

Lindum Homes

**Proposed Residential Development
Land South of Station Road, Waddington
Transport Assessment**

June 2023

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June 2023

Client Commission

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As part of our commitment to quality the following team of transport professionals was assembled specifically for the delivery of this project. Relevant qualifications are shown and CVs are available upon request to demonstrate our experience and credentials.

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PROPOSED RESIDENTIAL DEVELOPMENT LAND SOUTH OF STATION ROAD, WADDINGTON TRANSPORT ASSESSMENT

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EXECUTIVE SUMMARY

This Transport Assessment (TA) provides a detailed appraisal of the expected transport impacts associated with proposals for a residential development on land to the south of Station Road, in the village of Waddington. The key findings of this TA are summarised below:

- The proposals will be seeking full planning permission for the development of 94 dwellings comprising a mix of dwelling type and size. The 94 dwellings will constitute the first phase of a wider development which has an indicative capacity in the submission draft of the 'Central Lincolnshire Local Plan' (CLJSPC, 2022) for circa 321 dwellings.
- The proposed development is to be accessed by all modes via a simple priority T-junction with Station Road on the northern boundary of the site.
- The site is located within 2km walking distance of the majority of the built-up area of Bracebridge Low Fields and the western extents of the village of Waddington with pedestrian routes to local amenities located to the north of the site on Brant Road and Redwood Drive. As part of the proposed site access, a new footway is to be provided along the southern side of Station Road which will connect to existing pedestrian infrastructure to the east.
- The proposed site is located within a reasonable cycle ride (8km) of a number of areas/facilities including Waddington, Bracebridge, North Hykeham, and Branston including the southern extents of Lincoln along with a number of outlying settlements.
- There are bus stops on Station Road, an approximately 270m walk east of the site access, with rail services at Hykeham Rail Station, approximately 3.9km to the north-west.
- Analysis of the 11 local Personal Injury Collisions (PICs) has not revealed any identifiable existing collision issues associated with the expected movements of the development, therefore it is considered that there are no pertinent road safety issues for the proposals.
- Trip generation and modal split data for the development has been projected using the industry-standard TRICS database. The proposed development is expected to generate up to 46 two-way vehicle trips during the typical network AM peak (07:00-08:00) and up to 44 during the typical PM peak (17:00-18:00).
- The distribution and assignment of traffic across the local highway network has shown that the proposed development is not expected to have a significant impact on the operation of local junctions.

This TA demonstrates that the proposed development would not be expected to have a severe impact in terms of sustainable travel, traffic impact and road safety. As the impact of the proposals is not expected to be severe, the proposals are therefore considered to be in accordance with the National Planning Policy Framework (NPPF).

I. INTRODUCTION

I.1 Background

- 1.1.1 Local Transport Projects Ltd (LTP) has been commissioned to produce a Transport Assessment (TA) in support of a planning application for a residential development on land to the south of Station Road near Waddington, Lincolnshire. This TA provides a detailed appraisal of the expected transport impact of the proposals. A plan of the proposed site layout is attached as Appendix 1.
- 1.1.2 The local planning authority for the site is North Kesteven District Council (NKDC) and the local highway authority is Lincolnshire County Council (LCC).
- 1.1.3 LTP has also been commissioned to prepare a Travel Plan (TP) (LTP, 2023) for the proposed development, which outlines the approach to encouraging travel by sustainable modes at the site. Although the TP has been prepared as a standalone document, both the TA and TP are linked and should be read in conjunction with each other.

I.2 Scope

- 1.2.1 Pre-application scoping discussions have been undertaken with LCC Highways (ref: Sarah Heslam/Jon Sharpe) to establish the required scope of the TA. The scope of the report has been written in accordance with the Government's '*National Planning Policy Framework*' (MHCLG, 2021) and '*Planning Practice Guidance*' (MHCLG, 2014), with the scope outlined below:
- **Executive Summary:** A non-technical summary of the report outlining the key outcomes of the assessment.
 - **Introduction & Description of Proposals:**
 - Description of the development site, including location and existing access arrangements;
 - Summary of relevant planning and allocation history for the site;
 - Description of the proposed development including site layout, pedestrian/cycle facilities and proposed access arrangements.
 - **Site Assessment:**
 - Site assessments to determine existing traffic conditions, such as posted speed limits, road restrictions, highway geometry, on-street parking restrictions and any other relevant features of the local area;
 - Assessment of the sustainable transport infrastructure (pedestrian, cycle and public transport) local to the site.
 - **Road Casualty Appraisal:** Examination of road collision records (5-year study period) and assessment of the road safety impact of the proposed development on the local highway network.

- **Traffic Impact:**
 - Calculation of the projected trip generation for the proposed development;
 - Consideration of any relevant consented developments within the local area and any committed changes to the surrounding highway network;
 - Prediction of the distribution of the vehicle trips generated by the site onto the local highway network; and
 - Assessment of the likely traffic impact of the proposed development on the operation of the local highway network.
- **Access, Parking & Internal Layout:** Consideration of the proposed access arrangements and internal layout of the site, including consideration of the servicing arrangements and proposed parking provision.
- **Conclusions:** Conclusions summarising the outcomes of the TA, including a commentary on the suitability of the proposals in terms of sustainable travel, traffic impact and road safety.

1.2.2 This TA report has been prepared in accordance with the above scope and reference has been made to the following documents where appropriate:

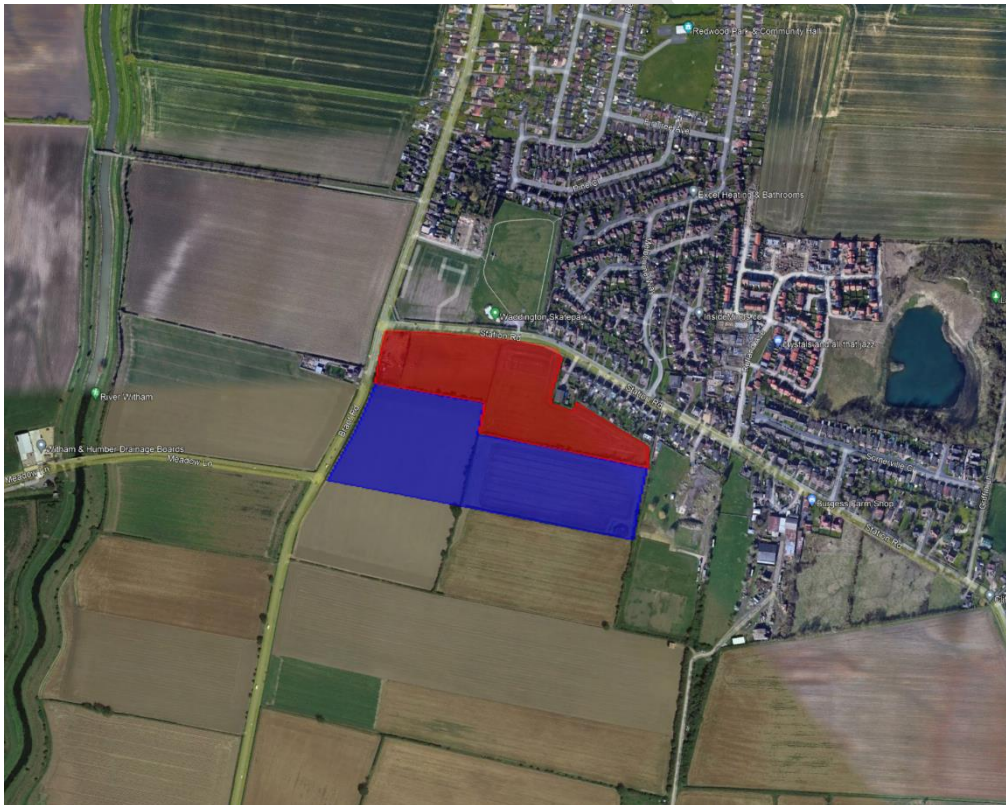
- Central Lincolnshire Local Plan Review – Proposed Submission (CLJSPC, 2022);
- 5th Lincolnshire Local Transport Plan (LCC, 2022c);
- National Planning Policy Framework (MHCLG, 2021);
- Central Lincolnshire Local Plan 2012-2036 – Adopted April 2017 (CLJSPC, 2017);
- Planning Practice Guidance (MHCLG, 2014);
- Manual for Streets 2: Wider Application of the Principles (CIHT, 2010);
- Guidance on Transport Assessment (DfT, 2007a); and
- Manual for Streets (DfT, 2007b).

2. SITE BACKGROUND

2.1 Site Location & Existing Use

2.1.1 The site is located to the south of Station Road near Waddington, and is currently in use as agricultural land. The proposed development site forms part of land allocated for residential development within the proposed submission draft of the 'Central Lincolnshire Local Plan' (CLJSPC, 2022). The proposed development site (Phase 1) is shown in red in Figure 1, with the remaining allocation site highlighted in blue. The wider site is bound by Station Road and dwellings served by Station Road to the north, a brownfield site and dwellings served by Station Road to the east, agricultural land to the south and Brant Road to the west.

Figure 1: Site Location



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2.2 Development Proposals

2.2.1 This report is based upon the proposals outlined on the site layout plan attached as Appendix 1. The proposals involve the development of the northern extents of the proposed allocation site to provide 94 dwellings, known as Phase 1 development.

2.2.2 Car parking standards are outlined within the proposed draft submission of the 'Central Lincolnshire Local Plan' (CLJSPC, 2022). The document outlines that for 1-bed dwellings, 1 car parking space is required, 2-bed dwellings require 2 car parking spaces, and 3+ bed dwellings require 3 car parking spaces. The proposed car parking provision is expected to be provided in line with the local requirements.

2.3 Access Arrangements

- 2.3.1 Discussions with LCC Highways (ref: Jon Sharpe) revealed a preference to provide two separate accesses to serve the wider allocation, from Station Road and from Brant Road. Given the level of development (94 dwellings) and the predicted trip generation of the proposed Phase 1 (see Section 5), it is expected that a single vehicular access would be sufficient to accommodate the vehicle movements associated with Phase 1 of the development, via the northern Station Road frontage for the Phase 1 scheme.
- 2.3.2 Vehicular access to the proposed Phase 1 development will be provided via a new simple priority T-junction connecting with Station Road on the northern site boundary, as shown in Appendix 1.
- 2.3.3 As part of the development of the southern extents of the proposed allocation site, a second vehicular access will be provided, connecting with Brant Road. This is considered to be appropriate as the wider allocation land has a larger frontage onto Brant Road than the Phase 1 land, and this would also ensure that a new junction onto Brant Road is not located too close to the Brant Road/Station Road junction, ensuring sufficient junction spacing.
- 2.3.4 It is anticipated that vehicular connections will be made between the Phase 1 and southern development parcels, which will facilitate access/egress to/from both parcels of land via both Station Road and Brant Road. However, as flagged by LCC Highways, it is expected that the internal route between Station Road and Brant Road through the allocation site will be relatively tortuous to ensure that traffic that is not associated with the site does not seek to avoid queuing at the Brant Road/Station Road junction by 'rat-running' through the development site.
- 2.3.5 Furthermore, a 3.7m wide emergency access is to be provided between #125 and #127 Station Road, which is to be delivered as part of the Phase 1 proposals, as shown in Appendix 1. This emergency vehicle access would also provide an additional pedestrian and cycle route to/from the local amenities in Waddington.
- 2.3.6 There are currently two key documents that provide guidance relating to visibility splay requirements; *'Design Manual for Roads and Bridges'* (DMRB) (NH, 2021), which is generally more applicable to predominantly trunk road, higher speed environments, and *'Manual for Streets'* (MfS) (DfT, 2007b), which is generally more applicable to low-speed residential urban environments. MfS is also complemented by further guidance *'Manual for Streets 2'* (MfS2) (CIHT, 2010) for the application of the MfS principles on additional road types, such as busier streets, rural routes and non-trunk roads.

- 2.3.7 Within the vicinity of the site, Station Road is subject to a 40mph speed limit, however as part of the development, this is expected to be reduced to 30mph, providing a continuation of the 30mph speed limit which is currently in place to the east. Given this, and as the proposed development will build-up the frontage along Station Road, it is considered that the use of MfS principles is applicable. Therefore, visibility splays of 2.4m x 43m are required to both sides of an access. A visibility assessment demonstrates that the required visibility splays are achievable. Moreover, for robustness visibility splays for a 40mph speed have also been shown to be achievable, even based on the requirements of the more onerous DMRB guidance (2.4m x 120m), as shown in Appendix 3.
- 2.3.8 Footways which will measure 2m in width are to be provided on both sides of the proposed site access, with the footway on the eastern side of the internal access road to be extended to connect with the existing footway provision on the southern side of Station Road to the east of the site, providing a new public footway that measures circa 175m in length. Dropped kerbs and tactile paving will be provided across the site access junction, on both sides of Station Road immediately west of the access junction, and on both sides of Station Road to the east of the site within the vicinity of the Waddington Skate Park access.
- 2.3.9 It is expected that the internal highway network of the site will be designed to ensure that refuse and delivery vehicles can utilise the highway alignment to enter and exit the site in a forward gear. Vehicle tracking for refuse vehicle turning at the site access junction is provided as Appendix 4.

2.4 Allocation Status & Planning History

- 2.4.1 The site forms part of land allocated for residential development within the proposed submission draft of the 'Central Lincolnshire Local Plan' (CLJSPC, 2022). The full allocation site, known as 'NK/WAD/004a', has an indicative capacity of 321 dwellings, with the boundary shown in Figure 2 below.

Figure 2: 'NK/WAD/004a' Allocation Site



Source: CLJSPC, 2022

2.4.2 The proposed submission draft of the 'Central Lincolnshire Local Plan' (CLJSPC, 2022) outlines a number of site-specific considerations that are required as part of the development of the site, as reproduced below:

- *"Development of the site will need to assess drainage and surface water flood risk on the site.*
- *A Transport Assessment and Travel Plan will be required. A contribution to the Lincoln Southern bypass will be required.*
- *Development to be sensitive to views into/out of/across the AGLV to CA in Waddington Cliff.*
- *Development will be required to address any additional infrastructure requirements including primary school and health care."*

2.4.3 There have not been any recent or pertinent planning applications relating to the proposed development site.

2.5 Committed Developments

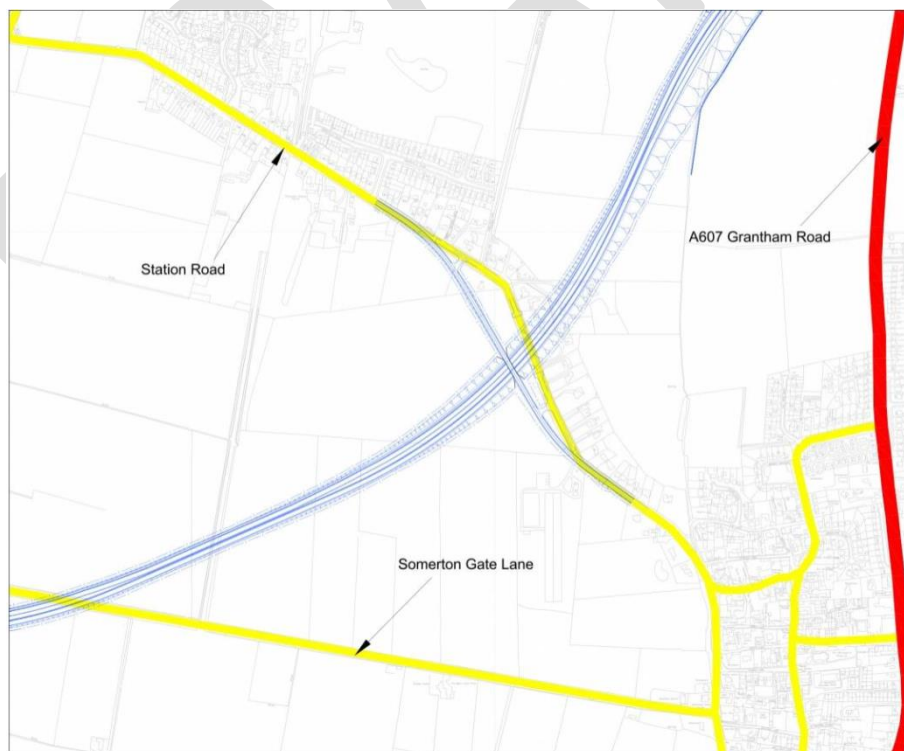
2.5.1 A planning application (ref: 16/0865/OUT) was submitted in July 2016 and subsequently approved in February 2017 for the 'proposed residential development comprising of 42 dwellings along with associated communal areas and access roadways (outline with details of access and layout)' located approximately 400m to the east of the site. A Transport Statement (TS) (JMP Consultants, 2016) was submitted in support of the application.

- 2.5.2 A subsequent reserved matters application (ref: 19/0987/RESM) was submitted in July 2019 and subsequently approved in January 2020 for the 'reserved matters application for 42 no. dwellings with associated communal areas and access roadways and with details of appearance, landscaping and scale (pursuant to outline application 16/0865/OUT as amended by application 19/1142/PNMAT).'
- 2.5.3 A number of non-material amendment, condition discharge, and minor amendment applications have since been made. It is understood that the development has now been constructed, served via Squires Road, which connects with Station Road in the form of a simple priority T-junction circa 400m east of the proposed site access.

2.6 North Hykeham Relief Road

- 2.6.1 As highlighted within Section 2.4, the development of the site requires a contribution to the Lincoln Southern Bypass, although it is understood that this may be removed as a requirement in an upcoming revision of the local plan draft.
- 2.6.2 The Lincoln Southern Bypass, known as the North Hykeham Relief Road, will connect the Lincoln Eastern Bypass and the Western Bypass at its junction with the A46 at the end of Newark Road. As part of the provision of the relief road, there are also planned realignment works to Station Road to the east of the site, although the relief road will go under Station Road, with no vehicular connection between the two roads. The current plan for the relief road is shown in Figure 3.

Figure 3: North Hykeham Relief Road



Source: LCC, 2022a

- 2.6.3 It is understood that the Government has confirmed funding for the relief road, with a planning application expected to be submitted in the next year or two, but completion not expected until circa 2028.
- 2.6.4 Given that the site is a relatively low vehicle trip generator, with vehicle trips expected to be spread out across the local network (see Section 5), it is considered that the development of the site is not dependent on the delivery of the relief road as mitigation, and therefore no funding contributions are considered necessary.

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3. SITE ASSESSMENT

3.1 Local Highway Network

- 3.1.1 As previously outlined, the proposed development site is to be accessed by a new simple priority T-junction connecting with Station Road on the northern site boundary. Station Road is a two-way single carriageway which measures approximately 6.3m in width within the vicinity of the site. It is subject to a 40mph speed limit along the site frontage, with this becoming a 30mph speed limit approximately 110m to the east of the proposed site access. As discussed in Section 2.3, the proposals may justify an extension of the 30mph speed limit to cover the new site access, although the design of the access junction would not be dependent on a change in speed limit and would be sufficient for the existing 40mph speed limit too. There are not any existing waiting/parking restrictions on Station Road within the vicinity of the site.

Photo 1: Station Road



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- 3.1.2 Within the north-western extents of the site, Station Road connects with Brant Road via a simple priority T-junction, albeit with some central hatching and a partial width right-turn lane that may be sufficient to accommodate the passing of some vehicles when there is a waiting right-turner.
- 3.1.3 Brant Road is a two-way single carriageway which varies in width between approximately 6.6m and 7.3m and is subject to a 40mph speed limit within the vicinity of the junction with Station Road. Brant Road runs between Low Road approximately 1.6km to the south-west, and Newark Road approximately 3km to the north (providing an onward route to/from Lincoln).

Photo 2: Brant Road



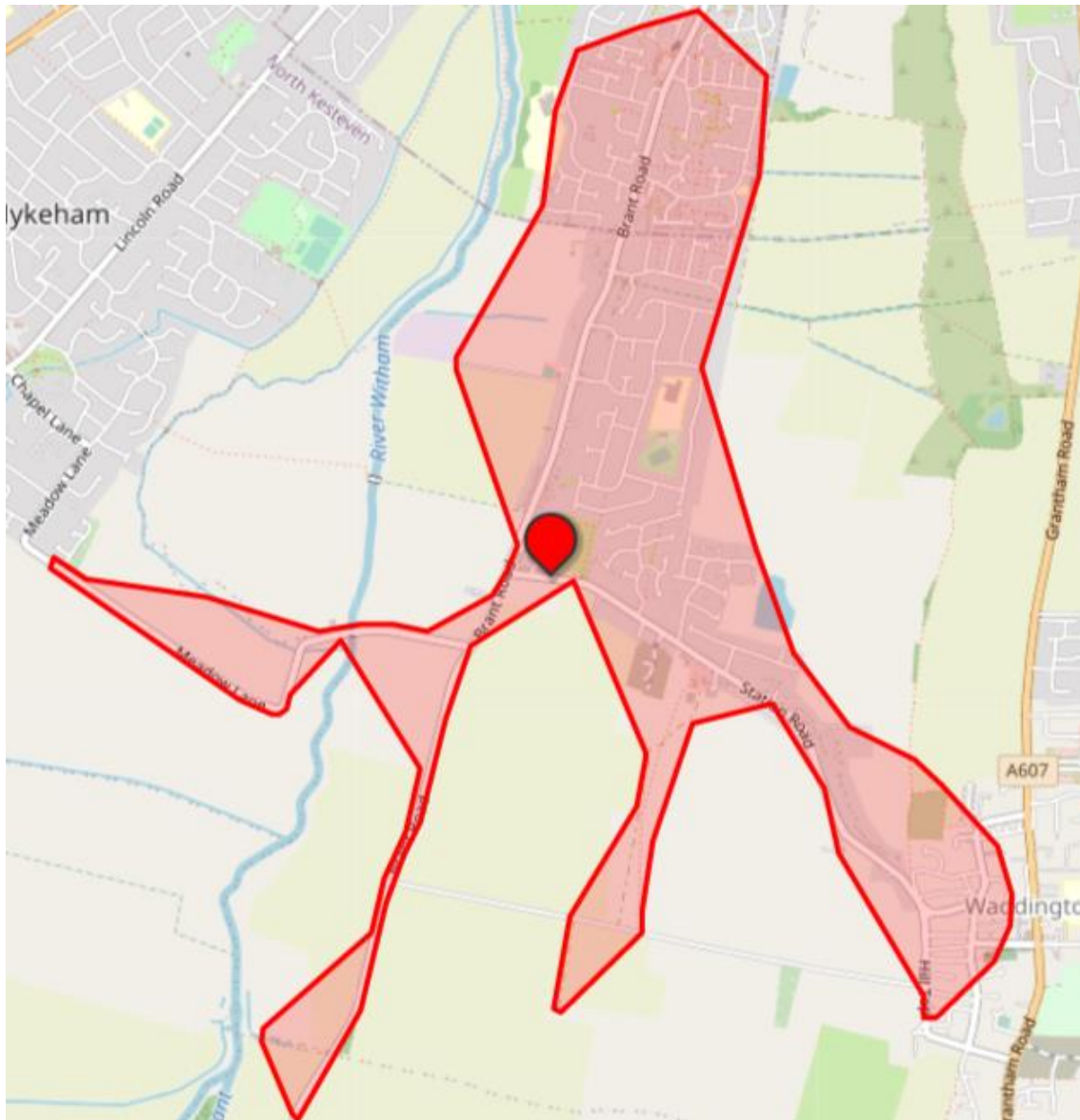
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- 3.1.4 Approximately 1.5km to the south-east of the site, Station Road becomes Hill Top at a priority T-junction with Manor Lane which features three separate give-way locations. Hill Top continues to the south before becoming Tinker's Lane, whilst Manor Lane continues east within Waddington. Tinker's Lane connects with the A607 to the east, circa 2.3km from the proposed site access.
- 3.1.5 Concern was raised by the Local Planning Authority (LPA) regarding the potential impact of the proposed scheme on several local junctions including the Newark Road/Moor Lane/Station Road junction located approximately 3.8km to the south-west and the Meadow Lane/Brant Road junction located approximately 430m to the south-west of the site. The projected traffic impact of the development is discussed further in Section 5.4 and shows that the traffic impact on both of these junctions is not expected to be significant.

3.2 Pedestrian Provision

3.2.1 Guidance from the Chartered Institution of Highways & Transportation (CIHT) suggests a preferred maximum walking distance of 2km for a number of trips, including commuting and school trips (IHT, 2000). The proposed development site is located within a 2km walking distance of the southern extents of Bracebridge Low Fields and the western extents of Waddington, as shown below in Figure 4.

Figure 4: 2km Walking Isochrone



Source: ORS Maps, 2022

3.2.2 The site is located within a reasonable walking distance (up to 2km) of a number of retail, health, leisure and education facilities located within Bracebridge Low Fields to the north of the site. These include the Waddington Redwood Primary School, the Meadows Primary School, nurseries, shops, takeaways, a public house and several hairdressers.

- 3.2.3 As previously mentioned, the eastern footway proposed to flank the site access will be extended to connect with the existing footway on the southern side of Station Road to the east of the site. As previously mentioned in Section 2.3, a 3.7m wide emergency access is to be provided between #125 and #127 Station Road, which is to be delivered as part of the Phase 1 proposals. This emergency vehicle access would also provide an additional pedestrian and cycle route to/from the site.
- 3.2.4 A footway measuring approximately 1.2m in width is provided on the northern side of Station Road within the vicinity of the site. The footway provides a continuous connection to Manor Lane approximately 1.7km to the east of the site.

Photo 3: Pedestrian Infrastructure on Station Road



Source Imagery: Copyright Google Earth Pro (License Key-JCPMR5M58LXF2GE)

- 3.2.5 Furthermore, the footway on the northern side of Station Road provides access to pedestrian infrastructure on Brant Road to the west of the site. Footways are provided in sections along both sides of Brant Road which vary in width between 0.7m and 1.6m.

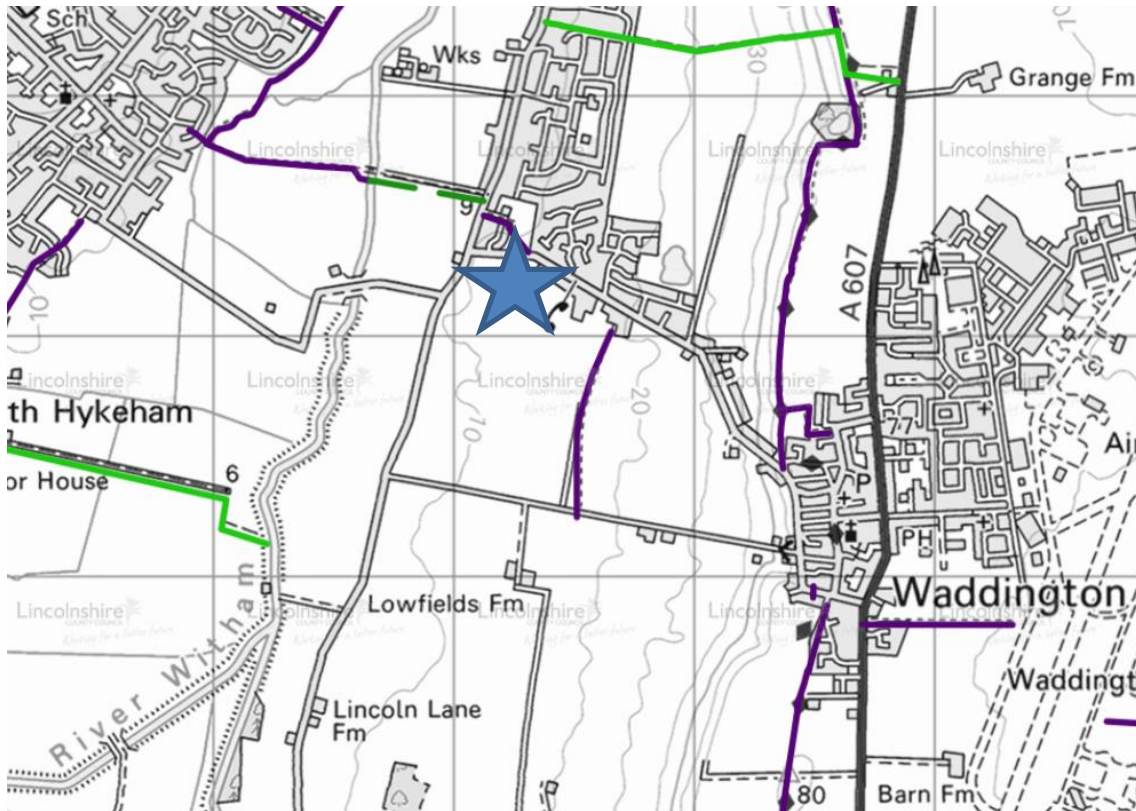
Photo 4: Pedestrian Infrastructure on Brant Road



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3.2.6 Figure 5 shows the existing Public Rights of Way (PRoW) within the vicinity of the site, with public footpaths shown in purple, bridleways in green and the site shown by the blue star.

Figure 5: Local Public Rights of Way



Source: LCC, 2022b

3.2.7 There are several public footpaths within the vicinity of the site, including the Waddington/9/1 footpath located to the east which runs between Station Road and Somerton Gate Lane to the south. Furthermore, there are several footpaths located within Waddington Skatepark to the north of Station Road, including the Waddington/2/1 footpath that provides a connection to the residential dwellings served by Meadowfield Close to the west.

3.2.8 The pedestrian infrastructure within the vicinity of the site appears to generally be sufficient to facilitate the movements of mobility and visually impaired people, with the provision of dropped kerbs at most local junctions and crossing points within the local area. The footways are generally of sufficient width and surface quality to accommodate the passage of wheelchairs (DfT, 2021).

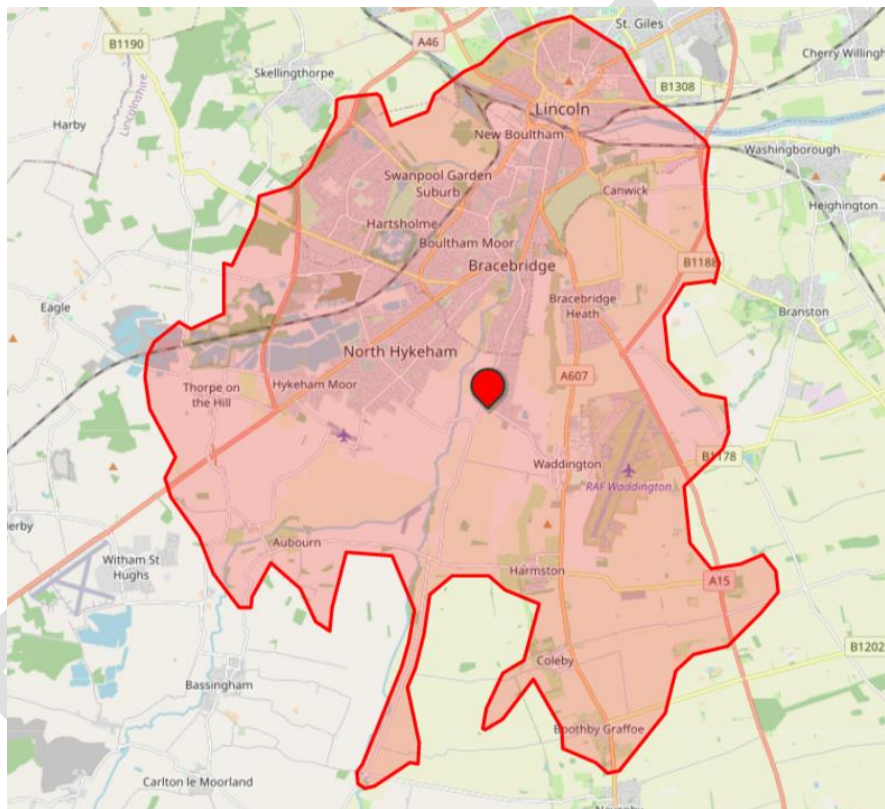
3.2.9 The proposed internal pedestrian routes are expected to be of adequate width, with step-free access between the site and the local footway network. It is therefore considered that the site can be suitably accessed on foot by all users, including those accompanied by young children and the mobility impaired.

3.2.10 A number of measures to promote walking trips to and from the site are outlined within the site TP (LTP, 2023).

3.3 Cycling Provision

- 3.3.1 Cycling is a low cost and healthy alternative to car use, which can substitute for short car trips, or can form part of a longer journey by public transport. The Department for Transport (DfT) state that journeys up to five miles (circa 8km) are “an achievable distance to cycle for most people” (DfT, 2020).
- 3.3.2 The proposed site is located within a reasonable cycle ride, up to 8km (approximately 25 minutes at the average cycling speed of 12mph), of the built-up areas of Waddington, Bracebridge, North Hykeham, the southern and central extents of Lincoln, and a range of further settlements as shown below in Figure 6.

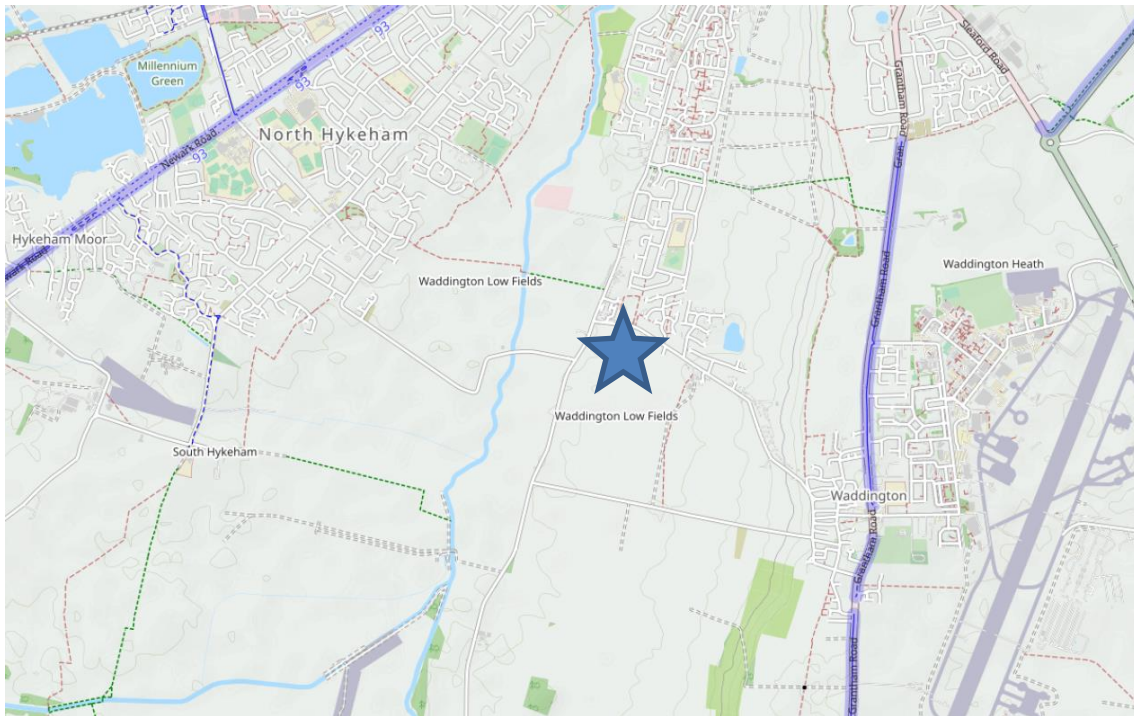
Figure 6: 8km Cycling Isochrone



Source: ORS, 2022

- 3.3.3 The 3.7m wide emergency access which is to be provided between #125 and #127 Station Road, would also provide an additional pedestrian and cycle route to/from the site.
- 3.3.4 An extract of the OpenCycleMap is provided below in Figure 7 and shows the available cycle facilities within the vicinity of the proposed site, with local cycle routes highlighted in blue (both thin and thick lines), and the proposed site highlighted by the blue star.

Figure 7: Local Cycle Routes



Source: OCM, 2022

- 3.3.5 As demonstrated in Figure 7, there is a shared use foot/cycleway located on the western side of the A607 approximately 2km to the east of the site that runs between Bracebridge Heath to the north and Navenby to the south. Additional cycle facilities can be accessed on Newark Road in the form of advisory cycle lanes, approximately 3.7km north-east of the proposed site, connecting the centre of Lincoln and Witham St. Hughs.
- 3.3.6 Given the availability of local cycle facilities, and that the local highway network is subject to a 30/40mph speed limit, it is considered that the local environment within the vicinity of the site is generally conducive to encouraging cycling trips.
- 3.3.7 A number of measures to promote cycling trips to and from the site are outlined within the site TP (LTP, 2023).

3.4 Public Transport Provision

- 3.4.1 Advice outlined within 'Guidelines for Public Transport in Development' (IHT, 1999) states that the generally acceptable maximum walking distance that a bus stop should be located from a development site is 400m, although it is acknowledged that actual walking distances can be notably longer.
- 3.4.2 The nearest bus stops to the site are located on Station Road, situated an approximately 250m walking distance to the east of the proposed site access point, providing travel in both directions. Additional bus stops are provided on Brant Road, approximately 300m to the north-west of the proposed site access, providing travel in both directions.
- 3.4.3 Details regarding the bus services which operate from the local bus stops are outlined within Table 1.

Table 1: Local Bus Services

Service	Route	Weekday Frequency*
Bus services accessible from Station Road ≈250m		
13	Lincoln Central Bus Station – Bracebridge – Waddington	Every 20 minutes
544	Bracebridge – Waddington – North Hykeham	One service per day each-way
575	Waddington – Bracebridge – Branston Community College	One service per day each-way
6531	Navenby – Boothby Graffoe – Coleby – Harmston – Waddington – North Hykeham	One service per day each-way
SLE9	Sleaford – South Rauceby – Leadenham – Welbourn – Wellingore – Navenby – Boothby Graffoe – Harmston – Waddington – Aubourn – Haddington – Witham St Hugh's	One service per day each-way
Additional services accessible from Brant Road ≈300m		
543	Waddington – North Hykeham	One service per day each-way

*Refers to the general daytime service between 08:00 and 17:00.

- 3.4.4 The nearest rail station to the site is Hykeham Rail Station, which is located approximately 3.9km to the north-west of the site. It should be noted that the #544 and #6531 services stop on Moor Lane, an approximate 1.1km walk to the east of Hykeham Rail Station. Hykeham Rail Station is operated by East Midlands Rail, and provides frequent services to Lincoln, Grimsby, Leicester, Nottingham and Loughborough. Facilities available at the station include cycle parking, a car park and step-free access.
- 3.4.5 Measures to promote and encourage trips by public transport to the site are outlined within the accompanying TP (LTP, 2023).

4. ROAD CASUALTY APPRAISAL

4.1 Collision Record

- 4.1.1 Personal Injury Collision (PIC) data for the highway network local to the site for the most recent available five-year study period (01/01/2017 to 31/12/2021), was obtained via a search of the Department for Transport’s (DfT) road safety data (DfT, 2022).
- 4.1.2 A total of 11 collisions occurred within the study area, which includes Station Road, Brant Road and Meadow Lane and a number of local junctions. The study area extents and the locations of the collisions are indicated on the plan attached as Appendix 2. Table 2 below outlines the collision history of the study area.

Table 2: Collision History

Year	2017	2018	2019	2020	2021	Total
Fatal	0	0	0	0	0	0
Serious	0	0	0	0	1	1
Slight	3	1	4	1	1	10
Total	3	1	4	1	2	11

- 4.1.3 The collision records show that the number of collisions remained relatively low across the study period with a slight peak of four collisions in 2019. There was one Killed or Seriously Injured (KSI) collision recorded during the study period, resulting in a severity ratio of 9.1%.

4.2 Collision Conditions

- 4.2.1 Table 3 below summarises the collisions by road surface, weather, and lighting conditions:

Table 3: Collision Conditions

Road Surface	Collisions	%
Dry	9	81.8%
Wet or Damp	2	18.2%
Weather		
Fine	11	100%
Lighting		
Daylight	8	72.7%
Darkness	3	27.3%

- 4.2.2 As illustrated in Table 3, the majority of collisions did not occur with an adverse road surface, in adverse weather or lighting conditions.

4.3 Collision Times

4.3.1 Table 4 below summarises the collisions by time of year:

Table 4: Collisions by Time of Year

Time of Year	Collisions	%
Winter (Dec-Feb)	3	27.3%
Spring (Mar-May)	2	18.2%
Summer (Jun-Aug)	3	27.3%
Autumn (Sep-Nov)	3	27.3%

4.3.2 Table 4 shows that the collisions were relatively spread out across the year, with a slight dip in the collisions during the spring months.

4.3.3 Table 5 below summarises the collisions by day of week and also the time of day:

Table 5: Collisions by Time and Day

Day	Morning (06:00- 11:00)	Lunch (11:00- 14:00)	Afternoon (14:00- 19:00)	Evening (19:00- 01:00)	Night (01:00- 06:00)	Total	%
Monday	1	-	-	1	1	3	27.3%
Tuesday	-	-	-	-	-	-	-
Wednesday	1	-	1	-	-	2	18.2%
Thursday	-	-	-	-	-	-	-
Friday	-	-	1	-	-	1	9.1%
Saturday	-	-	1	-	-	1	9.1%
Sunday	-	1	2	1	-	4	36.4%
Total	2	1	5	2	1	11	
%	18.2%	9.1%	45.5%	18.2%	9.1%		

4.3.4 Table 5 shows that just under half of the collisions (45.5%) occurred during the afternoon period. Over a third of the collisions (36.4%) occurred on a Sunday, with no collisions were occurring on a Tuesday or Thursday.

4.4 Collision Locations

4.4.1 The locations of the 11 study collisions (shown on the plot attached as Appendix 2) can be summarised as follows:

- 4 PICs occurred at the Brant Lane/Meadow Lane junction;
- 2 PICs occurred at the Station Road/Brant Road junction;
- 1 PIC occurred at the Station Road/Orchard Garth junction;
- 1 PIC occurred at the Station Road/Melbourne Way junction;
- 1 PIC occurred to the Station Road/Rutland Avenue junction;
- 1 PIC occurred on Brant Road (not at a junction); and
- 1 PIC occurred on Station Road (not at a junction).

4.4.2 No collisions occurred on Station Road within the vicinity of the proposed site access.

4.5 Casualties

4.5.1 A total of 16 casualties occurred as a result of the 11 recorded injury collisions during the study period. Table 6 below provides a breakdown of the casualties according to the mode of travel and age group:

Table 6: Casualty Road User Groups

Road User Group	Age (years)						Total	%
	0 to 15	16 to 20	21 to 25	26 to 45	46 to 65	66 +		
Pedestrian	2	-	-	1	-	-	3	18.8%
Cyclist	-	1	-	-	-	-	1	6.3%
Car Driver	-	-	1	2	2	1	6	37.5%
Car Passenger	1	1	-	2	-	1	5	31.3%
Goods Vehicle Occupant	-	-	1	-	-	-	1	6.3%
Total	3	2	2	5	2	2	16	
%	18.8%	12.5%	12.5%	31.3%	12.5%	12.5%		

4.5.2 Table 6 shows that slightly under one-third of the casualties (31.3%) were aged between 26 and 45 years, whilst the remaining casualties were relatively spread across the other age groups. Over two-thirds of the casualties (68.8%) were car occupants and a quarter of the casualties were vulnerable road users (pedestrians and cyclists).

4.6 Road Safety Impact

4.6.1 A total of 11 collisions, resulting in 16 casualties, have occurred within the study area during the five-year study period. Analysis of the study collisions has not revealed any identifiable existing collision issues associated with the expected movements of the proposed residential development. Therefore, it is considered that there are no existing road safety issues pertinent to the development of the site.

4.6.2 If the proposed site access junction and internal roads are designed with due consideration to road safety, with appropriate highway design features incorporated into the detailed design, then the proposals should not have a detrimental road safety impact on the local highway network and should not adversely affect the safety of other road users.

5. TRAFFIC IMPACT

5.1 Proposed Traffic Generation

5.1.1 The TRICS database is an industry-standard collection of traffic counts and trip generation statistics for calculating trip rates at development sites. The TRICS database has been interrogated to find suitable data to assist in projecting the trip generation of the proposed residential development.

5.1.2 In order to derive reflective trip rates, vehicle trip generation statistics within the 'Houses Privately Owned' category (03-A) of the TRICS database have been interrogated. To ensure that only trip generation statistics for comparable sites were used in calculations, the TRICS sites were filtered to the following criteria:

- Database version: v7.10.1;
- Survey type: Multi-modal sites;
- Size: 50 to 150 dwellings;
- TRICS location type: 'Edge of Town';
- Regions: UK (excluding Greater London and Ireland sites);
- Weekday survey data only (exclusion of Saturday and Sunday surveys);
- Recent survey data only (exclusion of surveys undertaken prior to 01/01/2015); and
- Exclusion of surveys undertaken during the Covid-19 pandemic.

5.1.3 As there were less than 20 comparable sites in the database after filtering (18 survey sites), mean trip rates (as weighted and calculated by the TRICS software) have been used to project the vehicle trip generation of the proposed development, in accordance with good practice guidelines (TCL, 2022). Details of the site selection and trip rates taken from the TRICS database are attached in full within Appendix 4, with the projected vehicle trip rates and generation shown in Table 7:

Table 7: Projected Vehicle Trip Generation

Residential Development (03-A)	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Vehicle Trip Rates (per dwelling)	0.145	0.341	0.318	0.149
Vehicle Trips (94 dwellings)	14	32	30	14

5.1.4 The trip generation projections indicate that the residential development could be expected to generate up to 46 two-way vehicle trips during the typical AM network peak hour (08:00-09:00) and 44 during the typical PM network peak hour (17:00-18:00).

5.2 Modal Split & Person Trip Generation

5.2.1 The TRICS sites utilised to predict the traffic generation of the development (see Section 5.1) contain multi-modal information, therefore the modal split of the development has been predicted based on travel pattern information from the comparable residential development sites in the TRICS database, with the number of trips generated by each mode projected utilising the total person trip generation for the site, as summarised in Table 8.

Table 8: Projected Modal Trip Generation

Person Trips	Modal Split	12 Hour (07:00-19:00) Two-Way Trips
Vehicle Drivers	56.9%	417
Vehicle Passengers	21.7%	159
Vehicle Occupants	78.6%	576
Pedestrians	16.1%	118
Cyclists	1.4%	10
Public Transport Users	4.2%	30
TOTAL	100%	733

* The total may not represent the sum of its parts due to rounding.

5.2.2 These modal split predictions indicate that just under half (43.1%) of person trips generated by the development would be expected to be made by sustainable modes (car sharing, walking, cycling or public transport).

5.2.3 It is noted that journey to work data from the 2011 National Census could be utilised to predict the modal split of trips generated by the site, however this dataset only represents commuting trips and does not account for journey purposes associated with other trips generated by residential sites, with varying modal splits across different journey purposes and time periods. It is therefore considered to be more representative to base the modal split projections for the proposed residential development on recorded trip generation data from comparable sites within the TRICS database.

5.3 Projected Trip Distribution & Assignment

5.3.1 The distribution of traffic associated with the site has been predicted utilising a gravity model based upon commuting patterns of existing residents within the 'North Kesteven 004' MSA (Middle-layer Super Output Area), within which the site is situated. 'Location of usual residence and place of work by method of travel to work' data from the 2011 National Census (ONS, 2014) shows the proportion of local residents travelling to each workplace destination (MSAs and local authority districts) by mode of travel (it is noted that Origin-Destination data from the 2021 census has not been released yet).

5.3.2 This trip distribution data has been combined with an assessment of route choice (traffic assignment) in order to determine the likely distribution of development traffic across the highway network. The predicted traffic assignment has been undertaken utilising journey planning tools to help determine the relative attractiveness of alternative routes, with consideration of influences such as the location and size of settlements and employment areas within each workplace destination and known existing traffic conditions on the relevant routes. The defined zones utilised within the gravity model calculations are illustrated below in Figure 8.

Figure 8: Gravity Model Zones



5.3.3 The detailed calculations of the gravity model are attached as Appendix 6, with the results summarised in Table 9.

Table 9: Gravity Model Results

Zone	Route	Distribution Split
A	Newark Road (N)	32.2%
B	Newark Road (W)	14.3%
C	Bracebridge Low Fields**	4.4%
D	Station Road (E)	27.7%
E	Brant Road (S)	7.0%
F	A1434 Newark Road (NE)	2.1%
G	Station Road (NW)	11.1%
H	A1434 Newark Road (SW)	1.3%
Total		100%

*The total may not represent the sum of its parts due to rounding.

** Zone C does not represent any specific junctions, but rather it represents several junctions/areas within Bracebridge Low Fields.

5.4 Impact on Local Junctions

5.4.1 The predicted increase in traffic across the key local junctions as a result of the development is summarised in Table 10.

Table 10: Predicted Traffic Impact at Key Local Junctions

Junction	Zones Included	Development Impact (Two-Way Vehicle Trips)
AM Peak		
Site Access Junction	A,B,C,D,E,F,G,H	47
Station Road/Brant Road	A,B,C,E,F,G	34
Station Road/Hill Top/Manor Lane	D	13
Brant Road/Newark Road	A,B	22
Brant Road/Meadow Lane	E,F,G,H	10
Chapel Lane/Lincoln Road/Mill Lane/Moor Lane	F,G,H	7
Moor Lane/Newark Road/Station Road	F,G,H	7
Brant Road/Somerton Gate Lane	E	3
PM Peak		
Site Access Junction	A,B,C,D,E,F,G,H	44
Station Road/Brant Road	A,B,C,E,F,G	32
Station Road/Hill Top/Manor Lane	D	12
Brant Road/Newark Road	A,B	20
Brant Road/Meadow Lane	E,F,G,H	10
Chapel Lane/Lincoln Road/Mill Lane/Moor Lane	F,G,H	7
Moor Lane/Newark Road/Station Road	F,G,H	7
Brant Road/Somerton Gate Lane	E	3

5.5 Impact on the Local Highway Network

- 5.5.1 The DfT has previously issued guidance that transport assessment of development impacts could be based on a threshold of “30 two-way peak hour vehicle trips” (DfT, 2007a). This guidance acknowledged that this threshold was not to be applied rigidly, but rather that it provided “a useful point of reference from which to commence discussions”.
- 5.5.2 This national DfT guidance has now been superseded and replaced with the ‘National Planning Policy Framework’ (NPPF) (MHCLG, 2021) and its accompanying ‘Planning Practice Guidance’ (PPG) (MHCLG, 2014). NPPF and PPG require that transport assessment is undertaken for “developments that generate significant amounts of movement”, although this is not defined. It is therefore acknowledged that there is no set threshold for assessment within the current national planning policy.
- 5.5.3 As detailed in Section 5.1, the development proposals are expected to generate a maximum of 46 two-way vehicle movements during the AM peak hour and 44 during the PM peak hour.
- 5.5.4 The distribution and assignment of traffic across the local highway network shows that only slightly in excess of 30 two-way trips are expected to be generated at the Station Road/Brant Road junction (34 AM and 32 PM), with substantially fewer two-way trips expected at all other key local junctions. It is therefore considered that the proposed development is not expected to have a significant impact on the operation of these junctions. It is expected that the site would generate less than 30 two-way vehicle movements at busier junctions on the wider highway network during the AM and PM peak hours, including at the Brant Road/Meadow Lane junction (10 two-way movements), the Brant Road/Newark Road signalised junction (22 two-way movements) and the Moor Lane/Newark Road/Station Road signalised crossroad junction (7 two-way movements).
- 5.5.5 It should be noted that the assessments presented in this TA represent the potential impacts of the Phase 1 development only. Any subsequent phases of development at the site will need to assess the cumulative impacts of the wider development at the ‘NK/WAD/004a’ site (including Phase 1). It is also worth noting that whilst the ‘NK/WAD/004a’ allocation has an indicative capacity for 321 dwellings, a second phase of development at the site may not come to fruition.
- 5.5.6 Based upon the assessments of this TA, it is considered that the proposed development will not have a significant impact on the operation of the local highway network. Therefore, the proposals are considered to be in accordance with the ‘National Planning Policy Framework’, which states that “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” (MHCLG, 2021).

6. CONCLUSIONS

- 6.1.1 This TA provides a detailed appraisal of the expected transport impacts associated with proposed residential development on land to the south of Station Road in Waddington, Lincolnshire. This TA provides a detailed appraisal of the expected transport impact of the proposals, and the scope has been discussed with LCC Highways.
- 6.1.2 The proposals involve Phase 1 residential development of 94 dwellings comprising a mix of dwelling types and sizes. The 94 dwellings will constitute the first phase of a wider development which has an indicative capacity in the 'Central Lincolnshire Local Plan Consultation Draft' (CLLPT, 2022) for circa 321 dwellings. The development is to be accessed by all modes via a new simple priority T-junction with Station Road on the northern boundary of the site.
- 6.1.3 The site is located within 2km walking distance of the majority of the built-up area of Bracebridge Low Fields and the western extents of the village of Waddington with pedestrian routes to local amenities located to the north of the site on Brant Road and Redwood Drive. The proposed site is located within a reasonable cycle ride (8km) of a number of areas/facilities including Waddington, Bracebridge, North Hykeham, and Branston including the southern extents of Lincoln along with a number of outlying settlements. The nearest bus stop to the site is located approximately 250m to west of the site on Station Road, with rail services at Hykeham Rail Station, approximately 3.9km to the north-west.
- 6.1.4 A road casualty study showed that 11 PICs occurred within the study area around the proposed development site during the five-year study period. Analysis of the study collisions has not revealed any identifiable existing collision issues associated with the expected movements generated by the proposed development, therefore it is considered that there are no existing road safety issues pertinent to the development of the site. If the proposed access and internal roads of the proposed development are designed with due consideration to road safety, then the proposals should not have a detrimental road safety impact on the local transport network and should not adversely affect the safety of other road users.
- 6.1.5 The vehicle and person trip generation of the proposed development has been projected using the industry-standard TRICS database. The proposals are expected to generate a maximum of 46 two-way vehicle trips during the AM peak hour (08:00-09:00) and 44 during the PM peak hour (17:00-18:00).
- 6.1.6 The modal split of the proposed development has been predicted based on travel pattern information from the comparable residential development sites in the TRICS database. The modal split predictions indicate that just under half (43.1%) of person trips generated by the development would be expected to be made by sustainable modes (car sharing, walking, cycling or public transport).

- 6.1.7 The distribution and assignment of traffic across the local highway network has shown that at only one local junction would there be slightly in excess of 30 two-way trips generated by the proposed development (Station Road/Brant Road priority junction), (34 two-way trips in the AM peak and 32 two-way trips during the PM peak). Therefore it is considered that the proposed development is not expected to have a significant impact on the operation of these junctions. It is expected that the proposed development would generate less than 30 two-way movements at busier local junctions on the wider highway network during the AM and PM peak hours, including at the Brant Road/Newark Road signalised junction and the Moor Lane/Newark Road/Station Road signalised crossroads junction.
- 6.1.8 Based on the assessments of this TA, it is considered that the proposed residential development would not be expected to have a significant impact on the operation of the local highway network. The proposals are therefore considered to be in accordance with the 'National Planning Policy Framework' (NPPF) which states that "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" (MHCLG, 2021).
- 6.1.9 It is concluded from the assessments within this TA that the proposed development would not be expected to have a severe impact in terms of sustainable travel, traffic impact and road safety.

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7. REFERENCES

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Appendix I – Site Layout Plan

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Appendix 2 – Collision Plot

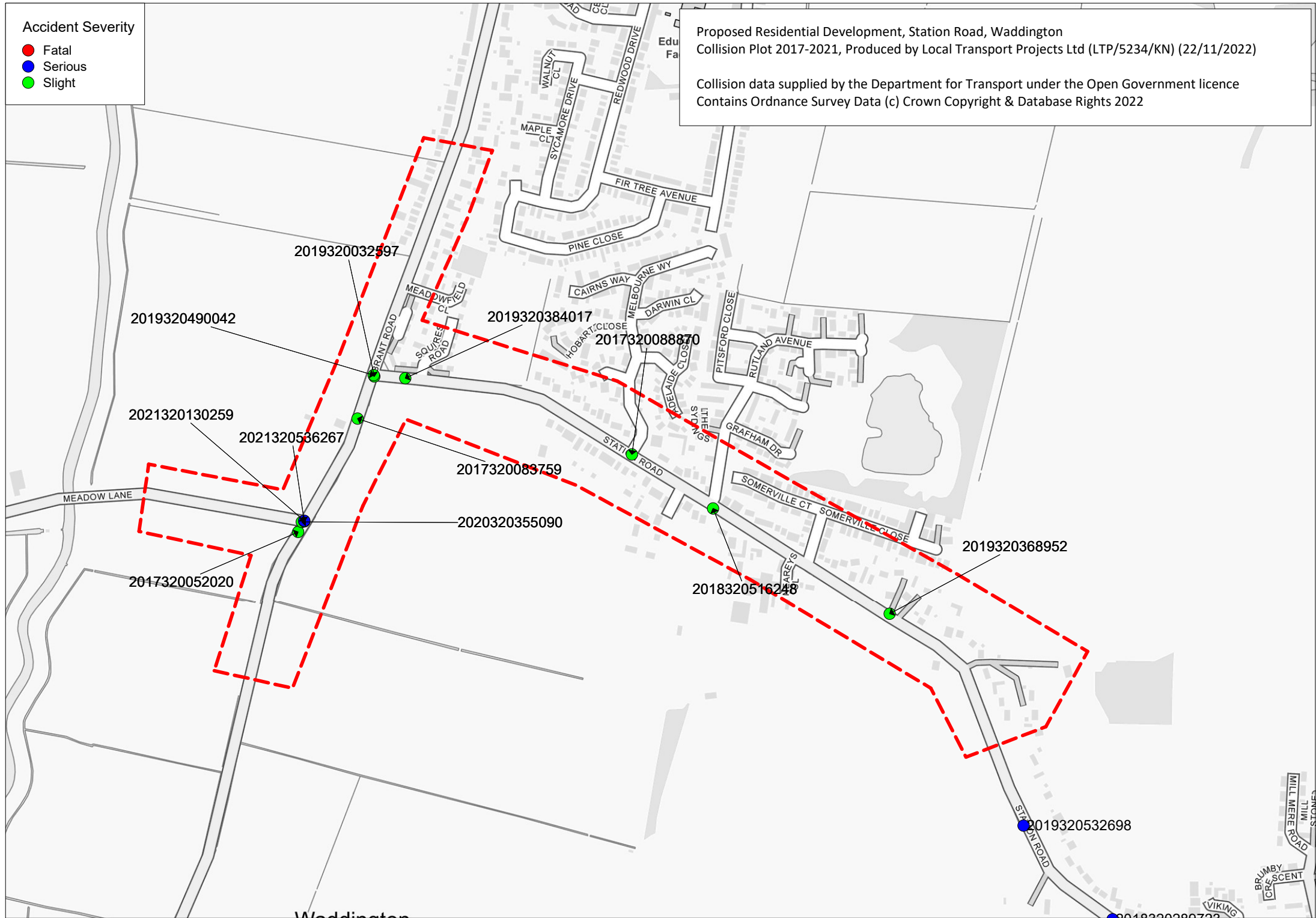
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Accident Severity

- Fatal
- Serious
- Slight

Proposed Residential Development, Station Road, Waddington
Collision Plot 2017-2021, Produced by Local Transport Projects Ltd (LTP/5234/KN) (22/11/2022)

Collision data supplied by the Department for Transport under the Open Government licence
Contains Ordnance Survey Data (c) Crown Copyright & Database Rights 2022

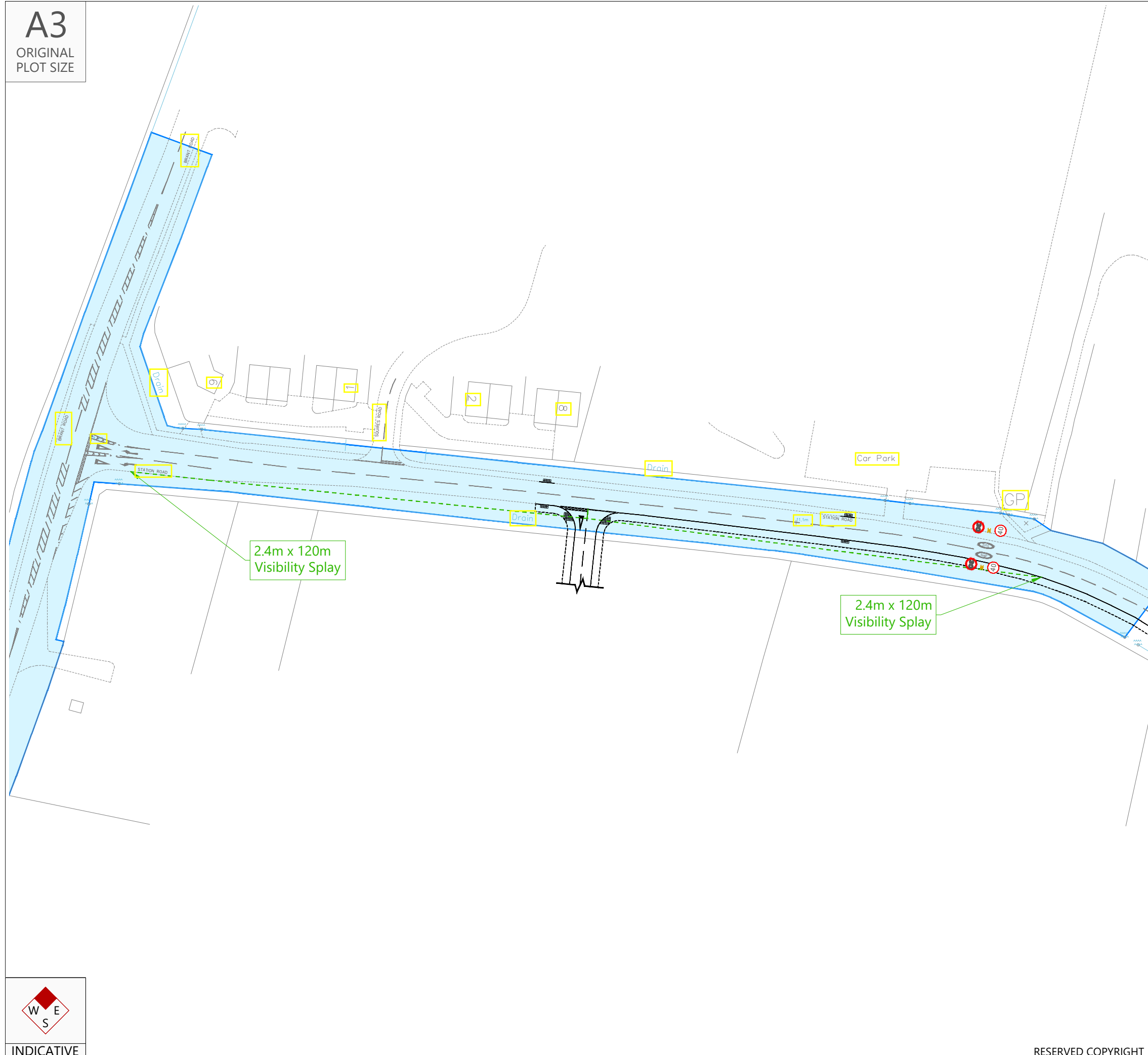


Appendix 3 – Visibility Splays

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A3

ORIGINAL
PLOT SIZE



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NOTES:

1. Indicative un-surveyed existing road markings.
2. Based on OS Mapping Data.
3. Highway Boundary interpreted from information supplied by Lincolnshire County Council.
4. Subject to topographical survey.

KEY

- Highway Boundary maintainable at public expense.

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
 London
 Manchester
 Oxford
 Welwyn Garden City



The Stables
 7 Chesterton Mill
 French's Road
 Cambridge
 CB4 3NP
 01223 455385
www.tpa.uk.com

CLIENT:

Lindum Group (Lincoln)

PROJECT:

Land South of
Station Road,
Waddington

TITLE:

Proposed
Station Road
Site Access Visibility

STATUS:

FEASIBILITY

SCALE: 1:1,000	DATE: 25.03.22	DRAWN: JA	CHECKED: TH	APPROVED: TH
JOB NO: 2203-058	DRAWING NO: SK02	REVISION: -		

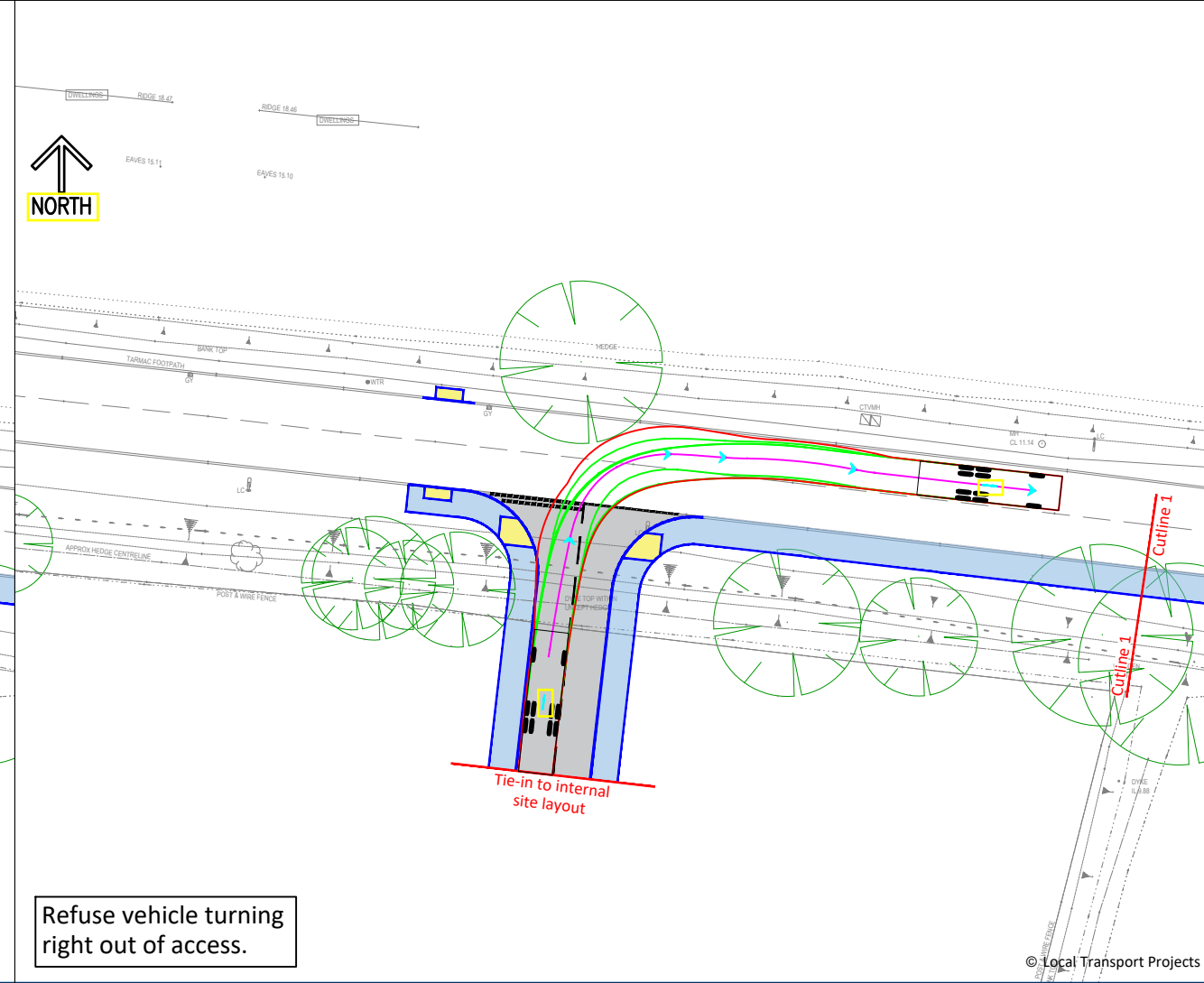
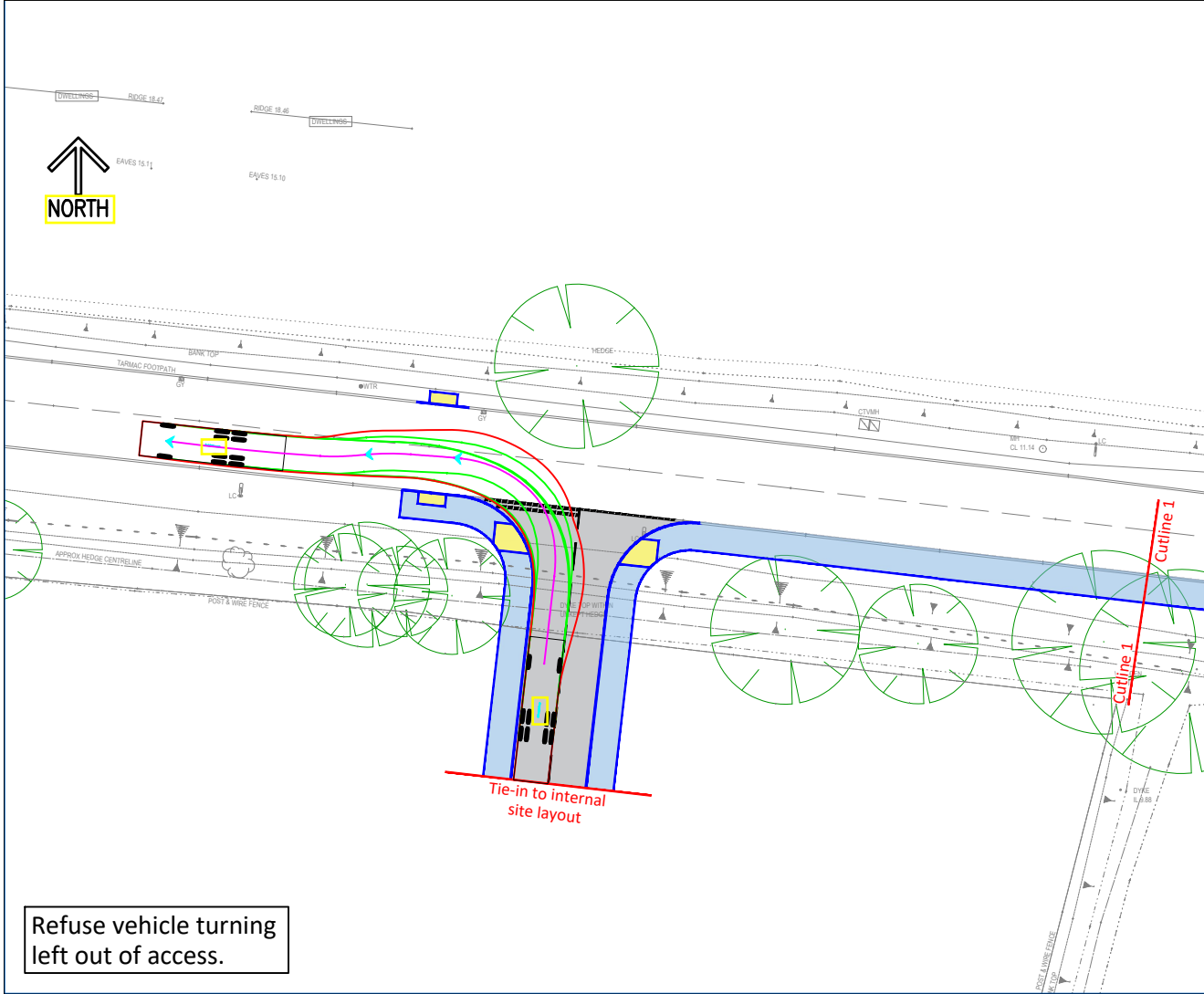
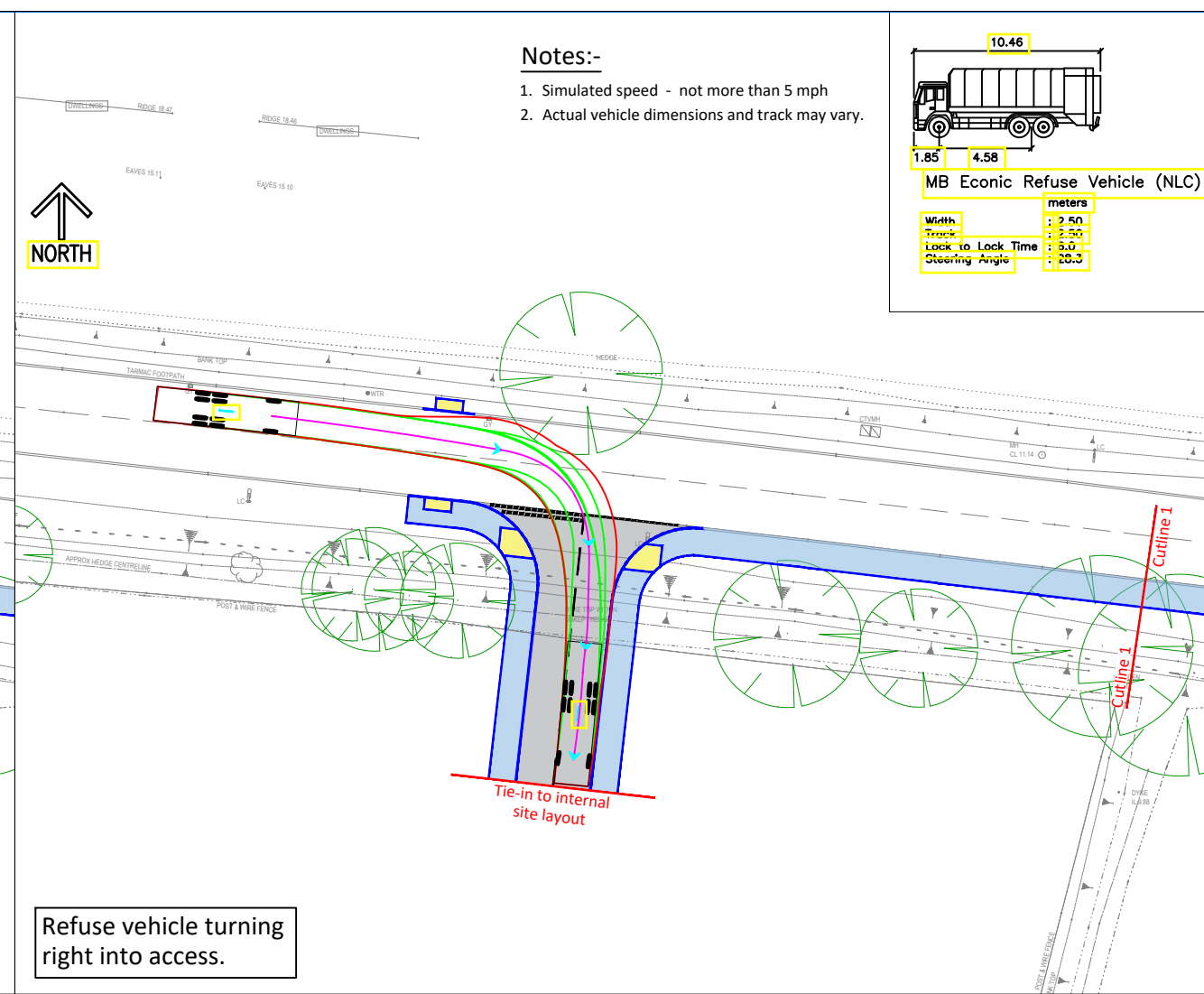
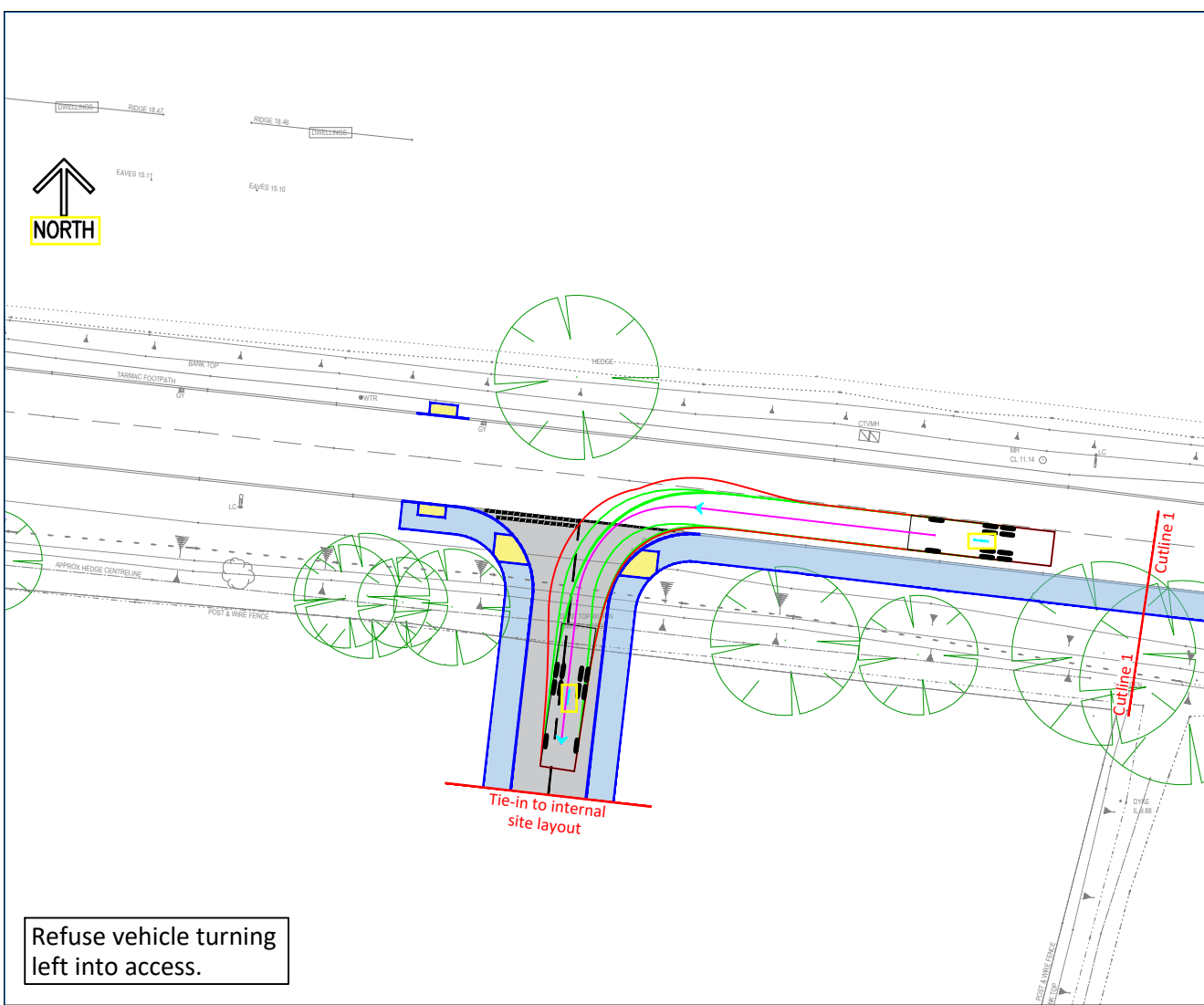


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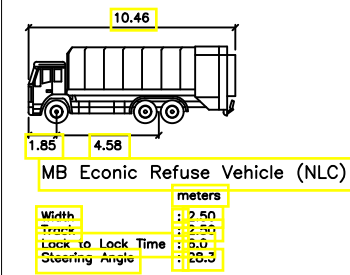
Appendix 4 – Swept Path Analysis

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Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



Key:-

	Proposed Footway Construction
	Proposed Carriageway Construction
	Proposed Tactile Paving
	Proposed Kerbline
	Proposed Road Markings
	Existing OS Mapping / Topographical Survey / Road Markings
	Existing Trees to remain
	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

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- All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations.
- This drawing is produced to be printed and read in colour. Reproduction in black and white may prevent correct interpretation of some aspects.
- Based on topographical survey provided by client.

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client
Lindum Homes

Project
Station Road, Waddington

Title
Preliminary Access Design Swept Path Analysis for Refuse Vehicle

local transport projects
traffic engineering and transport planning

Armstrong House,
The Flemington Centre,
Beverley,
East Riding of Yorkshire.
HU17 0NW.

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Registered No. 5295328

Drawn	OA	Date	09 03 23
Scale	1 : 500	Checked	SW
Status	Approved TK		

PRELIMINARY

Drawing number	LTP/5234/T1/01/01			
Project	Job	Drawing	Sheet	Revision
			01	0

Appendix 5 – Projected Trip Generation

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Projected Vehicle Trip Generation

94 dwellings

Vehicle Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.082	0.284	0.366
08:00-09:00	0.145	0.341	0.486
09:00-10:00	0.125	0.159	0.284
10:00-11:00	0.127	0.161	0.288
11:00-12:00	0.133	0.135	0.268
12:00-13:00	0.155	0.144	0.299
13:00-14:00	0.176	0.177	0.353
14:00-15:00	0.171	0.184	0.355
15:00-16:00	0.258	0.176	0.434
16:00-17:00	0.267	0.176	0.443
17:00-18:00	0.318	0.149	0.467
18:00-19:00	0.258	0.14	0.398

TOTAL	2.215	2.226	4.441
--------------	--------------	--------------	--------------

Vehicle Trips

IN	OUT	TOTAL
8	27	35
14	32	46
12	15	27
12	15	27
13	13	26
15	14	29
17	17	34
16	17	33
24	17	41
25	17	42
30	14	44
24	13	37

TOTAL	210	211	421
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Projected Person Trip Generation

Person Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.127	0.464	0.591
08:00-09:00	0.226	0.747	0.973
09:00-10:00	0.204	0.283	0.487
10:00-11:00	0.201	0.272	0.473
11:00-12:00	0.228	0.238	0.466
12:00-13:00	0.258	0.238	0.496
13:00-14:00	0.278	0.268	0.546
14:00-15:00	0.271	0.294	0.565
15:00-16:00	0.594	0.318	0.912
16:00-17:00	0.519	0.307	0.826
17:00-18:00	0.541	0.257	0.798
18:00-19:00	0.447	0.225	0.672

TOTAL	3.894	3.911	7.805
--------------	--------------	--------------	--------------

Person Trips

Time	IN	OUT	TOTAL
07:00-08:00	12	44	56
08:00-09:00	21	70	91
09:00-10:00	19	27	46
10:00-11:00	19	26	45
11:00-12:00	21	22	43
12:00-13:00	24	22	46
13:00-14:00	26	25	51
14:00-15:00	25	28	53
15:00-16:00	56	30	86
16:00-17:00	49	29	78
17:00-18:00	51	24	75
18:00-19:00	42	21	63

TOTAL	365	368	733
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Projected Modal Split

Proportion of Vehicle Trips

Time	IN	OUT	TOTAL
07:00-08:00	64.6%	61.2%	61.9%
08:00-09:00	64.2%	45.6%	49.9%
09:00-10:00	61.3%	56.2%	58.3%
10:00-11:00	63.2%	59.2%	60.9%
11:00-12:00	58.3%	56.7%	57.5%
12:00-13:00	60.1%	60.5%	60.3%
13:00-14:00	63.3%	66.0%	64.7%
14:00-15:00	63.1%	62.6%	62.8%
15:00-16:00	43.4%	55.3%	47.6%
16:00-17:00	51.4%	57.3%	53.6%
17:00-18:00	58.8%	58.0%	58.5%
18:00-19:00	57.7%	62.2%	59.2%

TOTAL	56.9%	56.9%	56.9%
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TRICS v7.10.1, Mean 03-A, MM, 50-150 Dwellings, England (exc. GL & Ireland) Wales and Scotland, Edge of Town, exc. Sat/Sun, 2015+, Exc. Covid (18 sites)

Projected Modal Trip Generation - (130 dwellings)

Mode	Split	12-Hour (07:00-19:00)		
		IN	OUT	TOTAL
Vehicle Drivers	56.9%	208	209	417
Vehicle Passengers	21.7%	79	80	159
Vehicle Occupants Sub-Total	78.6%	287	289	576

Pedestrian	16.1%	59	59	118
Pedal-cycle	1.4%	5	5	10
Public Transport	4.2%	15	15	30
	21.7%	79	80	159

Total Person Trips	100%	365	368	733
---------------------------	-------------	------------	------------	------------

Calculation Reference: AUDIT-342901-230116-0110

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED
 MULTI-MODAL TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	ES	EAST SUSSEX 2 days
	EX	ESSEX 1 days
	HC	HAMPSHIRE 2 days
	HF	HERTFORDSHIRE 1 days
	KC	KENT 1 days
	SC	SURREY 1 days
	WB	WEST BERKSHIRE 1 days
	WS	WEST SUSSEX 3 days
04	EAST ANGLIA	
	NF	NORFOLK 3 days
11	SCOTLAND	
	AS	ABERDEENSHIRE 1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
 Actual Range: 108 to 212 (units:)
 Range Selected by User: 100 to 220 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/14 to 29/09/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	5 days
Tuesday	1 days
Wednesday	3 days
Thursday	4 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	16 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Edge of Town	16
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This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	16
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This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	6 days - Selected
Servicing vehicles Excluded	14 days - Selected

Secondary Filtering selection:

Use Class:

C3	16 days
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This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	3 days
5,001 to 10,000	2 days
10,001 to 15,000	6 days
15,001 to 20,000	2 days
20,001 to 25,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	5 days
50,001 to 75,000	1 days
75,001 to 100,000	2 days
125,001 to 250,000	7 days
250,001 to 500,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	11 days
1.6 to 2.0	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	11 days
No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	16 days
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This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1	AS-03-A-02 FARROCHIE ROAD STONEHAVEN	MIXED HOUSES		ABERDEENSHIRE
	Edge of Town Residential Zone Total No of Dwellings:		131	
	<i>Survey date: WEDNESDAY</i>		<i>20/04/22</i>	<i>Survey Type: MANUAL</i>
2	ES-03-A-03 SHEPHAM LANE POLEGATE	MIXED HOUSES & FLATS		EAST SUSSEX
	Edge of Town Residential Zone Total No of Dwellings:		212	
	<i>Survey date: MONDAY</i>		<i>11/07/16</i>	<i>Survey Type: MANUAL</i>
3	ES-03-A-04 NEW LYDD ROAD CAMBER	MIXED HOUSES & FLATS		EAST SUSSEX
	Edge of Town Residential Zone Total No of Dwellings:		134	
	<i>Survey date: FRIDAY</i>		<i>15/07/16</i>	<i>Survey Type: MANUAL</i>
4	EX-03-A-03 KESTREL GROVE RAYLEIGH	MIXED HOUSES		ESSEX
	Edge of Town Residential Zone Total No of Dwellings:		123	
	<i>Survey date: MONDAY</i>		<i>27/09/21</i>	<i>Survey Type: MANUAL</i>
5	HC-03-A-28 EAGLE AVENUE WATERLOOVILLE LOVEDEAN	MIXED HOUSES & FLATS		HAMPSHIRE
	Edge of Town Residential Zone Total No of Dwellings:		125	
	<i>Survey date: MONDAY</i>		<i>08/11/21</i>	<i>Survey Type: MANUAL</i>
6	HC-03-A-29 CROW LANE RINGWOOD CROW	MIXED HOUSES & FLATS		HAMPSHIRE
	Edge of Town Residential Zone Total No of Dwellings:		195	
	<i>Survey date: THURSDAY</i>		<i>30/06/22</i>	<i>Survey Type: MANUAL</i>
7	HF-03-A-03 HARE STREET ROAD BUNTINGFORD	MIXED HOUSES		HERTFORDSHIRE
	Edge of Town Residential Zone Total No of Dwellings:		160	
	<i>Survey date: MONDAY</i>		<i>08/07/19</i>	<i>Survey Type: MANUAL</i>

LIST OF SITES relevant to selection parameters (Cont.)

8	KC-03-A-04 KILN BARN ROAD AYLESFORD DITTON Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: FRIDAY</i>	SEMI -DETACHED & TERRACED	110 <i>22/09/17</i>	KENT	<i>Survey Type: MANUAL</i>
9	NF-03-A-33 LONDON ROAD ATTLEBOROUGH Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: THURSDAY</i>	MIXED HOUSES	143 <i>29/09/22</i>	NORFOLK	<i>Survey Type: MANUAL</i>
10	NF-03-A-35 REPTON AVENUE NORWICH Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: WEDNESDAY</i>	MIXED HOUSES & FLATS	116 <i>28/09/22</i>	NORFOLK	<i>Survey Type: MANUAL</i>
11	NF-03-A-39 HEATH DRIVE HOLT Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: TUESDAY</i>	MIXED HOUSES	212 <i>27/09/22</i>	NORFOLK	<i>Survey Type: MANUAL</i>
12	SC-03-A-05 REIGATE ROAD HORLEY Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: MONDAY</i>	MIXED HOUSES	207 <i>01/04/19</i>	SURREY	<i>Survey Type: MANUAL</i>
13	WB-03-A-03 DORKING WAY READING CALCOT Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: FRIDAY</i>	MIXED HOUSES	108 <i>09/09/22</i>	WEST BERKSHIRE	<i>Survey Type: MANUAL</i>
14	WS-03-A-04 HILLS FARM LANE HORSHAM BROADBRIDGE HEATH Edge of Town Residential Zone Total No of Dwellings: <i>Survey date: THURSDAY</i>	MIXED HOUSES	151 <i>11/12/14</i>	WEST SUSSEX	<i>Survey Type: MANUAL</i>

LIST OF SITES relevant to selection parameters (Cont.)

15	WS-03-A-08 ROUNDSTONE LANE ANGMERING	MIXED HOUSES	WEST SUSSEX
	Edge of Town Residential Zone		
	Total No of Dwellings:	180	
	Survey date: THURSDAY	19/04/18	Survey Type: MANUAL
16	WS-03-A-14 TODDINGTON LANE LITTLEHAMPTON WICK	MIXED HOUSES	WEST SUSSEX
	Edge of Town Residential Zone		
	Total No of Dwellings:	117	
	Survey date: WEDNESDAY	20/10/21	Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
SF-03-A-10	Covid-19
WS-03-A-12	Covid-19
WS-03-A-13	Covid-19

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
 MULTI-MODAL TOTAL VEHICLES
 Calculation factor: 1 DWELLS
 BOLD print indicates peak (busiest) period
 Total People to Total Vehicles ratio (all time periods and directions): 1.76

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	16	152	0.063	16	152	0.267	16	152	0.330
08:00 - 09:00	16	152	0.127	16	152	0.345	16	152	0.472
09:00 - 10:00	16	152	0.130	16	152	0.175	16	152	0.305
10:00 - 11:00	16	152	0.130	16	152	0.158	16	152	0.288
11:00 - 12:00	16	152	0.134	16	152	0.141	16	152	0.275
12:00 - 13:00	16	152	0.144	16	152	0.134	16	152	0.278
13:00 - 14:00	16	152	0.160	16	152	0.152	16	152	0.312
14:00 - 15:00	16	152	0.169	16	152	0.181	16	152	0.350
15:00 - 16:00	16	152	0.239	16	152	0.168	16	152	0.407
16:00 - 17:00	16	152	0.250	16	152	0.148	16	152	0.398
17:00 - 18:00	16	152	0.300	16	152	0.147	16	152	0.447
18:00 - 19:00	16	152	0.264	16	152	0.136	16	152	0.400
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.110			2.152			4.262

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected: 108 - 212 (units:)
 Survey date date range: 01/01/14 - 29/09/22
 Number of weekdays (Monday-Friday): 16
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys automatically removed from selection: 1
 Surveys manually removed from selection: 3

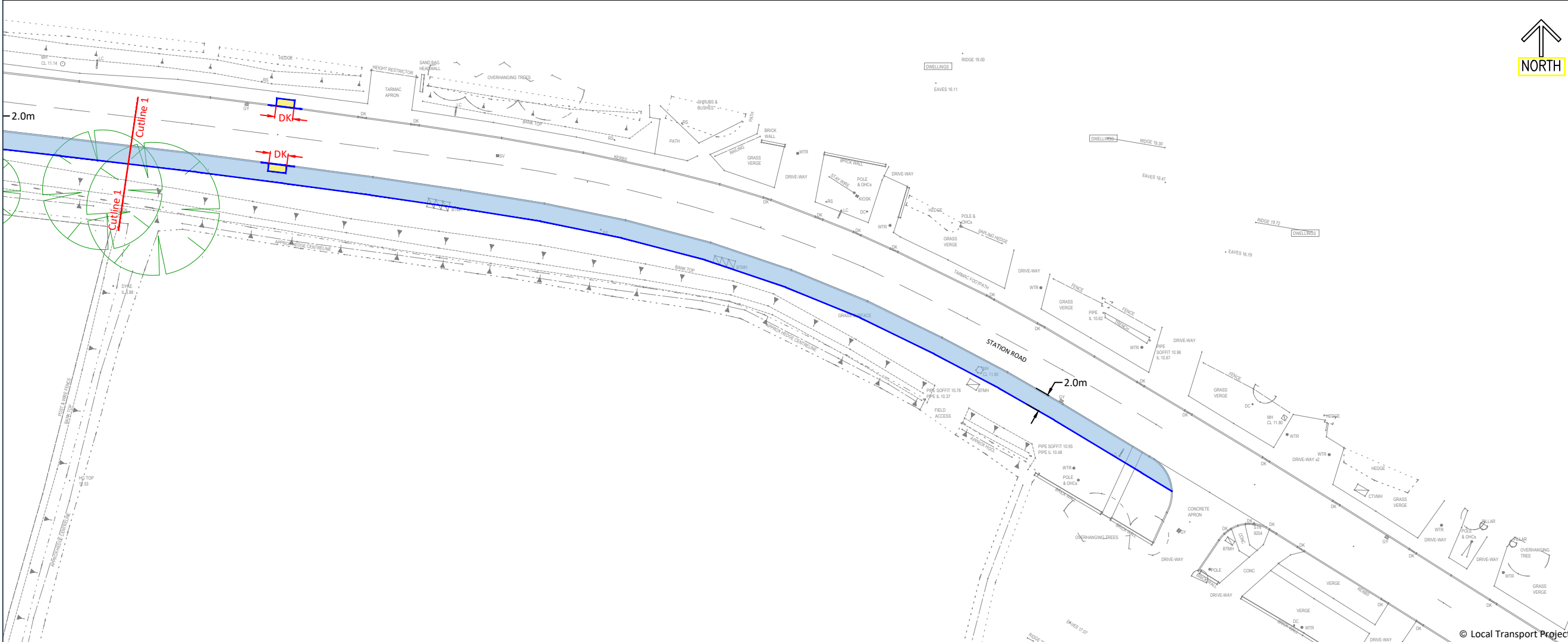
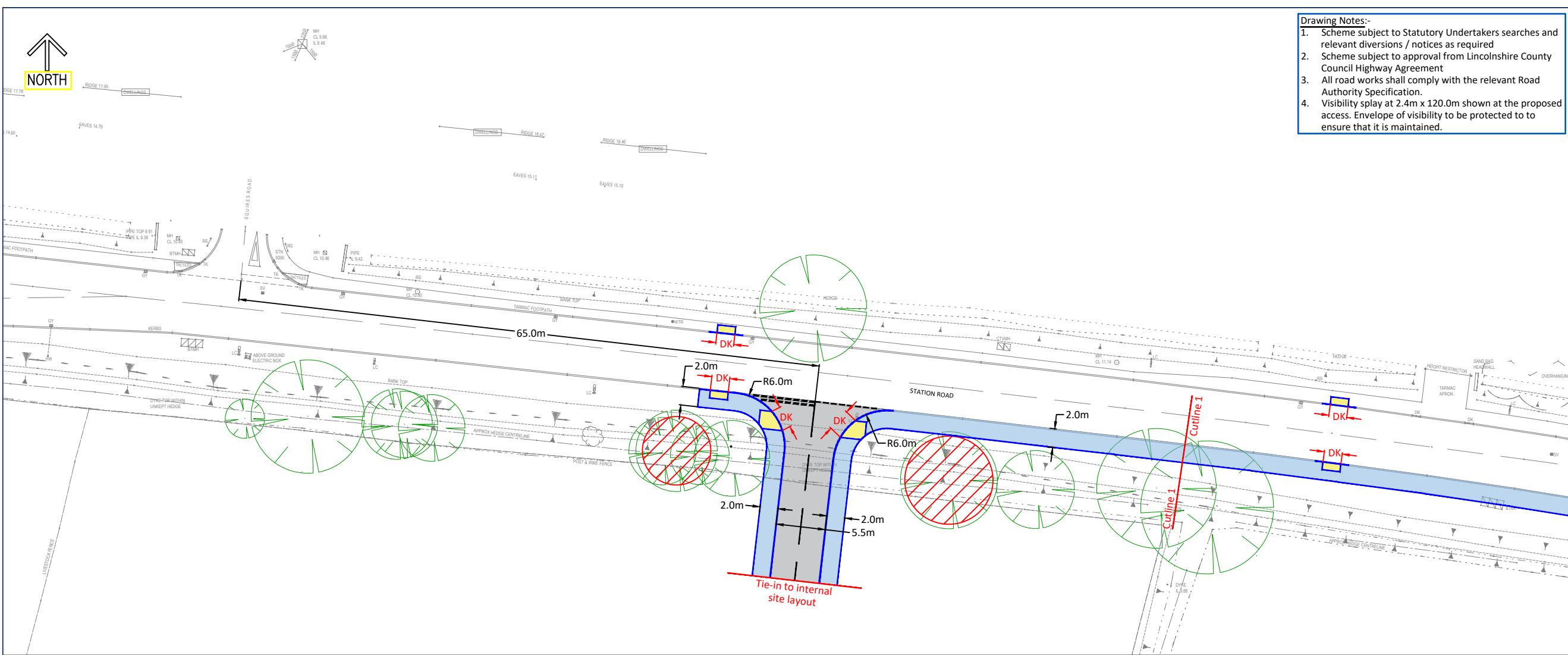
This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix 6 – Gravity Model

DRAFT

Appendix 7 – Preliminary Access Design

DRAFT



- Drawing Notes:-**
1. Scheme subject to Statutory Undertakers searches and relevant diversions / notices as required
 2. Scheme subject to approval from Lincolnshire County Council Highway Agreement
 3. All road works shall comply with the relevant Road Authority Specification.
 4. Visibility splay at 2.4m x 120.0m shown at the proposed access. Envelope of visibility to be protected to ensure that it is maintained.

Key:-

	Proposed Footway Construction
	Proposed Carriageway Construction
	Proposed Tactile Paving
	Proposed Dropped Kerb
	Proposed Kerblines
	Proposed Road Markings
	Existing OS Mapping / Topographical Survey / Road Markings
	Existing Trees to remain
	Root Protection Area

- Disclaimers:-**
- i. This drawing is copyright and must not be copied in part or in whole unless agreed in writing by Local Transport Projects Ltd.
 - ii. Reference should be made to the project's drawing register to ensure the latest drawing is being referred to.
 - iii. All dimensions are to be checked by the contractor prior to commencement of work. Any discrepancy shall be reported immediately to Local Transport Projects Ltd.
 - iv. All work shall be carried out in accordance with local authority, statutory authority and health & safety requirements & regulations.
 - v. This drawing is produced to be printed and read in colour. Reproduction in black and white may prevent correct interpretation of some aspects.
 - vi. Based on topographical survey provided by client.

Rev.	Date	By	Chk	Description
0	-	-	-	-

Client
Lindum Homes

Project
Station Road,
Waddington

Title
Preliminary Access Design

local transport projects
traffic engineering and transport planning

Armstrong House,
The Flemington Centre,
Beverley,
East Riding of Yorkshire.
HU17 0NW.

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Registered No. 5295328

Drawn	OA	Date	09 03 23
Scale	1 : 500	Checked	SW
		Approved	TK

Status
PRELIMINARY

Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/5234/P1	/ 01	01	01	0

