junction – no mitigation required.
2. B6021 Lowmoor Road/Penny Emma Way/Kirkby Folly Road signal controlled junction – no mitigation required.
3. B6022 Newark Road/Kirkby Folly Road mini-roundabout – mitigation required in the form of minor kerb widening to increase the flare length and entry widths as shown in **Drawing ADC1580-DR-004-P8.**
4. B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction – mitigation required in the form of alterations to the signal controlled junction as shown in **Drawing ADC1580-DR-004-P8**.
5. B6139 Coxmoor Road/Hamilton Road mini-roundabout – mitigation required in the form of widening to Coxmoor Road (S) and Hamilton Road to provide longer two lane approaches as shown on **Drawing ADC1580-005-P7**
6. A611 Derby Road/B6139 Coxmoor Road signal controlled junction – no mitigation required.
7. A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction – no mitigation required.
8. A611 Derby Road/B6021 Nottingham Road signal controlled junction – no mitigation required.
9. A611 Derby Road/A608 Annesley Road signal controlled gyratory – no mitigation required.
10. A611/Forest Road traffic signal controlled T-junction – no mitigation required.
11. A38/Station Road traffic signal controlled crossroads – no mitigation required.
12. A38/Coxmoor Road traffic signal controlled crossroads – no mitigation required.
13. A617/Hamilton Road traffic signal controlled crossroads – no mitigation required.

7.109 It is also proposed to install yellow hatched box markings across the junction on Newark Road, as shown in **Drawing ADC1580/003 P10 and Drawing ADC1580/006 P2**. This will ensure that any vehicles queuing on Newark Road (for example when the level crossing is down) will not block the junction, and will allow vehicles to enter and exit Newark Road more easily.

8.0 SUMMARY AND CONCLUSIONS

8.1 Hallam Land Management Ltd submitted an outline planning application for up to 300 dwellings on land to the south of the B6022 Newark Road, in Sutton in Ashfield, Nottinghamshire (application reference V/2017/0565 – submitted October 2017).

8.2 The development would be accessed via a new traffic signal controlled T-junction on Newark Road, and the internal layout would include a loop road arrangement, as agreed in principle with Nottinghamshire County Council (NCC), who are the local highway authority. There would be no vehicular access from Searby Road.

8.3 ADC Infrastructure Ltd were appointed by Hallam Land Management to provide transport and highways advice to support the outline application (March 2017). Since the application was submitted, ADC Infrastructure have had extensive correspondence with NCC Highways, and have prepared a Transport Assessment Scoping Report (May 2017), a Transport Assessment (September 2017), a Transport Assessment Addendum (February 2018), an additional Transport Assessment Addendum (May 2018), a Capacity Assessment Technical Note (February 2019), and a Stage One Road Safety Audit and Response Report for the off-site mitigation schemes (April 2019). Each report was prepared to address comments raised by NCC at each stage. The result of all of this work was that NCC had no objections to the development, subject to planning obligations, conditions and informatives (consultation response dated 3 July 2019).

8.4 This Consolidated Transport Assessment report collates the agreed position, including agreed parameters and assessments into one complete document for ease of reference and understanding. It uses the agreed trip rates, traffic generation, distribution and assignment, assessment year traffic flows, study area junctions, and junction mitigation schemes. This report does not include any new or additional assessment or analysis.

8.5 It is concluded that the development site is accessible by all modes of travel and is therefore well located for residential development. There are good opportunities for pedestrian travel, with good infrastructure provided on the desire lines to the north, east and west. There are also good opportunities for cycle travel. Whilst there are no cycle facilities in the vicinity of the site, there is a network of on-road and off-road cycle routes that cyclists can use. There are good opportunities for public transport travel, including both bus and rail. The entire site is within 800m walking distance of the regular bus service 3C running at a 30-minutes frequency. Much of the site is also within walking distance of the hourly Service 90 and hourly Black Cat bus service. Sutton Parkway train station is within walking and cycling distance, and is also accessible via bus service 3C. The station provides secure cycle parking, so there are good opportunities for train travel as part of a multi-modal journey.

8.6 As part of the proposed development, and to encourage pedestrian travel, three pedestrian connections would be provided from the site. These include a connection to the footways on Searby Road; a connection to the footway on Sotheby Avenue; and a new footway/cycleway on the southern side of Newark Road. A new traffic signal controlled pedestrian crossing would also be provided on Newark Road at the site access junction. Within the site, a new footway/cycleway would be provided along the main site access road and along the southern side of Newark Road to connect the development to the off-road cycle lane running parallel to Kirkby Folly Road. The site is within walking distance of a regular bus service, but it is proposed to provide funding contributions towards bus service enhancements and bus stop improvements.

8.7 The development will generate 45 pedestrian journeys, nine cycle journeys, 21 bus journeys and three train journeys during a peak hour. These additional trips can be accommodated by the existing infrastructure and the proposed measures.

8.8 A Travel Plan has been produced to accompany the planning application, with the aim to manage travel demand in the future. It includes a target for 10% reduction in peak hour vehicle trips. It provides measures and a monitoring regime to further increase the use of sustainable travel modes, and hence create a modal shift away from single occupancy car use.

8.9 The development will generate up to 214 two-way vehicle trips in a peak hour. These trips were distributed and assigned to the highway network using 2011 Census data and observed turning movements, as agreed with NCC.

8.10 The impact of this traffic on the operation and safety of the highway network was examined, with the following junctions being studied in detail, as agreed with NCC:

1) A38/Penny Emma Way signal controlled junction
2) B6021 Lowmoor Road/Penny Emma Way/Kirkby Folly Road signal controlled junction
3) B6022 Newark Road/Kirkby Folly Road mini-roundabout
4) B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction
5) B6139 Coxmoor Road/Hamilton Road mini-roundabout
6) A611 Derby Road/B6139 Coxmoor Road signal controlled junction
7) A611 Derby Road/Diamond Avenue/Blidworth Road signal controlled junction
8) A611 Derby Road/B6021 Nottingham Road signal controlled junction
9) A611 Derby Road/A608 Annesley Road signal controlled gyratory
10) A611/Forest Road traffic signal controlled T-junction
11) A38/Station Road traffic signal controlled crossroads
12) A38/Coxmoor Road traffic signal controlled crossroads
13) A617/Hamilton Road traffic signal controlled crossroads.

8.11 Each junction was modelled using 2017 and 2027 traffic flows, both without and with the development. These assessments confirmed that most of the existing junctions have capacity to accommodate the additional development traffic without the need for mitigation.

8.12 However, interventions are necessary at the following locations.

- Junction 3 - B6022 Newark Road/Kirkby Folly Road mini-roundabout – mitigation required in the form of minor kerb widening to increase the flare length and entry widths as shown in **Drawing ADC1580-DR-004-P8** in the drawings section at the end of the report.
- Junction 4 - B6139 Coxmoor Road/Newark Road/Cauldwell Road signal controlled junction – mitigation required in the form of alterations to the signal controlled junction as shown in **Drawing ADC1580-DR-004-P8** in the drawings section at the end of the report.
- Junction 5 - B6139 Coxmoor Road/Hamilton Road mini-roundabout – mitigation required in the form of widening to Coxmoor Road (S) and Hamilton Road to provide longer two lane approaches as shown on **Drawing ADC1580-005-P7** in the drawings section at the end of the report.

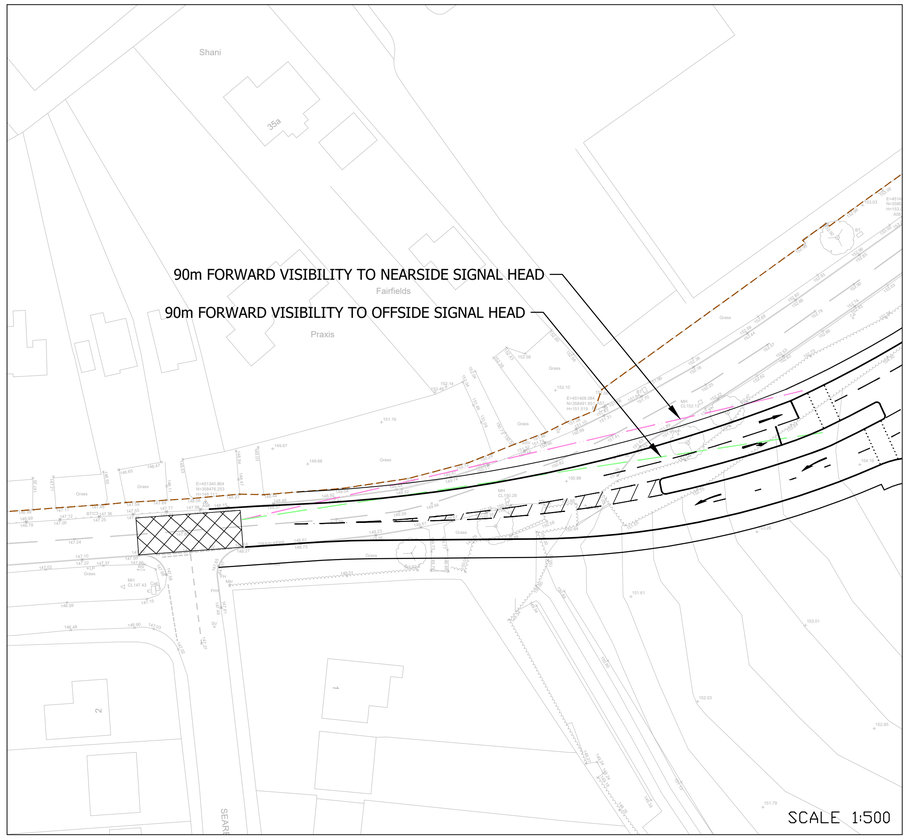
These schemes would satisfactorily mitigate the impact of the development traffic, as agreed with NCC.

8.13 In addition, following comments from local residents at the public consultation, the operation of the Newark Road/Searby Road T-junction was assessed, as was the operation of the Sutton Junction level crossing on the B6022 Newark Road/Station Road. It was concluded that the proposed development would not have a severe impact on the operation of the junction or crossing. Nevertheless, in order to improve the operation of the Newark Road/Searby Road T-

junction, it is proposed to install yellow hatched box markings across the junction on Newark Road. This will ensure that any vehicles queuing on Newark Road (for example when the level crossing is down) will not block the junction, and will allow vehicles to enter and exit Newark Road more easily. This is shown in **Drawing ADC1580/003 P10 and Drawing ADC1580/006 P2** provided in the drawings folder at the end of the report.

8.14 Overall, the proposed development would accord with the aims of the NPPF. The opportunities for sustainable travel would be improved as part of the proposals, and safe and suitable access can be achieved for all people. Appropriate improvements are proposed to mitigate impacts, and thus the development would not result in severe impacts on the operation or safety of the local highway network. Therefore, it would be unreasonable to prevent the development on highways grounds, a conclusion agreed with NCC.

DRAWINGS



COXMOOR ROAD/NEWARK ROAD/CAULDWELL ROAD
STAGE ARRANGEMENT

NEWARK ROAD/SITE ACCESS STAGE ARRANGEMENT

Rev	Description	Date
P10	Revised Layout following RSA comments	15/04/19
P9	Revised Layout following comments	22/10/18
P8	Revised Layout following comments	25/07/18
P7	Revised Layout following RSA comments	01/05/18
P6	Revised layout following comments	10/04/18
P5	Revised visibility following comments	19/03/18
P4	Revised visibility following comments	06/03/18
P3	Revised Layout	05/02/18
P2	Revised Layout	01/08/17
P1	Revised Layout	20/07/17

Client:
Hallam Land Management

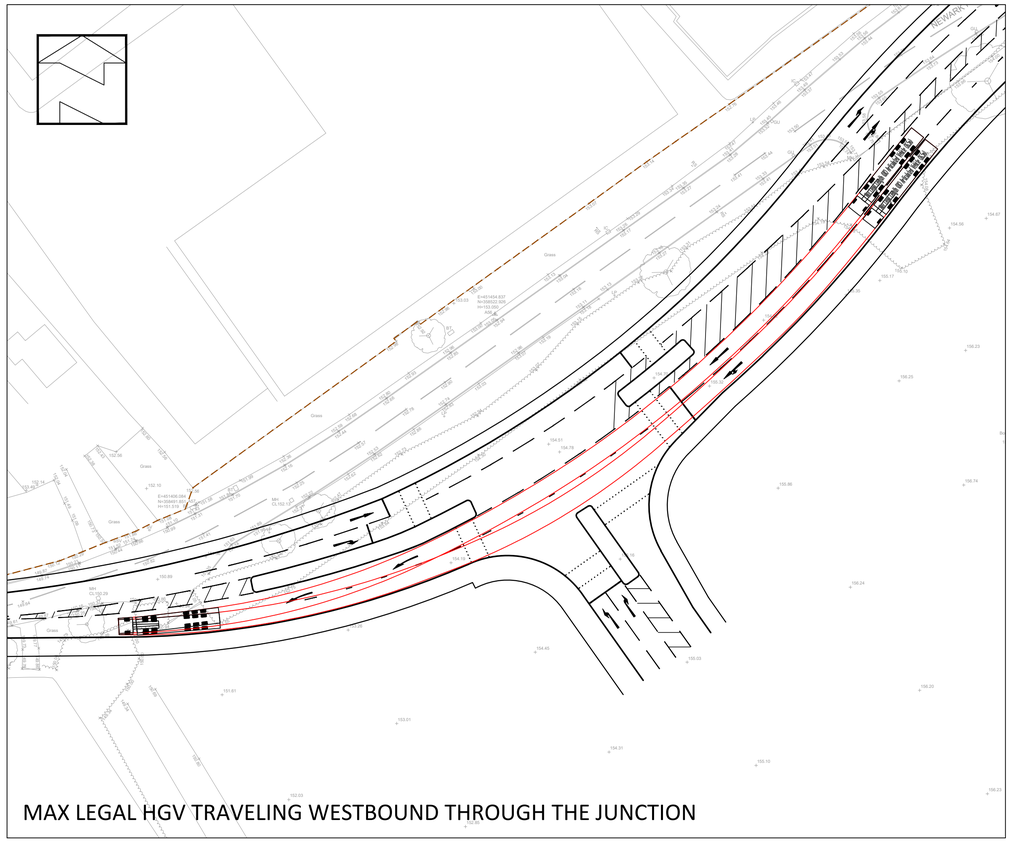
Project:
Proposed Residential Development
Newark Road, Sutton in Ashfield

Title:
Signal Controlled
Access Junction Layout
& Mitigation at Coxmoor Road/Cauldwell Road Junction

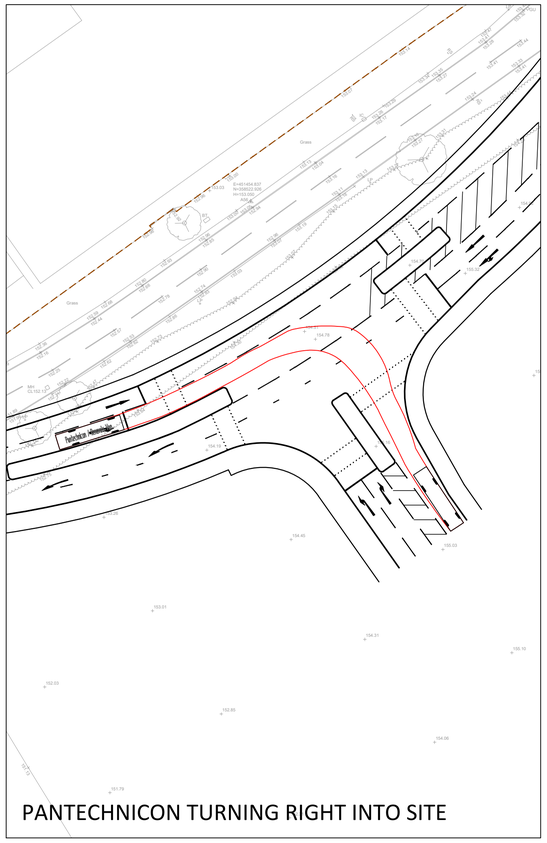
ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A1	As Shown	05/05/2017

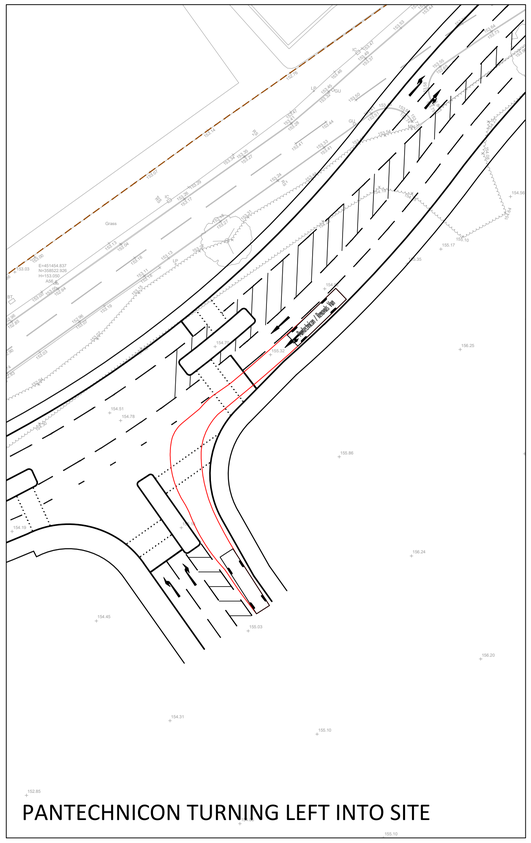
Drg No: ADC1580/003
Rev: P10



MAX LEGAL HGV TRAVELING WESTBOUND THROUGH THE JUNCTION



PANTECHNICON TURNING RIGHT INTO SITE



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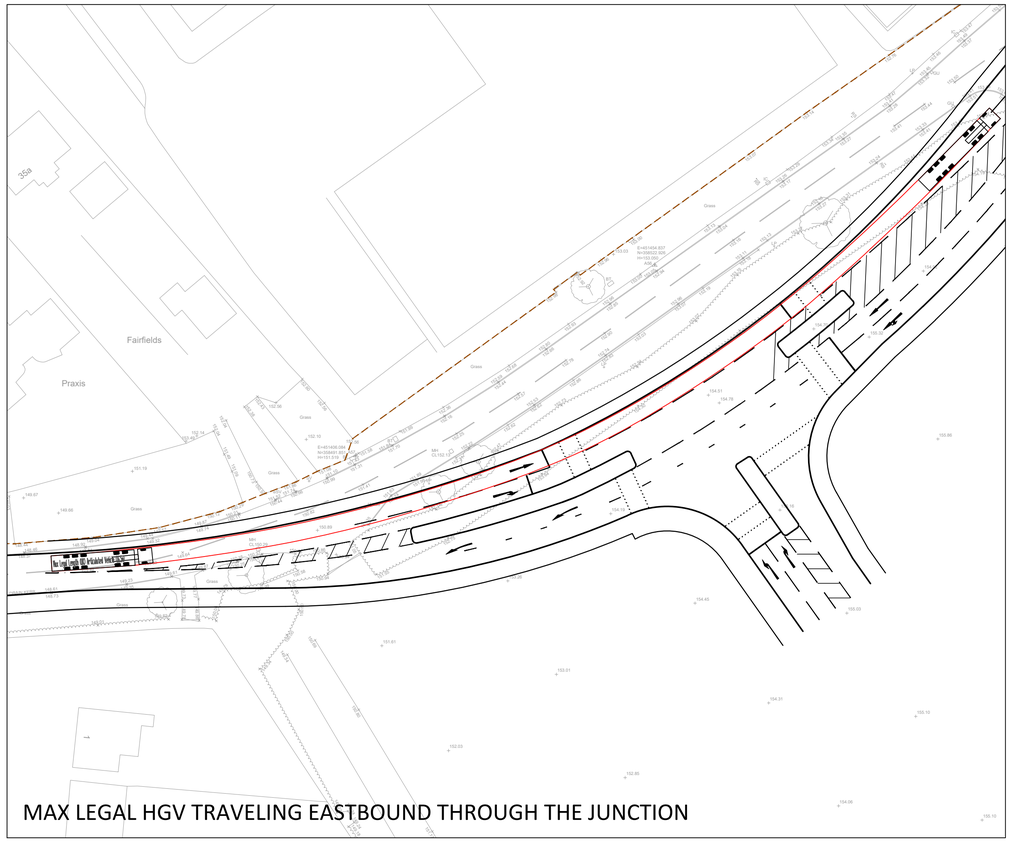
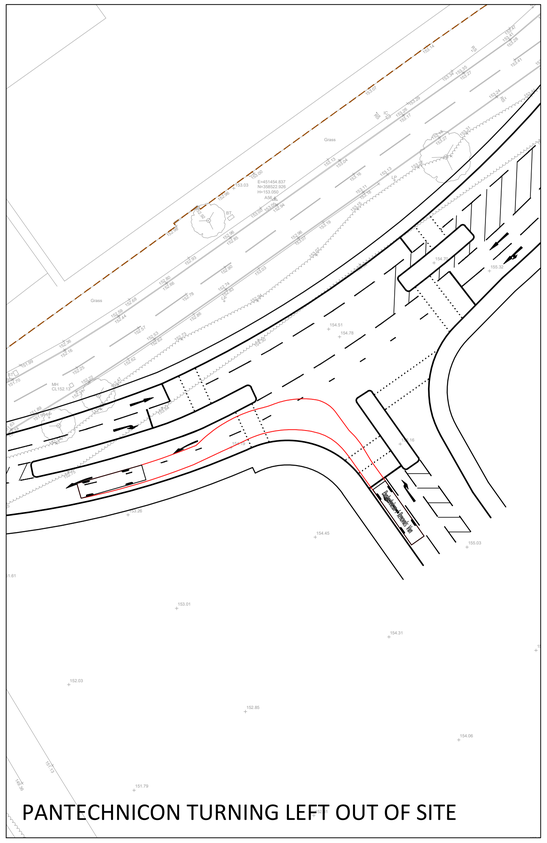
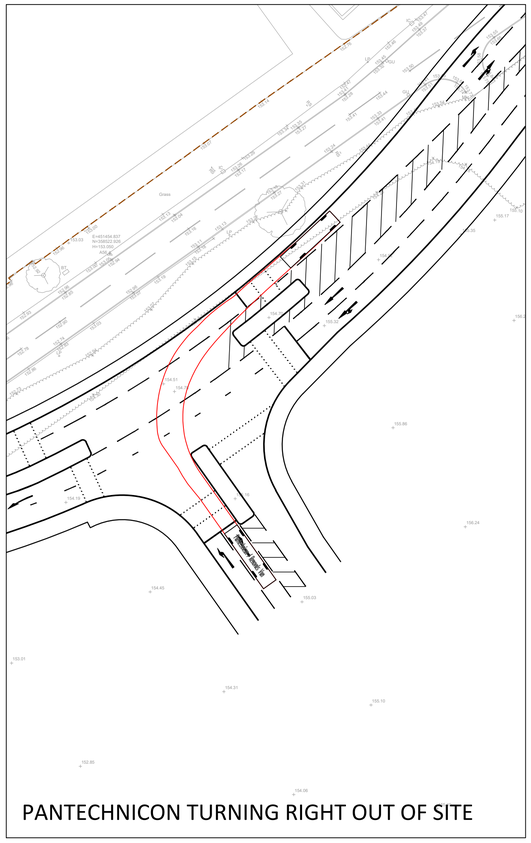


MAX LEGAL HGV TRAVELING EASTBOUND THROUGH THE JUNCTION



PANTECHNICON TURNING LEFT OUT OF SITE



PANTECHNICON TURNING RIGHT OUT OF SITE

Rev	Description	Date
P2	Revised following RSA comments	01/05/18

Client:

Hallam Land Management

Project:

Proposed Residential Development
Newark Road, Sutton in Ashfield

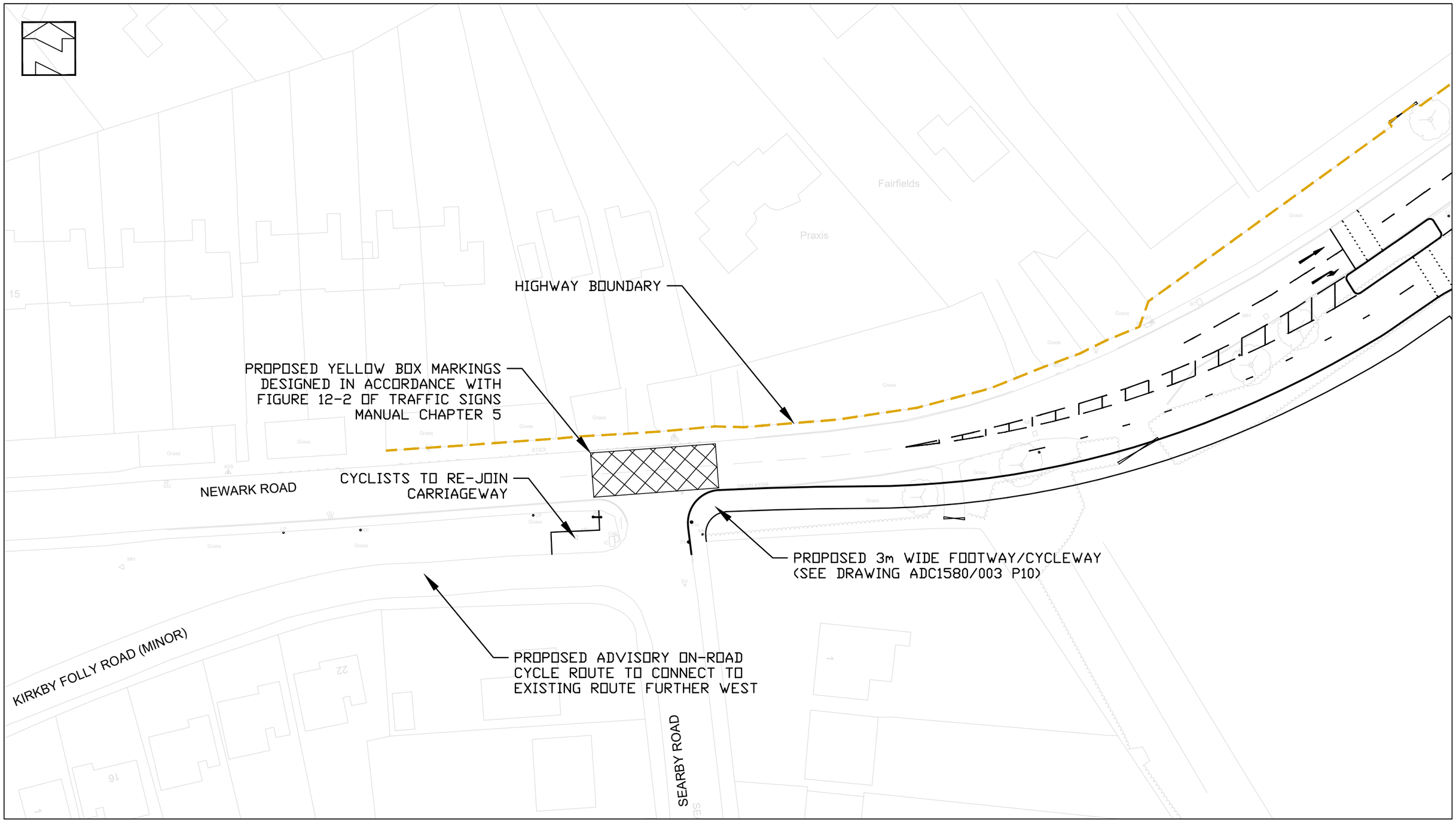
Title:

Swept Path Analysis
Site Access Junction

ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A1	As Shown	11/04/2018

Drg No:	Rev:
ADC1580-DR-051	P2



Rev	Description	Date
P2	Updated drawing reference	15/03/22
P1	Preliminary Issue	01/08/17

Project:

Proposed Residential Development Newark Road, Sutton in Ashfield

Title:

Proposed Improvement Scheme Newark Road / Searby Road

Client:

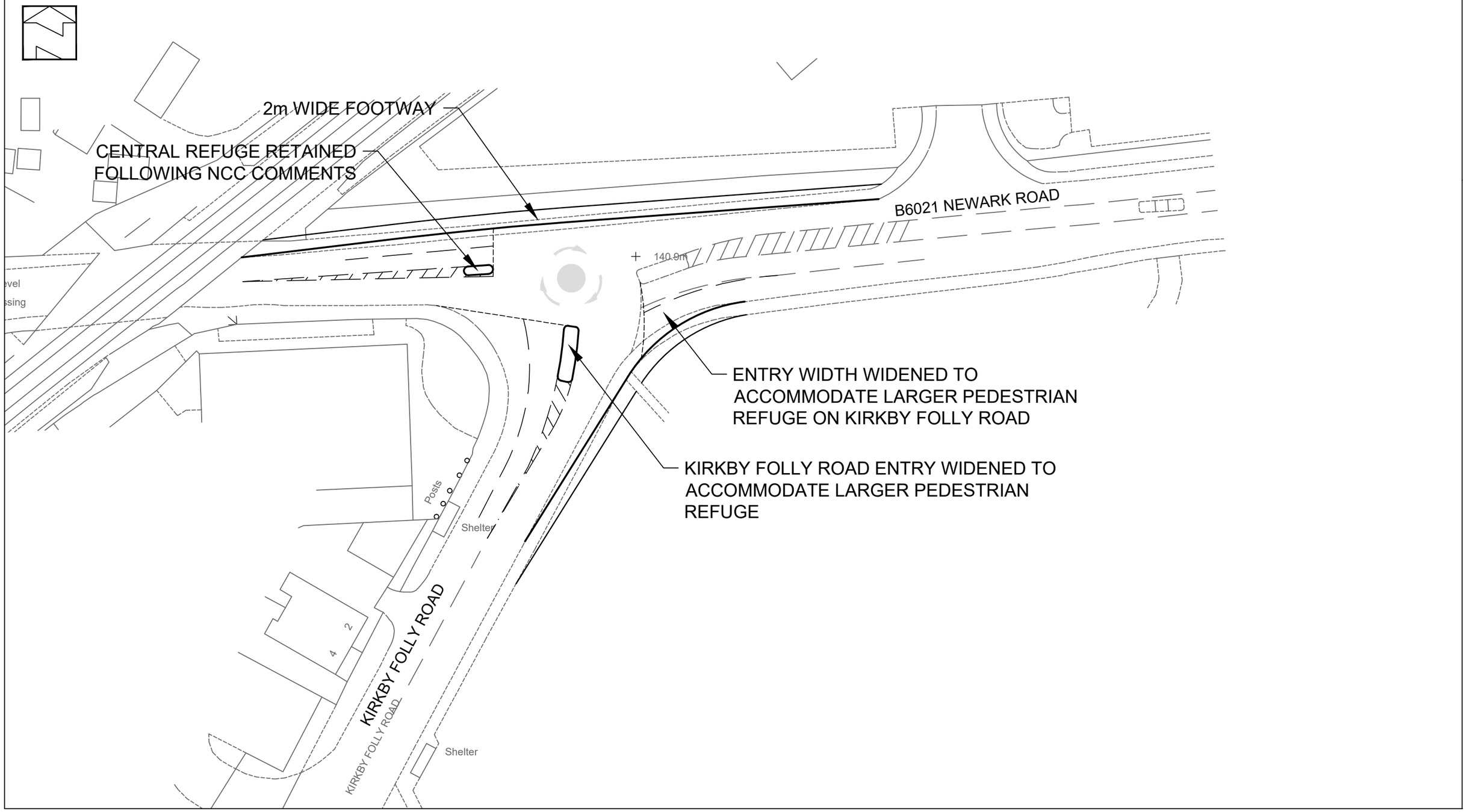
Hallam Land Management

ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A3	1:500	01/08/2017

Drg No: ADC1580/006

Rev: P2



Rev	Description	Date
P8	Revised layout following NCC comments	01/04/19
P7	Revised to accommodate HGVs	12/02/19
P6	Revised layout following comments	31/01/19
P5	Revised layout following comments	30/08/18
P4	Revised layout following RSA comments	02/05/18
P3	Revised Junction Layout	11/04/18

Project:

Proposed Residential Development Newark Road, Sutton in Ashfield

Title:

Proposed Improvement Scheme Newark Road / Kirkby Folly Road

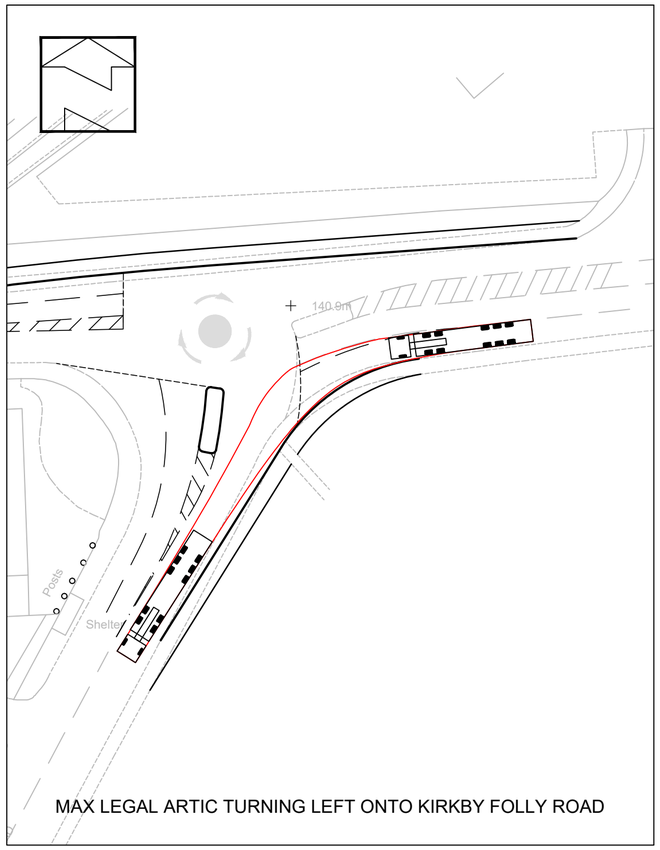
Client:

Hallam Land Management

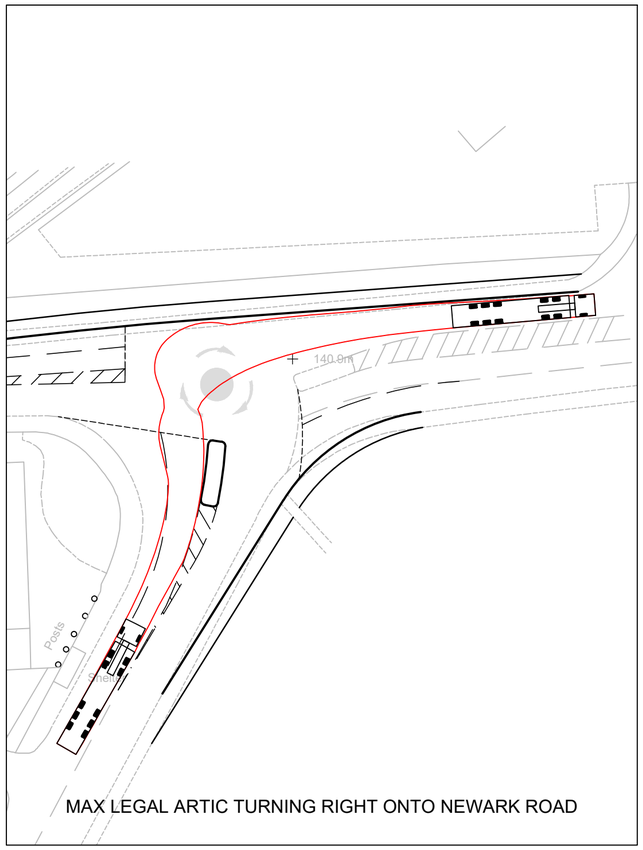
ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A3	1:500	15/06/2017

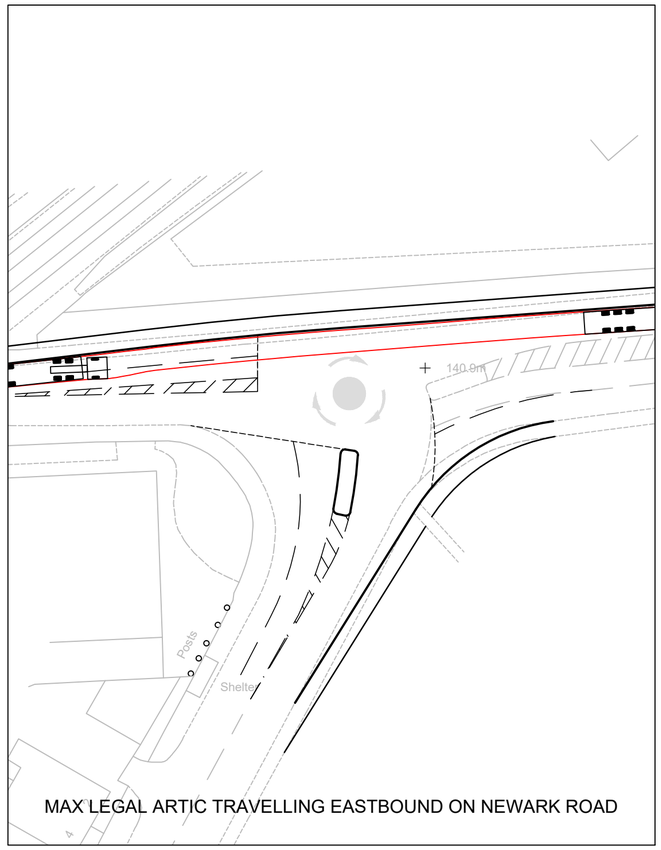
Drg No:	Rev:
ADC1580-DR-004	P8



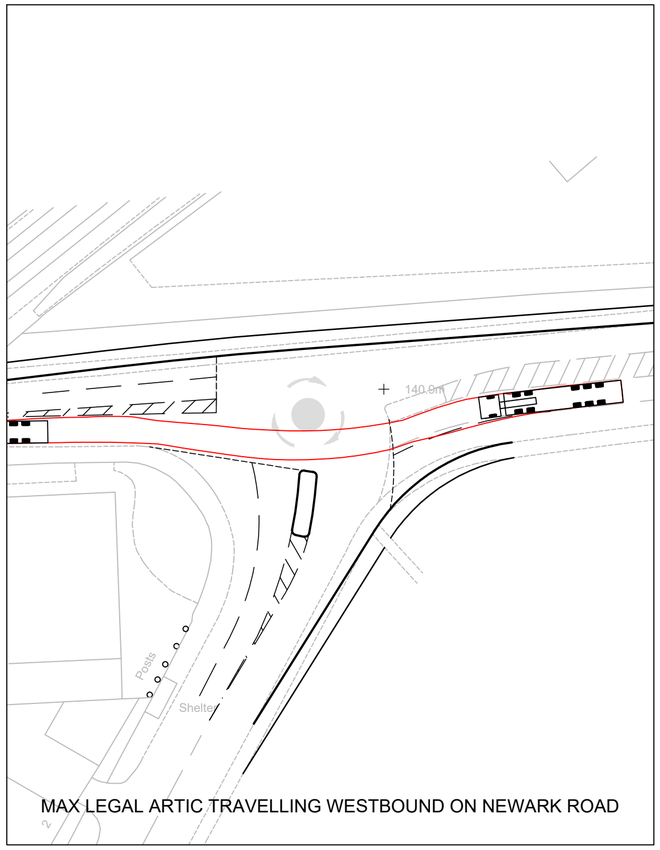
MAX LEGAL ARTIC TURNING LEFT ONTO KIRKBY FOLLY ROAD



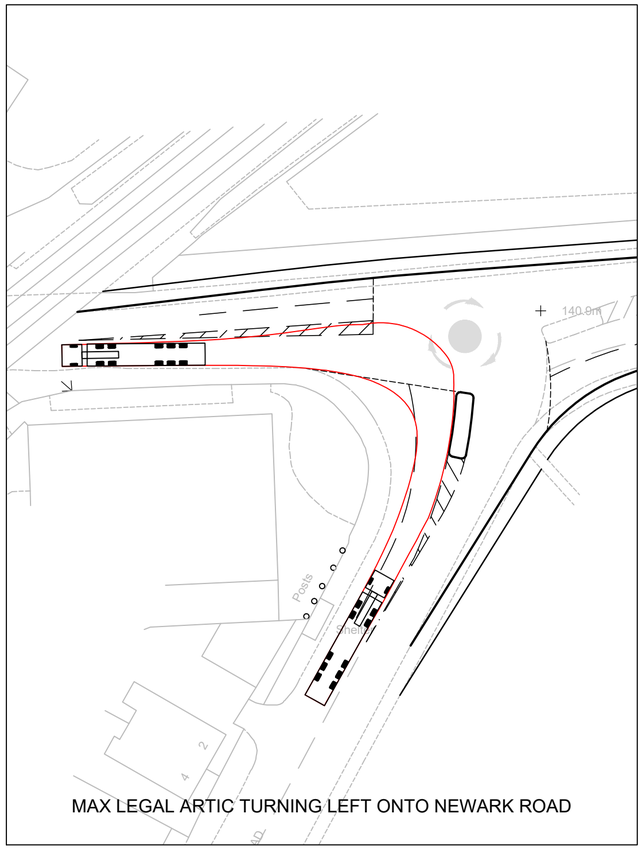
MAX LEGAL ARTIC TURNING RIGHT ONTO NEWARK ROAD



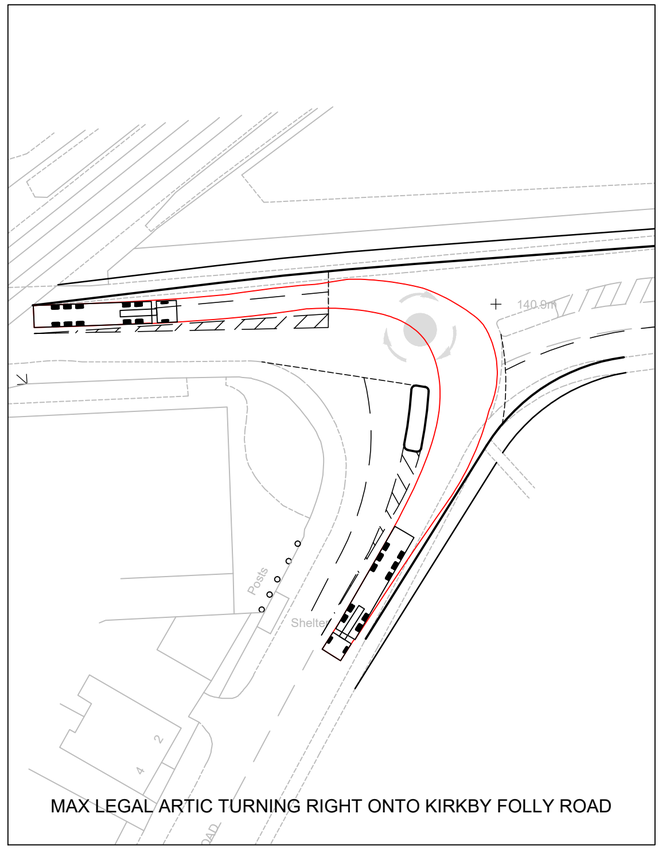
MAX LEGAL ARTIC TRAVELLING EASTBOUND ON NEWARK ROAD



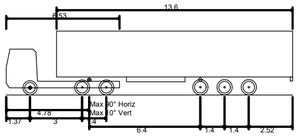
MAX LEGAL ARTIC TRAVELLING WESTBOUND ON NEWARK ROAD



MAX LEGAL ARTIC TURNING LEFT ONTO NEWARK ROAD



MAX LEGAL ARTIC TURNING RIGHT ONTO KIRKBY FOLLY ROAD



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

Rev	Description	Date
P2	Revised Junction Layout	12/02/19

Client:

Hallam Land Management

Project:

Proposed Residential Development
Newark Road, Sutton in Ashfield

Title:

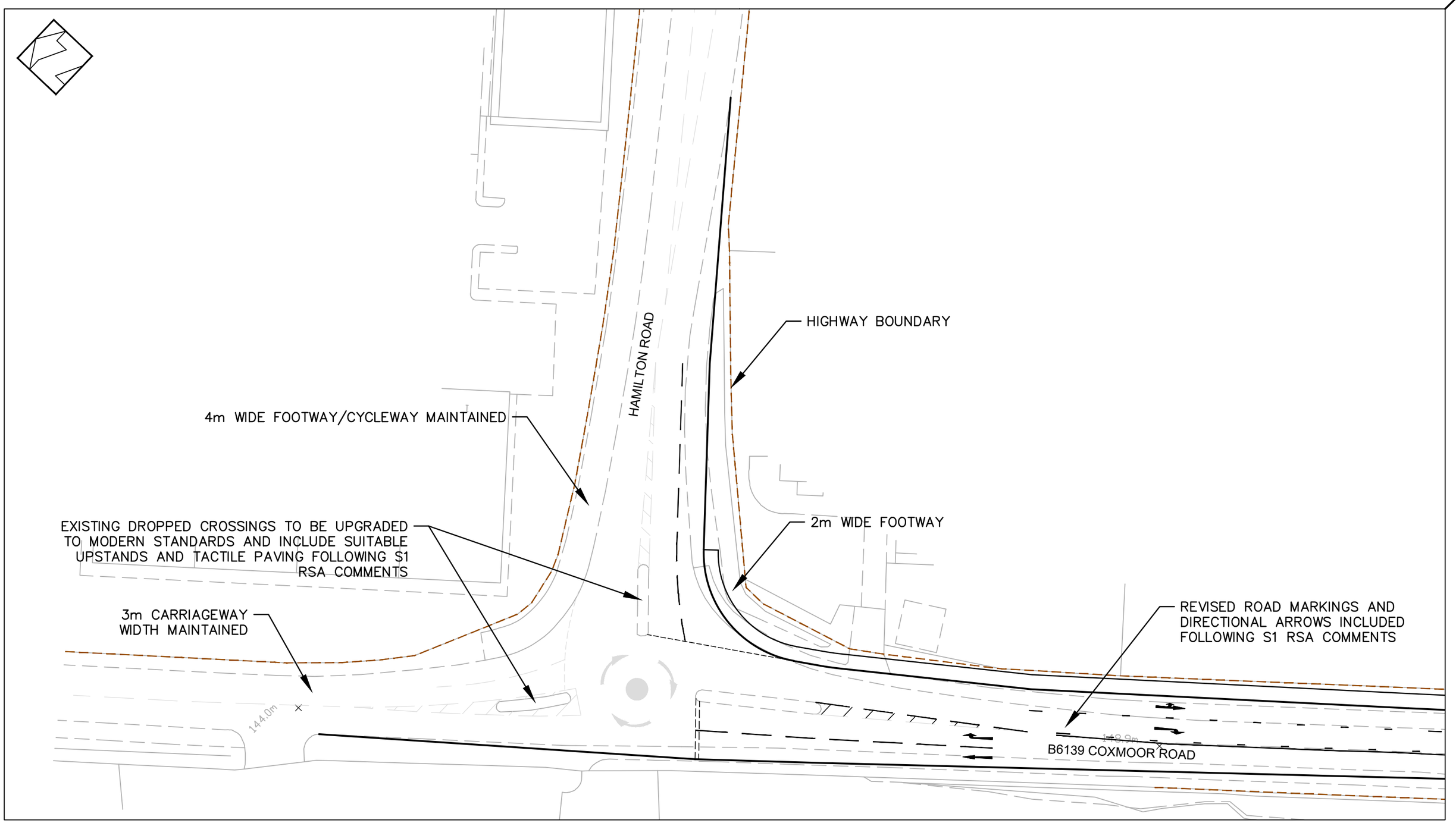
Swept Path Analysis at
Newark Road/Kirkby Folly Road
Mini-Roundabout

ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A2	1:500	03/05/2018

Drg No: ADC1580-DR-052

Rev: P2



Rev	Description	Date
P7	Revised following RSA comments	15/04/19
P6	Revised Scheme	25/01/19

Project:

Proposed Residential Development Newark Road, Sutton in Ashfield

Title:

Proposed Improvement Scheme B6139 Coxmoor Road/Hamilton Road

Client:

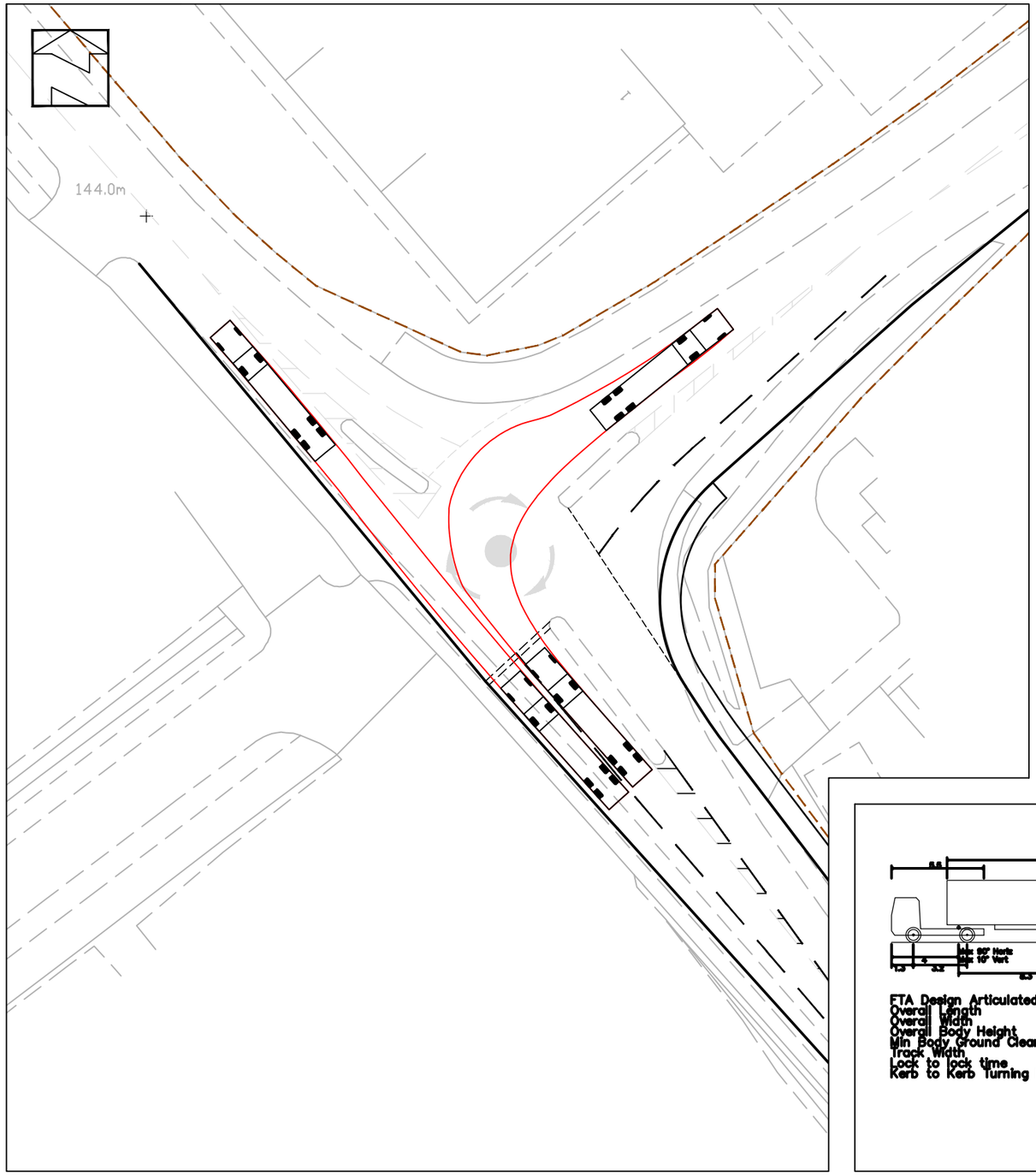
Hallam Land Management

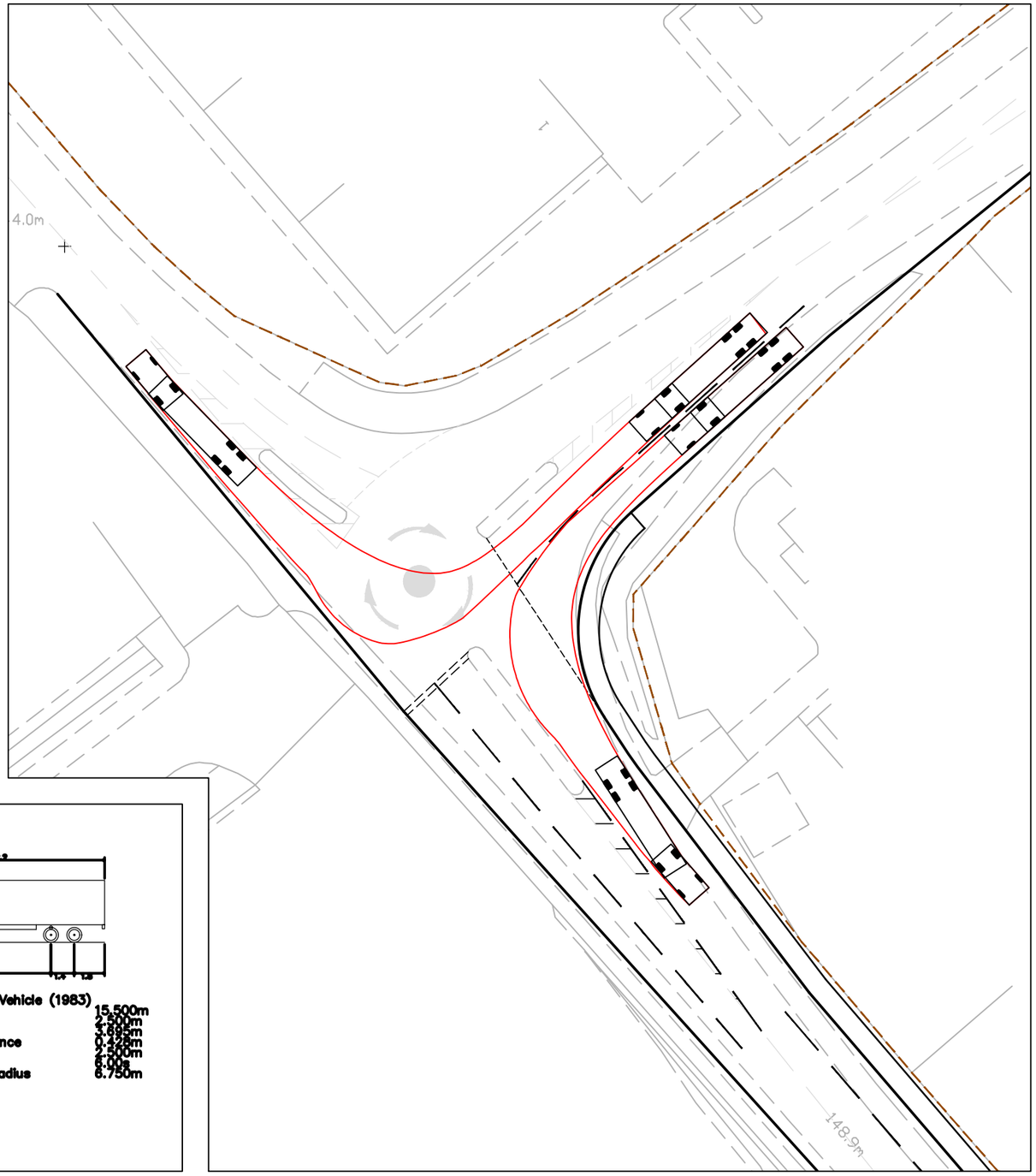
ADC INFRASTRUCTURE

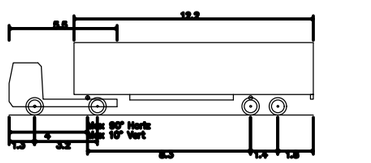
Drg Size:	Scale:	Date:
A3	1:500	17/07/2017

Drg No: ADC1580/005

Rev: P7







FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.895m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.750m

Rev	Description	Date
P2	Revised Scheme	12/02/19

Project:

Proposed Residential Development Newark Road, Sutton in Ashfield

Title:

Swept Path Analysis Coxmoor Road/Hamilton Road

Client:

Hallam Land Management

ADC INFRASTRUCTURE

Drg Size:	Scale:	Date:
A3	1:500	03/05/2018

Drg No:	Rev:
ADC1580-DR-053	P2

APPENDIX A

ILLUSTRATIVE DEVELOPMENT MASTERPLAN