

Brown & Co JH Walter

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**Proposed Residential Development  
Eastfield Lane, Welton  
Transport Assessment**

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February, 2022

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February, 2022

### Client Commission

Client:	Brown & Co JH Walter	Date Commissioned:	January 2022
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### LTP Quality Control

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### LTP PROJECT TEAM

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, EASTFIELD LANE, WELTON TRANSPORT ASSESSMENT

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## EXECUTIVE SUMMARY

This Transport Assessment (TA) provides a detailed appraisal of the likely transport impact of proposals for the development of 109 dwellings on land to the west of Eastfield Lane in the village of Welton. The key findings of this TA are summarised below:

- A Travel Plan that provides a strategy for encouraging sustainable travel at the site has also been produced in conjunction with this TA as a separate document.
- Access to the site will be provided via Eastfield Lane, where the required visibility splays appear achievable subject to vegetation clearance. There would be a further pedestrian access to the west of the site, adjoining an existing footpath running along the western edge of the site.
- The site is located within a 2km walking distance of the entire villages of Welton and Dunholme. The site is located within a reasonable cycle ride (circa 8km) of areas including Welton, Nettleham, and northern section of Lincoln.
- The nearest bus stops to the proposed development site are located on Ryland Road, within an approximately 700m walk to the west of the site access, providing access to/from destinations, including Market Rasen and Grimsby. Lincoln Central Rail Station is located approximately 10.5km to the south of the site and provides regular services to Doncaster, Sheffield, Grimsby Town and London King's Cross.
- Analysis of the five local Personal Injury Collisions (PICs) 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 not any existing road safety issues pertinent to the development of the site.
- The trip generation projections indicate that the development could be expected to generate up to 53 two-way trips during the AM peak hour and 52 during the PM peak hour.
- 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 significant 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 full planning application for a proposed residential development on land to the west of Eastfield Lane in Welton. This TA provides a detailed appraisal of the expected transport impacts of the proposals. A plan of the proposed site layout is attached as Appendix 1.
- 1.1.1 The local highway authority for the site is Lincolnshire County Council (LCC), and the local planning authority is West Lindsey District Council (WLDC).
- 1.1.2 A Travel Plan (LTP, 2022) that provides a strategy for encouraging sustainable travel at the proposed development site has been produced in conjunction with this TA as a separate document.

### I.2 Scope

- 1.2.1 This report is written in accordance with the Government's '*National Planning Policy Framework*' (MHCLG, 2021) and '*Planning Practice Guidance*' (DCLG, 2014), with the scope summarised 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 any 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, utilising data from comparable sites within the latest TRICS database;
  - Prediction of the distribution of the vehicle trips generated by the site onto the local highway network;

- 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 the proposed parking provision and access/servicing arrangements.
  - **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:
- National Planning Policy Framework (MHCLG, 2021);
  - Planning Practice Guidance (DCLG, 2014);
  - 4<sup>th</sup> Lincolnshire Local Transport Plan (LTP4) (LCC, 2013);
  - 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 proposed development site is located to the west of Eastfield Lane in the village of Welton and currently forms agricultural land. The site is bound by agricultural land to the north, a combination of agricultural land and Eastfield Lane to the east, and residential properties served by Eastfield Lane, Dovecote Drive and Owls End to the south. To the west the site is bound by a public footpath (ref: Welt/54/1) that traverses north-south along the length of the development, connecting to Mill Lane further north and Eastfield Lane to the south. The approximate location and boundary of the proposed development site is shown in Figure 1 below.

**Figure 1: Site Location**



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

### 2.2 Development Proposals & Access Arrangements

- 2.2.1 The report is based upon the proposals outlined on the site layout plan attached as Appendix 1. The proposals are seeking outline consent for the development of circa 109 dwellings, comprising a mix of dwelling types and size.
- 2.2.2 Vehicular access to the site is to be provided via an existing farm access which is to be redesigned as part of the proposals to form a simple priority T-junction with Eastfield Lane on the eastern boundary of the site.
- 2.2.3 Cyclists are expected to access the site via the Eastfield Lane access on-carriageway, in line with the principles outlined within 'Manual for Streets' (MfS), which advises that *"cyclists should generally be accommodated on the carriageway. In areas with low traffic volumes and speeds, there should not be any need for dedicated cycle lanes on the street"* (DfT, 2007b).

- 2.2.4 Three pedestrian-only accesses are to be provided on the western boundary of the site, connecting to the existing footpath that runs along the site's western boundary. Pedestrians are also expected to access the site via Eastfield Lane, with a footway proposed on the western side of the carriageway to tie in with existing local pedestrian infrastructure.
- 2.2.5 As part of the detailed design of the site, which is to form part of a subsequent reserved matters application, the proposed parking provision is expected to be provided in line with the requirements of LCC Highways, and is therefore expected to be suitable to accommodate the likely parking demand generated by the site.
- 2.2.6 Also as part of the detailed design of the site, the internal highway network of the site is to be designed to ensure that refuse and delivery vehicles can utilise the highway alignment to enter and exit the site in a forward gear.

## 2.3 Allocation Status & Planning History

- 2.3.1 The application site is allocated for residential development in the 'Central Lincolnshire Local Plan Consultation Draft' (CLLPT, 2021) (ref: WL/WELT/008A), with an indicative capacity of 109 dwellings. The boundary of the allocation site is outlined in Figure 2.

Figure 2: WL/WELT/008A Allocation



Source: CLLPT, 2021

- 2.3.2 The allocation refers to two potential transport related mitigation measures which could be implemented as part of the development of the site, outlined as follows:
- "Where possible provide new linkages for walking and cycling between new development and facilities outside of the site area"; and
  - "Development should promote the use of sustainable modes of transport and improve linkages to these".

- 2.3.3 There have not been any recent or relevant planning applications directly related to the application site itself. However, directly west of the proposed site, an application (ref: 143728) was submitted in August 2021 to *'erect 49 dwellings with associated highway networks, earthworks to create a drainage attenuation pond, landscaping and boundary treatments'*. The application was subsequently approved in February 2022. It is understood that there have been discussions surrounding the potential for an access route to be provided between the proposed site and the site directly west, although this is subject to developer plans.

### 3. SITE ASSESSMENT

#### 3.1 Local Highway Network

- 3.1.1 As previously outlined in Section 2.2, access to the site is to be provided via an existing farm access from Eastfield Lane, which is a two-way single carriageway that varies in width between approximately 4.5m and 5.5m within the vicinity of the proposed access location. The road is subject to a derestricted speed limit (60mph) which reduces to a 30mph speed limit approximately 105m to the south of the access location as the predominantly rural road becomes more urban in nature in the village of Welton. It is acknowledged that it may be suitable to extend the current 30mph speed limit in order to cover the proposed site access junction, which would be subject to a Traffic Regulation Order (TRO) that is to be agreed with LCC and funded by the Developer. There are not any parking or waiting restrictions within the vicinity of the site on Eastfield Lane.

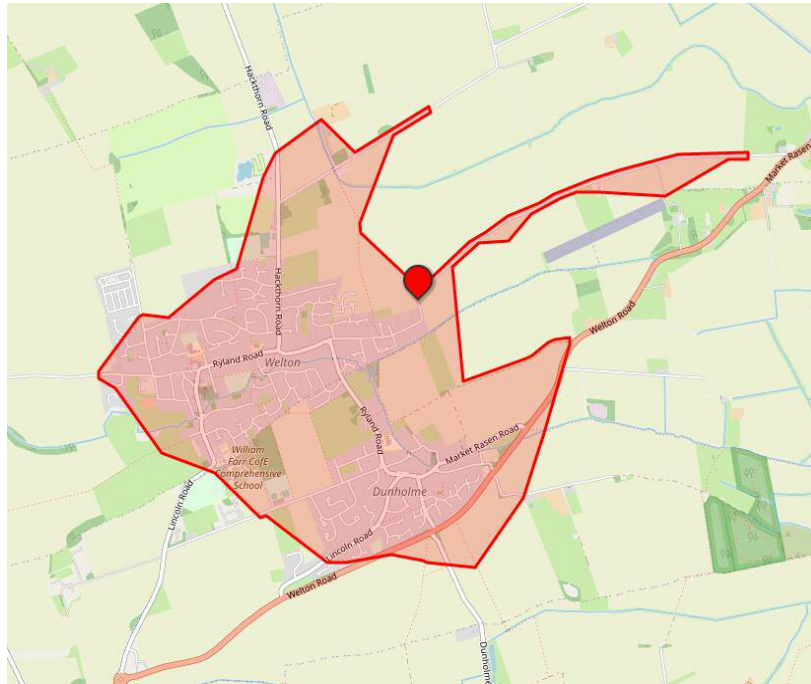
**Photo 1: Eastfield Lane**



- 3.1.2 Approximately 2.4km to the east of the proposed access, Eastfield Lane provides access to the A46 (Market Rasen Road) via a simple priority T-junction. Approximately 700m to the west of the site, Eastfield Lane provides access to Ryland Road and Dunholme Road via priority junctions in a Y arrangement. Ryland Road provides access to Hackthorne Road approximately 300m further west via a mini roundabout and continues west through Welton Village.

#### 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 entire built-up areas of Welton and Dunholme, including all amenities within the villages, as shown in Figure 3.

**Figure 3: 2km Walking Isochrone**

Source: ORS, 2022

- 3.2.2 Amenities within Welton include a Co-op (with a Pharmacy and a Post Office), The Welton Family Health Centre, Welton Manor Park Sports Centre and a dentist's clinic. There are also a variety of local shops including cafés and hairdressers providing amenities for residents, all within 2km walking distance, predominantly located on Cliff Road and Lincoln Road within the centre of Welton village. Additionally, St. Mary's C of E Primary School is located approximately a 1.2km walk to the west of the site, with William Farr Secondary School located approximately 1.7km to the south-west of the site.
- 3.2.3 There is a footway provided on the western side of Eastfield Lane approximately 115m to the south of the site which continues west, providing access to the wider pedestrian infrastructure in Welton. It is understood that as part of the proposals this footpath it to be extended north, connecting with the site access. Although, a footway is to be provided on Eastfield Lane, it should be noted that it is a shorter walking distance to local amenities (including shops and bus stops) via the Public Rights of Way (PRoW) on the western boundary of the site, which is shown in Figure 4.

**Photo 2: Footway on the Western Side of Eastfield Lane**



3.2.4 Figure 4 shows the existing Public Rights of Way (PRoW) within the vicinity of the site, with the site indicated by the blue star, public footpaths shown in purple and bridleways shown in green.

**Figure 4: Public Rights of Way Map**



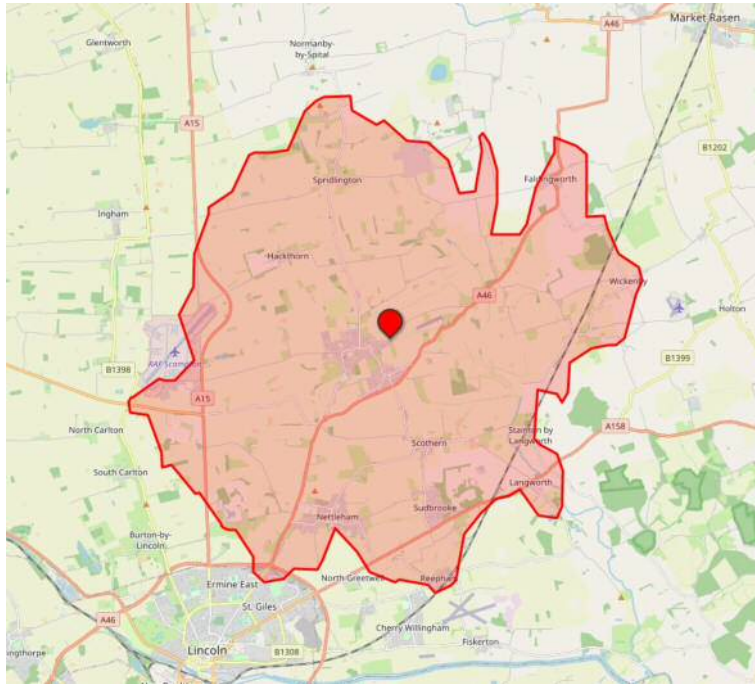
Source: LCC, 2022

- 3.2.5 Figure 4 shows that there are several public footpaths within the vicinity of the site, including the previously mentioned footpath (ref: WELT/54/1) that runs along the western boundary of the site. Approximately 750m to the north of the site, the footpath connects to Mill Lane, providing a leisure walking route for residents. The footpath provides access to Eastfield Lane approximately 220m to the south of the site, leading to Dunholme approximately 490m further south; although it is acknowledged that this route may not be suitable for all residents at the site due to the presence of steps at the connection with Eastfield Lane, also with no formal street lighting or hard-surfacing on sections of the PRow. There is also the potential to provide a pedestrian link between the site and the proposed site to the west, via the public footpath, improving the permeability of the site.
- 3.2.6 Figure 5 also shows that there is a public bridleway (ref: Dunh/57/3) accessible within an approximately 1.3km walk to the south-east of the site, providing direct access to Reasby, also providing a leisure walking route for residents.
- 3.2.7 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 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).
- 3.2.8 The 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.
- 3.2.9 A number of measures to promote walking trips to and from the site are outlined within the site Travel Plan (LTP, 2022).

### 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). The site is located within a reasonable cycle ride, up to 8km (approximately 25 minutes at the average cycling speed of 12mph) of areas including Welton, Nettleham, Scothern, and a northern section of Lincoln, as shown in Figure 5.

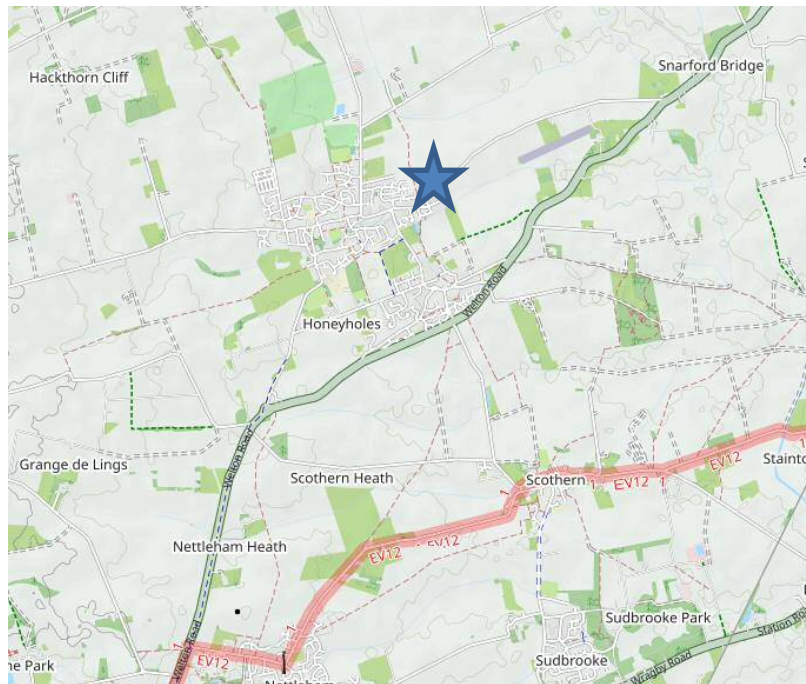
**Figure 5: 8km Cycle Isochrone**



Source: ORS, 2022

- 3.3.2 An extract from OpenCycleMap is provided below in Figure 6 and highlights the cycling facilities within the vicinity of the site. The location of the proposed development site is indicated by the blue star.

**Figure 6: Extract of OpenCycleMap**



Source: OpenCycle Map, 2022

- 3.3.3 As demonstrated in Figure 6, National Cycle Network (NCN) Route 1 is accessible in Scothern approximately 2.8km (a 13-minute bike ride) to the south of the site via Ryland Road. NCN Route 1 runs between Dover in the south of England and the Highlands of Scotland in the north; locally providing access to Lincoln to the south-east of the proposed site and towns such as Market Rasen and Cleethorpes to the north-east.
- 3.3.4 Whilst it is acknowledged that there are no formal cycling facilities within the immediate vicinity of the site, given the low-speed local environment towards Welton and the availability of NCN Route 1, it is considered that the local area within the vicinity of the site is generally conducive to encouraging cycling trips.
- 3.3.5 A number of measures to promote cycling trips to and from the site are outlined within the site Travel Plan (LTP, 2022).

### 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 proposed development site are located on Ryland Road, within an approximately 700m walk to the west of the site access junction, providing access to services in both directions. If pedestrians utilise PRow WELT/54/1 on the western boundary of the site, the walking distance to this bus stop is reduced to approximately 550m.

**Photo 3: Ryland Road Bus Stop**



- 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*
<b>12</b>	<b>Welton</b> – Dunholme – <b>Welton</b> – Nettleham – Lincoln Station	Every 30 minutes
<b>53/53a</b>	Lincoln Station – Nettleham – <b>Welton</b> – Dunholme – Faldingworth – Market Rasen – Caistor – Laceby – Grimsby	Hourly
<b>510</b>	Lincoln Station – Cherry Willingham – Sudbrooke – Scothern – Dunholme – <b>Welton</b>	School service twice daily
<b>511</b>	Faldingworth – Friesthorpe – Wickenby – Langworth – Sudbrooke – Scothern – Dunholme – <b>Welton</b>	School service twice daily

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

- 3.4.4 Table 1 demonstrates that there are a number of frequent bus services available from local stops providing access to/from key destinations, including Lincoln, Market Rasen and Grimsby. It should be noted that local bus services also provide access to Lincoln Bus Station where a plethora of additional services are available.
- 3.4.5 It should also be noted that in addition to the services listed above, the stops are also served by the Call Connect Bus services 100V and 100L, an on-demand bus service that can be used by residents at the site Monday to Saturday.
- 3.4.6 The nearest rail station to the site is Lincoln Central Rail Station which is located approximately 10.5km to the south of the site. Lincoln Central Rail Station is located opposite Lincoln Bus Station, and therefore can be accessed via the majority of the bus services in Table 1 above. Lincoln Central Rail Station is operated by East Midlands Railway and provides regular services to Doncaster, Sheffield, Peterborough, Leicester, Grimsby Town and London King's Cross. Facilities at Lincoln Central Rail Station include cycle parking, a car park and step-free access.
- 3.4.7 A number of measures to encourage public transport use to and from the site are outlined within the site Travel Plan (LTP, 2022).

## 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 (01/01/2016 to 31/12/2020) was obtained via a search of the Department for Transport's (DfT) road safety data (DfT, 2022).
- 4.1.2 A total of five collisions occurred within the study area, which includes sections of Eastfield Lane, Ryland Road and a number of junctions within the vicinity of the site. 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	2016	2017	2018	2019	2020	Total
Fatal	-	-	-	-	-	0
Serious	-	-	-	-	1	1
Slight	-	3	-	1	-	4
<b>Total</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>5</b>

- 4.1.3 The collision records show that the number of PICs per year has fluctuated across the study period, with three collisions occurring in 2017 and no collisions in 2016 or 2018. There was one Killed or Seriously Injured (KSI) collision recorded during the study period, resulting in a severity ratio of 20%, with no fatal collisions recorded.

### 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	3	60%
Wet	1	20%
Frost or Ice	1	20%
Weather	Collisions	%
Fine	4	80%
Rain	1	20%
Lighting	Collisions	%
Daylight	4	80%
Dark (no lighting)	1	20%

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

## 4.3 Collision Times

4.3.1 Table 4 summarises the collisions by time of year:

**Table 4: Collisions by Time of Year**

Time of Year	Collisions	%
Winter (Dec-Feb)	2	40%
Spring (Mar-May)	0	-
Summer (Jun-Aug)	0	-
Autumn (Sep-Nov)	3	60%

4.3.2 Table 4 shows that over half of the collisions (60%) occurred during the autumn months, with no collisions recorded in the spring or summer months.

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

**Table 5: Collisions by Day & Time**

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	-	-	-	-	-	0	-
Tuesday	-	-	-	-	-	0	-
Wednesday	-	1	1	-	-	2	40%
Thursday	-	-	1	-	-	1	20%
Friday	1	-	-	-	-	1	20%
Saturday	-	-	-	-	-	0	-
Sunday	-	-	1	-	-	1	20%
<b>Total</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>5</b>	
<b>%</b>	<b>20%</b>	<b>20%</b>	<b>60%</b>	<b>-</b>	<b>-</b>		

4.3.4 Table 5 highlights that the collisions have occurred relatively evenly across the week, with a peak of two collisions occurring on a Wednesday (40%), but no collisions recorded on a Monday, Tuesday or Saturday. Over half of the collisions (60%) occurred in the afternoon period.

## 4.4 Collision Locations

4.4.1 The locations of the five study collisions are shown on the plot attached as Appendix 2. The key collision locations are summarised below:

- 2 PIC occurred at the Hackthorn Road/Ryland Road mini roundabout.
- 2 PICs occurred on Eastfield Lane (not at a junction); and
- 1 PICs occurred on at the Ryland Road/Eastfield Lane junction.

## 4.5 Casualties

4.5.1 A total of seven casualties occurred as a result of the five 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+		
Car Driver	-	1	1	1	1	2	6	85.7%
Car Passenger	1	-	-	-	-	-	1	14.3%
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>7</b>	
<b>%</b>	<b>14.3%</b>	<b>14.3%</b>	<b>14.3%</b>	<b>14.3%</b>	<b>14.3%</b>	<b>28.6%</b>		

4.5.2 Table 6 shows that the majority of casualties were car drivers (85.7%) and the age of casualties was varied. It should be noted that no casualties were vulnerable road users (pedestrians, cyclists or Powered Two-Wheelers).

## 4.6 Road Safety Impact

4.6.1 A total of five collisions, resulting in seven 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 development. It is therefore considered that there are no existing road safety issues pertinent to the development of the site.

4.6.2 If the internal roads and access junction 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.

## 4.7 2021 Update

4.7.1 The DfT has released provisional part-year 2021 collision data covering the period 01/01/2021 to 30/06/2021. It should be noted that, as the data is provisional, it is subject to change and does not contain all the information to allow full analysis to be undertaken. No additional collisions occurred within the study area in the first half of 2021 and therefore the findings of the above appraisal are unchanged.

## 5. TRIP GENERATION PROJECTIONS

### 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 sites. The TRICS database has been interrogated to find suitable data to assist in estimating the trip generation of the proposed 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: v7.8.4;
- Survey type: Multi-modal surveys;
- Size: 50-150 dwellings;
- TRICS location type: 'Suburban Area' & '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 01/01/2013); 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 estimate the vehicle trip generation of the proposed development site, in accordance with good practice guidelines (TCL, 2021). Details of the site selection and trip rates taken from the TRICS database attached in full within Appendix 3, with the projected vehicle trip rates and generation shown in Table 7.

**Table 7: Projected Vehicle Trip Generation**

	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
<b>Houses Privately Owned (03-A)</b>				
Vehicle Trip Rates (per dwelling)	0.121	0.363	0.334	0.146
<b>Development Vehicle Trips (109 dwellings)</b>	<b>13</b>	<b>40</b>	<b>36</b>	<b>16</b>

5.1.4 The trip generation projections shown in Table 7 indicate that the development could be expected to generate up to 53 two-way vehicle trip movements during the AM peak hour (08:00-09:00) and 52 during the PM peak hour (17:00-18:00).

- 5.1.5 A Travel Plan (LTP, 2022) has been produced in association with this TA to help promote and encourage sustainable travel to/from the proposed development. In order to ensure that this assessment robustly analyses a '*worst-case scenario*', the potential vehicle trip reducing benefits of the site Travel Plan have not been considered within the trip generation projections. However, it is worth noting that the Travel Plan would be expected to increase the number of trips generated by sustainable modes and reduce the number of car trips.

## 5.2 Modal Split

- 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 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
Vehicle Drivers	53.2%
Vehicle Passengers	21.7%
<b>Vehicle Occupants</b>	<b>74.9%</b>
Pedestrians	18.7%
Cyclists	2.2%
Public Transport Users	4.2%
<b>TOTAL</b>	<b>100%</b>

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

- 5.2.2 These modal split predictions indicate that almost half of the person trips (46.8%) generated by the development would be expected to be made by sustainable modes (pedestrian, cycle, public transport and car passenger).
- 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 e.g. trips to retail amenities, 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 '*West Lindsey 008*' 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.

- 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 in Figure 7.

**Figure 7: Gravity Model Zones**



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

- 5.3.3 The detailed calculations of the gravity model are attached as Appendix 4, with the results summarised in Table 9.

**Table 9: Gravity Model Results**

Zone	Route	Distribution Split	AM 2-Way	PM 2-Way
A	Lincoln Road (S)	52.9%	28	28
B	Ryland Road (S)	13.5%	7	7
C	Cliff Road (W)	16.8%	9	9
D	Eastfield Lane (E)	11.6%	6	6
E	Hackthorn Road (N)	5.1%	3	3
<b>TOTAL</b>		<b>100.0%</b>	<b>53</b>	<b>52</b>

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

## 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)
<b>AM Peak</b>		
Eastfield Lane/Ryland Road/Dunholme Road Priority Junction	A, B, C, E	<b>+47</b>
Ryland Road/Hackthorn Road Mini-Roundabout	A, C, E	<b>+40</b>
Ryland Road/Lincoln Road/Cliff Road Priority Junction	A, C	<b>+37</b>
Lincoln Road/A46 Junction	A	<b>+28</b>
Heath Lane/A15 Junction	C	<b>+9</b>
Eastfield Lane/A46 Junction	D	<b>+6</b>
<b>PM Peak</b>		
Eastfield Lane/Ryland Road/Dunholme Road Priority Junction	A, B, C, E	<b>+47</b>
Ryland Road/Hackthorn Road Mini-Roundabout	A, C, E	<b>+40</b>
Ryland Road/Lincoln Road/Cliff Road Priority Junction	A, C	<b>+37</b>
Lincoln Road/A46 Junction	A	<b>+28</b>
Heath Lane/A15 Junction	C	<b>+9</b>
Eastfield Lane/A46 Junction	D	<b>+6</b>

## 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) (DCLG, 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.

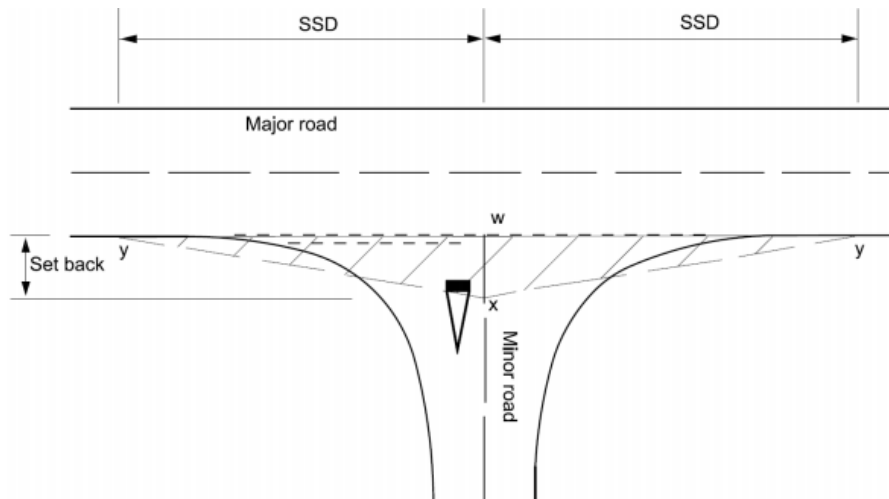
- 5.5.3 As detailed in Section 5.1, the development could be expected to generate up to 53 two-way trips during the AM peak hour and 52 during the PM peak hour. As demonstrated within Table 9 and Table 10, the vehicle trips expected to be generated the development will split at a number of local junctions, subsequently reducing the impact.
- 5.5.4 Given that only slightly in excess of 30 two-way trips are expected to occur at the local junctions within Welton village (Eastfield Lane/Ryland Road/Dunholme Road priority junction, the Ryland Road/Hackthorn Road mini-roundabout and the Ryland Road/Lincoln Road/Cliff Road priority junction), it is considered that the proposed development is not expected to have a significant impact on the operation of these junctions. It is also worth noting that these junctions are minor priority junctions in a village and are therefore expected to currently be lightly trafficked, further suggesting 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 Eastfield Lane/A46 Junction, the Lincoln Road/A46 junction and the Heath Lane/A15 junction.
- 5.5.5 Therefore, as the impact of the development is not expected to be severe, 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. HIGHWAY ACCESS APPRAISAL

### 6.1 Visibility Splay Requirements

- 6.1.1 Given that Eastfield Lane is subject to a derestricted speed limit (60mph), and although actual vehicle speeds are expected to be less than the posted speed limit due to constraints of the road, including the bend at the access junction and to the south of the site, the visibility splay criteria at the proposed site access has been assessed based on guidance contained within Design Manual for Roads and Bridges (DMRB) (HE, 2021). However, it should be noted that DMRB principles are generally used as guidance only for non-trunk roads such as the Eastfield Lane, with Manual for Streets (MfS) (DfT, 2007b) arguably more applicable, particularly when considering the southward visibility splay, and also if the speed limit is reduced to 30mph as part of the proposals.
- 6.1.2 For information, Figure 8 illustrates the definition and measurement of the visibility splay distances described in this section.

**Figure 8: Definition of 'X' & 'Y' Distances**



Source: HE, 2020

- 6.1.3 DMRB outlines that *"The minimum distance used to locate point X shall satisfy one of the following:*
- 1) for direct access:
    - a) 4.5 metres; or,
    - b) 2.0 metres.
  - 2) for simple priority junctions:
    - a) 9.0 metres; or,
    - b) 2.4 metres.
  - 3) for all other priority junctions:
    - a) 9.0 metres; or,
    - b) 4.5 metres.

*The minimum distance used to locate point X should be in accordance with a) for each junction/access type.*

*Where it is not feasible to locate point X fully in accordance with a), the minimum distance used to locate point X should be as close to a) as practicable, but no less than b).” (HE, 2021)*

- 6.1.4 As the access junction is to form a simple priority junction, visibility splays have been measured from an ‘X’ distance of 2.4m, in accordance with DMRB.
- 6.1.5 The ‘Y’ distances are based on the Stopping Sight Distance (SSD), which is *“the distance within which drivers need to be able to see ahead and stop from a given speed. It is calculated from the speed of the vehicle, the time required for a driver to identify a hazard and then begin to brake (the perception-reaction time), and the vehicle’s rate of deceleration”* (DfT, 2007).
- 6.1.6 Within DMRB desirable minimum SSDs are defined for specific design speeds, as reproduced in Table 11 below.

**Table 11: DMRB Stopping Sight Distances**

Design Speed (kph)	Design Speed (mph)	Stopping Sight Distance (m)
50	31.07	70
60	37.28	90
70	43.50	120
85	52.82	160
100	62.14	215
120	74.56	295

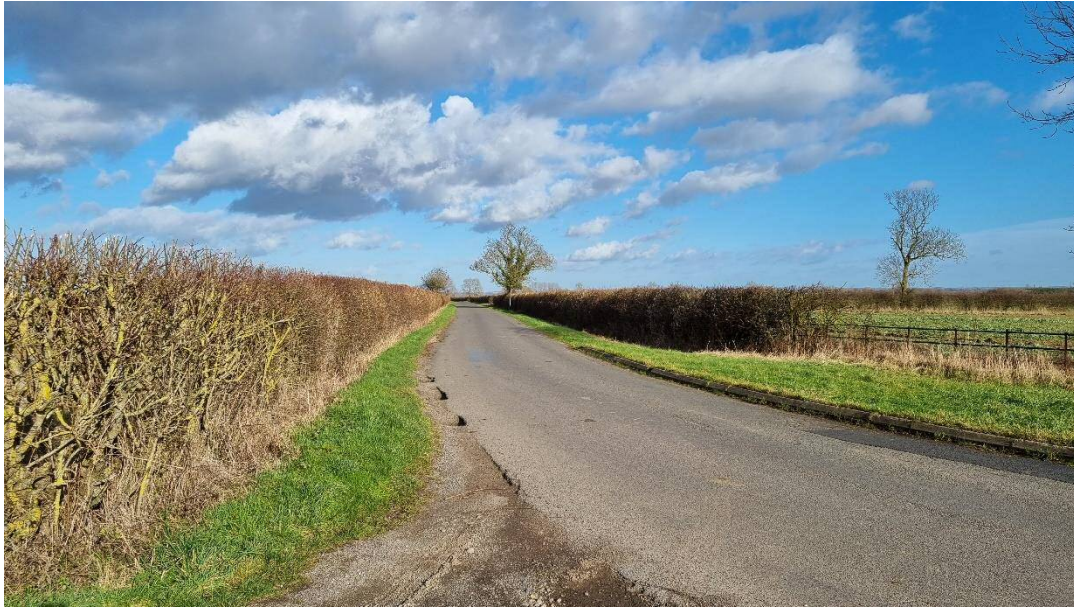
- 6.1.7 As shown in Table 11, there is a marked change in SSD requirements between the different design speed categories, with a requirement for 215m where vehicle speeds slightly exceed 52.82mph, and 160m slightly below this speed. The required ‘Y’ distance to the left would be 215m based on the design speed of 60mph and strict application of these DMRB speed categories.
- 6.1.8 Approximately 105m to the south of the site access junction the speed limit on Eastfield Lane decreases to 30mph. Given the 30mph speed limit and that the site is situated on a sharp bend, it is considered reasonable to assume that vehicle speeds on the northbound approach to the junction would be around 30mph. However, to form a robust assessment, the required visibility splay to the right of the access has been assessed based on vehicle speeds of around 40mph on the northbound approach to the access. Therefore, a SSD of 120m is required to the right of the access.

## 6.2 Visibility Assessment

- 6.2.1 The visibility splays achievable at the existing access junction with Eastfield Lane have been assessed both on-site and utilising OS mapping as shown in Appendix 5. On-site observations highlighted that the visibility splays at the access junction are not constrained due to the vertical alignment of the carriageway.

- 6.2.2 The analysis shows that the proposed access can achieve in excess of the required 2.4m x 215m visibility splay to the left. It appears that the required visibility splay envelope does not encroach over third-party land, as confirmed by the highway adoption plan in Appendix 6.

**Photo 4: Existing Visibility to the Left of the Access**



- 6.2.3 The analysis shows that the proposed access can achieve in excess of the required 2.4m x 120m visibility splay to the right. Although, it appears that the required visibility splay envelope does not encroach over third-party land as shown by the highway adoption plan in Appendix 6 (although the LCC caveat that it cannot be confirmed from the adoption plan whether the ditch that runs along the western side of Eastfield Lane is within the highway boundary). The 2.4m x 120m visibility splay (based on robust 40mph assumed speeds) encroaches over the ditch, however a visibility splay of 2.4m x 67m (required for 30mph speeds which is considered more representative of actual vehicle speeds on the northbound approach to the access) is achievable without encroaching over the ditch in the verge.

**Photo 5: Existing Visibility to the Right of the Access**



- 6.2.4 Therefore, the achievable visibility splays to the left and right of the access junction are considered to provide sufficient SSD.

### **6.3 Forward Visibility**

- 6.3.1 Forward visibility on the Eastfield Lane has been tested based on expected vehicle speeds and DMRB SSD requirements (HE, 2021). Forward visibility relating to the visibility between westbound vehicles on Eastfield Lane and vehicles waiting to turn right into the site has been assessed on on-site observations and OS mapping as shown in Appendix 5. The forward visibility assessment indicated that the required SSD of 215m appears to be achievable on the westbound approach to vehicles waiting to turn right into the site, subject to the trimming of vegetation within the apparent extents of the adopted highway.
- 6.3.2 Forward visibility relating to the visibility between vehicles waiting to turn right into the site access and northbound vehicles on Eastfield Lane has been assessment based on on-site observations and OS mapping. It is expected that northbound vehicles will be approaching the access at around 30mph. However, to form a robust assessment the assessment has been based on northbound vehicles approaching the access at 40mph therefore with a required SSD of 120m. The forward visibility envelope demonstrates that the required forward visibility of 120m (as mentioned in Section 6.1) is achievable on the northbound approach to vehicles waiting to turn right into the site.

## **6.4 Further Considerations**

- 6.4.1 As previously mentioned, it is understood that there have been discussions surrounding the potential for an access route to be provided between the proposed site and the site directly west. Given the assessments in this TA, it is considered that the design of the proposed site access junction would also be suitable to accommodate the additional traffic associated with this approved scheme for 49 dwellings, in terms of key factors such as road safety (e.g. visibility splays) and junction capacity.

## 7. CONCLUSIONS

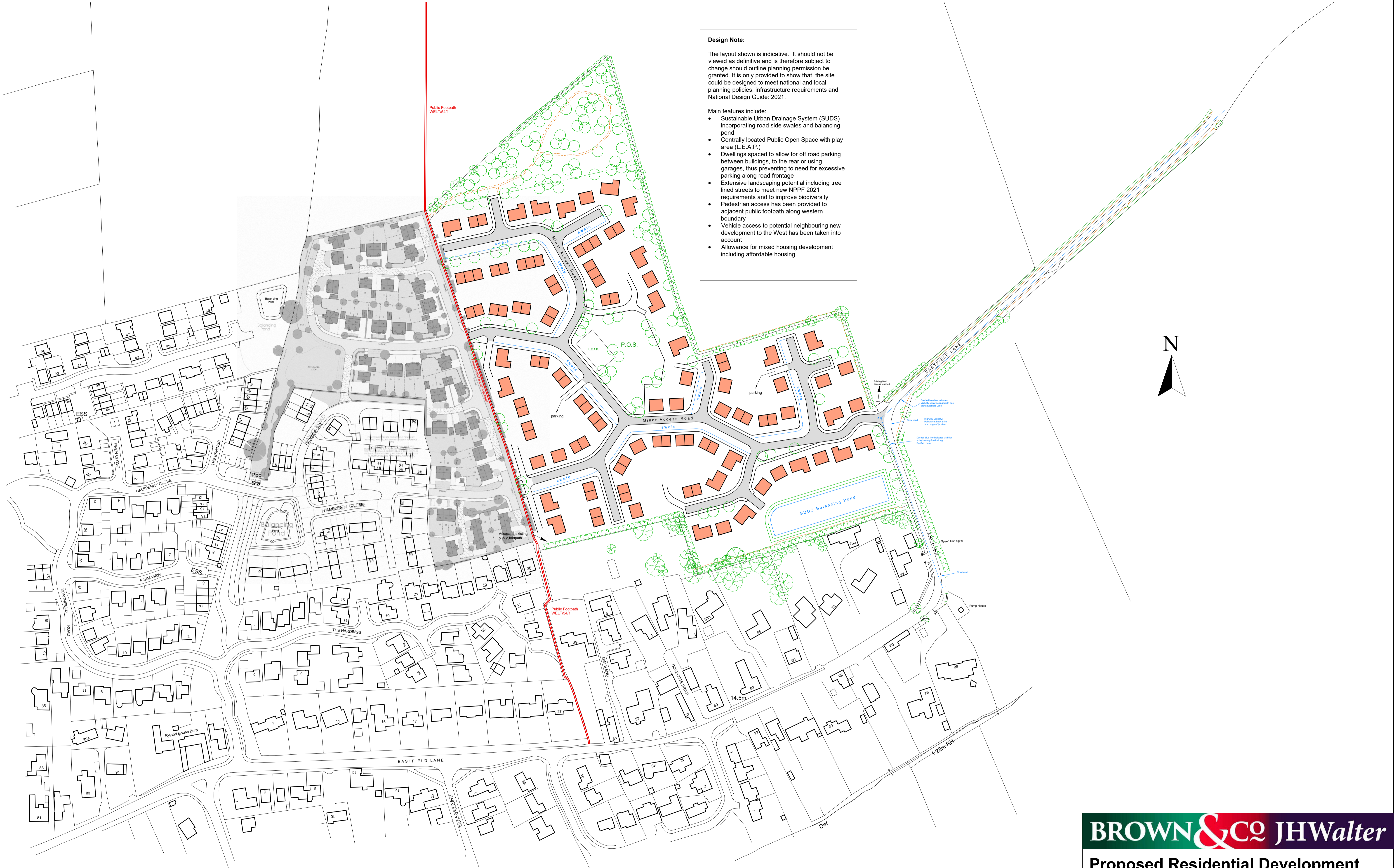
- 7.1.1 This TA provides a detailed appraisal of the transport impacts associated with the proposals for the development of 109 dwellings on land to the west of Eastfield Lane in the village of Welton.
- 7.1.2 A Travel Plan (LTP, 2022) that provides a strategy for encouraging sustainable travel at the proposed development site has been produced in conjunction with this TA, as a separate document.
- 7.1.3 Vehicular access to the site is to be provided via an existing farm access which is to be redesigned as part of the proposals to form a simple priority T-junction with Eastfield Lane on the eastern boundary of the site. It is expected that suitable parking provision is to be provided to accommodate the likely parking demand generated by the site. Additional pedestrian access is to be provided via a footpath on the western boundary of the site.
- 7.1.4 The required visibility splays of 2.4m x 120m to the right and 2.4m x 215m to the left of the access appear to be achievable, subject to vegetation clearance within the highway boundary.
- 7.1.5 The site is located within a 2km walking distance of the entire villages of Welton and Dunholme. The site is located within a reasonable cycle ride (circa 8km) of areas including Welton, Nettleham, Scothern, and a northern section of Lincoln. The nearest bus stops to the proposed development site are located on Ryland Road, within an approximately 700m walk to the west of the site access junction, providing access to/from key destinations including Market Rasen and Grimsby. Lincoln Central Rail Station is located approximately 10.5km to the south of the site and provides regular services to Doncaster, Sheffield, Peterborough, Leicester, Grimsby Town and London King's Cross.
- 7.1.6 A road casualty study showed that five 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 of the proposed development. If the internal roads and access junction 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.
- 7.1.7 The trip generation projections indicate that the development could be expected to generate up to 53 two-way trips during the AM peak hour and 52 during the PM peak hour.

- 7.1.8 The distribution and assignment of traffic across the local highway network has shown that only slightly in excess of 30 two-way trips are expected to occur at local junctions within Welton village (Eastfield Lane/Ryland Road/Dunholme Road priority junction, the Ryland Road/Hackthorn Road mini-roundabout and the Ryland Road/Lincoln Road/Cliff Road priority junction). Therefore, it is considered that the proposed development is not expected to have a significant impact on the operation of these junctions. These junctions are minor priority junctions in a village and are therefore expected to currently be lightly trafficked, further suggesting 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 Eastfield Lane/A46 Junction, the Lincoln Road/A46 junction and the Heath Lane/A15 junction.
- 7.1.9 Based on the assessments within this TA, it is considered that the proposed development would not be expected to have a significant impact on the operation of the local highway network. Therefore, as the impact of the proposals at the site is not expected to be severe, the proposals are 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).
- 7.1.10 It is concluded from the assessments within this TA that the proposed development would not be expected to have a significant impact in terms of sustainable travel, traffic impact and road safety.

## 8. REFERENCES

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## **Appendix I – Site Layout Plan**

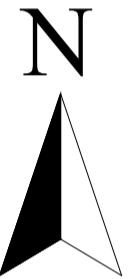


**Design Note:**

The layout shown is indicative. It should not be viewed as definitive and is therefore subject to change should outline planning permission be granted. It is only provided to show that the site could be designed to meet national and local planning policies, infrastructure requirements and National Design Guide: 2021.

Main features include:

- Sustainable Urban Drainage System (SUDS) incorporating road side swales and balancing pond
- Centrally located Public Open Space with play area (L.E.A.P.)
- Dwellings spaced to allow for off road parking between buildings, to the rear or using garages, thus preventing to need for excessive parking along road frontage
- Extensive landscaping potential including tree lined streets to meet new NPPF 2021 requirements and to improve biodiversity
- Pedestrian access has been provided to adjacent public footpath along western boundary
- Vehicle access to potential neighbouring new development to the West has been taken into account
- Allowance for mixed housing development including affordable housing



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0 50 100 150 200

Scale 1:1250

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**BROWN & CO JHWalter**

**Proposed Residential Development**  
Land West of Eastfield Lane, Welton

Indicative Site Layout Plan	Scale: 1:1250	Revision
	Sheet Size: A1	21/01/2022
	AP038224-PW01	B

## **Appendix 2 – Collision Plot**

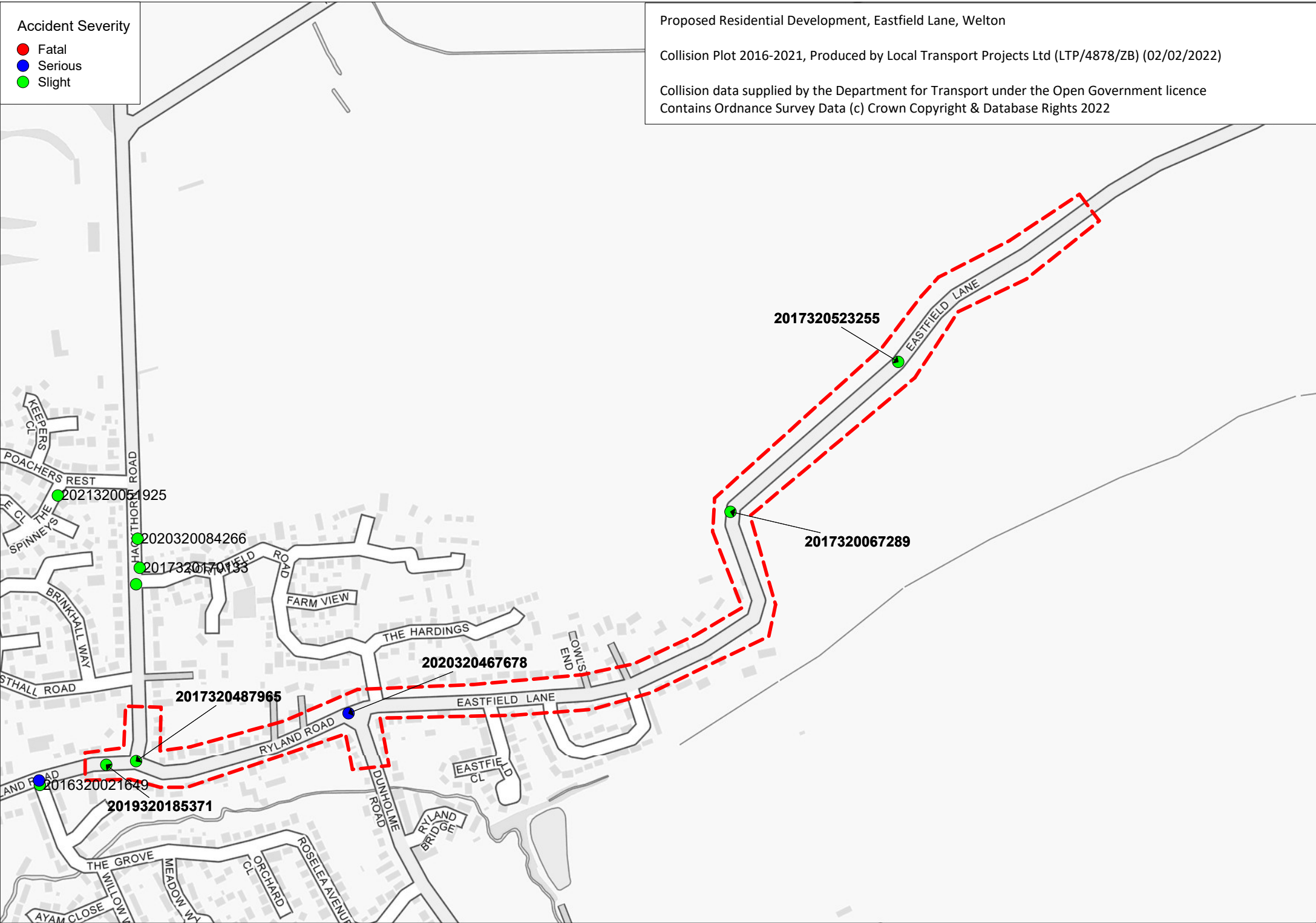
Accident Severity

- Fatal
- Serious
- Slight

Proposed Residential Development, Eastfield Lane, Welton

Collision Plot 2016-2021, Produced by Local Transport Projects Ltd (LTP/4878/ZB) (02/02/2022)

Collision data supplied by the Department for Transport under the Open Government licence  
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## **Appendix 3 – Trip Generation Projections**

Projected Vehicle Trip Generation

109 dwellings

Vehicle Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.066	0.287	0.353
08:00-09:00	0.121	0.363	0.484
09:00-10:00	0.143	0.166	0.309
10:00-11:00	0.133	0.178	0.311
11:00-12:00	0.140	0.157	0.297
12:00-13:00	0.163	0.145	0.308
13:00-14:00	0.170	0.168	0.338
14:00-15:00	0.153	0.178	0.331
15:00-16:00	0.249	0.163	0.412
16:00-17:00	0.279	0.161	0.440
17:00-18:00	0.334	0.146	0.480
18:00-19:00	0.261	0.147	0.408
TOTAL	2.212	2.259	4.471

Vehicle Trips

IN	OUT	TOTAL
7	31	38
13	40	53
16	18	34
14	19	33
15	17	32
18	16	34
19	18	37
17	19	36
27	18	45
30	18	48
36	16	52
28	16	44
240	246	486

TRICS v7.8.2 - MM, 03-A, 50-150 dwellings, UK (exc. GL and Ireland), 'Suburban Area' & 'Edge of Town' exc. Sat/Sun & COVID, 2013+ (18)

Projected Person Trip Generation

Person Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.100	0.517	0.617
08:00-09:00	0.213	0.803	1.016
09:00-10:00	0.251	0.331	0.582
10:00-11:00	0.238	0.344	0.582
11:00-12:00	0.258	0.276	0.534
12:00-13:00	0.280	0.263	0.543
13:00-14:00	0.300	0.276	0.576
14:00-15:00	0.255	0.289	0.544
15:00-16:00	0.591	0.331	0.922
16:00-17:00	0.575	0.323	0.898
17:00-18:00	0.612	0.255	0.867
18:00-19:00	0.474	0.257	0.731
TOTAL	4.147	4.265	8.412

Person Trips

Time	IN	OUT	TOTAL
07:00-08:00	11	56	67
08:00-09:00	23	88	111
09:00-10:00	27	36	63
10:00-11:00	26	37	63
11:00-12:00	28	30	58
12:00-13:00	31	29	60
13:00-14:00	33	30	63
14:00-15:00	28	32	60
15:00-16:00	64	36	100
16:00-17:00	63	35	98
17:00-18:00	67	28	95
18:00-19:00	52	28	80
TOTAL	453	465	918

Projected Modal Split

Proportion of Vehicle Trips

Time	IN	OUT	TOTAL
07:00-08:00	66.0%	55.5%	57.2%
08:00-09:00	56.8%	45.2%	47.6%
09:00-10:00	57.0%	50.2%	53.1%
10:00-11:00	55.9%	51.7%	53.4%
11:00-12:00	54.3%	56.9%	55.6%
12:00-13:00	58.2%	55.1%	56.7%
13:00-14:00	56.7%	60.9%	58.7%
14:00-15:00	60.0%	61.6%	60.8%
15:00-16:00	42.1%	49.2%	44.7%
16:00-17:00	48.5%	49.8%	49.0%
17:00-18:00	54.6%	57.3%	55.4%
18:00-19:00	55.1%	57.2%	55.8%
TOTAL	53.3%	53.0%	53.2%

Projected Modal Trip Generation - (109 dwellings)

12-Hour (07:00-19:00)				
Mode	Split	IN	OUT	TOTAL
Vehicle Drivers	53.2%	241	247	488
Vehicle Passengers	21.7%	99	101	200
Vehicle Occupants Sub-Total	74.9%	340	348	688
Pedestrian	18.7%	85	87	172
Pedal-cycle	2.2%	10	10	20
Public Transport	4.2%	19	20	39
	25.1%	114	117	231
Total Person Trips	100%	453	465	918

**TRIP RATE CALCULATION SELECTION PARAMETERS:**

Land Use : 03 - RESIDENTIAL  
 Category : A - HOUSES PRIVATELY OWNED

**MULTI-MODAL TOTAL VEHICLES**Selected regions and areas:

<b>02 SOUTH EAST</b>	
ES EAST SUSSEX	2 days
HC HAMPSHIRE	1 days
KC KENT	2 days
SC SURREY	1 days
WS WEST SUSSEX	1 days
<b>03 SOUTH WEST</b>	
DV DEVON	2 days
<b>04 EAST ANGLIA</b>	
NF NORFOLK	2 days
SF SUFFOLK	1 days
<b>06 WEST MIDLANDS</b>	
SH SHROPSHIRE	1 days
<b>07 YORKSHIRE &amp; NORTH LINCOLNSHIRE</b>	
NY NORTH YORKSHIRE	2 days
SY SOUTH YORKSHIRE	1 days
<b>09 NORTH</b>	
DH DURHAM	2 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: 50 to 134 (units: )  
 Range Selected by User: 50 to 150 (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: 01/01/13 to 21/09/21

*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	2 days
Tuesday	4 days
Wednesday	4 days
Thursday	4 days
Friday	4 days

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

Selected survey types:

Manual count	18 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:

Suburban Area (PPS6 Out of Centre)	8
Edge of Town	10

*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	17
No Sub Category	1

*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.*

**Secondary Filtering selection:**

Use Class:

C3	18 days
----	---------

*This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 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	1 days
5,001 to 10,000	6 days
10,001 to 15,000	4 days
15,001 to 20,000	4 days
20,001 to 25,000	1 days
25,001 to 50,000	1 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	3 days
25,001 to 50,000	3 days
75,001 to 100,000	6 days
100,001 to 125,000	1 days
125,001 to 250,000	4 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	15 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	4 days
No	14 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	18 days
-----------------	---------

*This data displays the number of selected surveys with PTAL Ratings.*

LIST OF SITES relevant to selection parameters

<b>1</b>	<b>DH-03-A-01</b>	<b>SEMI DETACHED</b>	<b>DURHAM</b>
	GREENFIELDS ROAD		
	BISHOP AUCKLAND		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	50	
	Survey date: TUESDAY	28/03/17	Survey Type: MANUAL
<b>2</b>	<b>DH-03-A-03</b>	<b>SEMI-DETACHED &amp; TERRACED</b>	<b>DURHAM</b>
	PILGRIMS WAY		
	DURHAM		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	57	
	Survey date: FRIDAY	19/10/18	Survey Type: MANUAL
<b>3</b>	<b>DV-03-A-02</b>	<b>HOUSES &amp; BUNGALOWS</b>	<b>DEVON</b>
	MILLHEAD ROAD		
	HONITON		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	116	
	Survey date: FRIDAY	25/09/15	Survey Type: MANUAL
<b>4</b>	<b>DV-03-A-03</b>	<b>TERRACED &amp; SEMI DETACHED</b>	<b>DEVON</b>
	LOWER BRAND LANE		
	HONITON		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	70	
	Survey date: MONDAY	28/09/15	Survey Type: MANUAL
<b>5</b>	<b>ES-03-A-04</b>	<b>MIXED HOUSES &amp; FLATS</b>	<b>EAST SUSSEX</b>
	NEW LYDD ROAD		
	CAMBER		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	134	
	Survey date: FRIDAY	15/07/16	Survey Type: MANUAL
<b>6</b>	<b>ES-03-A-05</b>	<b>MIXED HOUSES &amp; FLATS</b>	<b>EAST SUSSEX</b>
	RATTLE ROAD		
	NEAR EASTBOURNE		
	STONE CROSS		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	99	
	Survey date: WEDNESDAY	05/06/19	Survey Type: MANUAL
<b>7</b>	<b>HC-03-A-23</b>	<b>HOUSES &amp; FLATS</b>	<b>HAMPSHIRE</b>
	CANADA WAY		
	LIPHOOK		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	62	
	Survey date: TUESDAY	19/11/19	Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

<b>8</b>	<b>KC-03-A-03</b>	<b>MIXED HOUSES &amp; FLATS</b>	<b>KENT</b>
	HYTHE ROAD		
	ASHFORD		
	WILLESBOROUGH		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	51	
	Survey date: THURSDAY	14/07/16	Survey Type: MANUAL
<b>9</b>	<b>KC-03-A-04</b>	<b>SEMI-DETACHED &amp; TERRACED</b>	<b>KENT</b>
	KILN BARN ROAD		
	AYLESFORD		
	DITTON		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	110	
	Survey date: FRIDAY	22/09/17	Survey Type: MANUAL
<b>10</b>	<b>NF-03-A-04</b>	<b>MIXED HOUSES</b>	<b>NORFOLK</b>
	NORTH WALSHAM ROAD		
	NORTH WALSHAM		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	70	
	Survey date: WEDNESDAY	18/09/19	Survey Type: MANUAL
<b>11</b>	<b>NF-03-A-25</b>	<b>MIXED HOUSES &amp; FLATS</b>	<b>NORFOLK</b>
	WOODFARM LANE		
	GORLESTON-ON-SEA		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	55	
	Survey date: TUESDAY	21/09/21	Survey Type: MANUAL
<b>12</b>	<b>NY-03-A-09</b>	<b>MIXED HOUSING</b>	<b>NORTH YORKSHIRE</b>
	GRAMMAR SCHOOL LANE		
	NORTHALLERTON		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	52	
	Survey date: MONDAY	16/09/13	Survey Type: MANUAL
<b>13</b>	<b>NY-03-A-10</b>	<b>HOUSES AND FLATS</b>	<b>NORTH YORKSHIRE</b>
	BOROUGHBRIDGE ROAD		
	RIPON		
	Edge of Town		
	No Sub Category		
	Total No of Dwellings:	71	
	Survey date: TUESDAY	17/09/13	Survey Type: MANUAL
<b>14</b>	<b>SC-03-A-04</b>	<b>DETACHED &amp; TERRACED</b>	<b>SURREY</b>
	HIGH ROAD		
	BYFLEET		
	Edge of Town		
	Residential Zone		
	Total No of Dwellings:	71	
	Survey date: THURSDAY	23/01/14	Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

<b>15</b>	<b>SF-03-A-07</b>	<b>MIXED HOUSES</b>	<b>SUFFOLK</b>
	FOXHALL ROAD IPSWICH		
	Suburban Area (PPS6 Out of Centre) Residential Zone		
	Total No of Dwellings:	73	
	Survey date: THURSDAY	09/05/19	Survey Type: MANUAL
<b>16</b>	<b>SH-03-A-05</b>	<b>SEMI-DETACHED/TERRACED</b>	<b>SHROPSHIRE</b>
	SANDCROFT TELFORD SUTTON HILL		
	Edge of Town Residential Zone		
	Total No of Dwellings:	54	
	Survey date: THURSDAY	24/10/13	Survey Type: MANUAL
<b>17</b>	<b>SY-03-A-01</b>	<b>SEMI DETACHED HOUSES</b>	<b>SOUTH YORKSHIRE</b>
	A19 BENTLEY ROAD DONCASTER BENTLEY RISE		
	Suburban Area (PPS6 Out of Centre) Residential Zone		
	Total No of Dwellings:	54	
	Survey date: WEDNESDAY	18/09/13	Survey Type: MANUAL
<b>18</b>	<b>WS-03-A-10</b>	<b>MIXED HOUSES</b>	<b>WEST SUSSEX</b>
	TODDINGTON LANE LITTLEHAMPTON WICK		
	Edge of Town Residential Zone		
	Total No of Dwellings:	79	
	Survey date: WEDNESDAY	07/11/18	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	.

Local Transport Projects Beverley East Yorkshire

Licence No: 342901

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): 1.88

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	18	74	0.066	18	74	0.287	18	74	0.353
08:00 - 09:00	18	74	0.121	<b>18</b>	<b>74</b>	<b>0.363</b>	<b>18</b>	<b>74</b>	<b>0.484</b>
09:00 - 10:00	18	74	0.143	18	74	0.166	18	74	0.309
10:00 - 11:00	18	74	0.133	18	74	0.178	18	74	0.311
11:00 - 12:00	18	74	0.140	18	74	0.157	18	74	0.297
12:00 - 13:00	18	74	0.163	18	74	0.145	18	74	0.308
13:00 - 14:00	18	74	0.170	18	74	0.168	18	74	0.338
14:00 - 15:00	18	74	0.153	18	74	0.178	18	74	0.331
15:00 - 16:00	18	74	0.249	18	74	0.163	18	74	0.412
16:00 - 17:00	18	74	0.279	18	74	0.161	18	74	0.440
17:00 - 18:00	<b>18</b>	<b>74</b>	<b>0.334</b>	18	74	0.146	18	74	0.480
18:00 - 19:00	18	74	0.261	18	74	0.147	18	74	0.408
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.212			2.259			4.471

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:	50 - 134 (units: )
Survey date date range:	01/01/13 - 21/09/21
Number of weekdays (Monday-Friday):	18
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	3
Surveys manually removed from selection:	1

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 shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Local Transport Projects Beverley East Yorkshire

Licence No: 342901

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

**MULTI-MODAL TOTAL PEOPLE****Calculation factor: 1 DWELLS****BOLD print indicates peak (busiest) period**

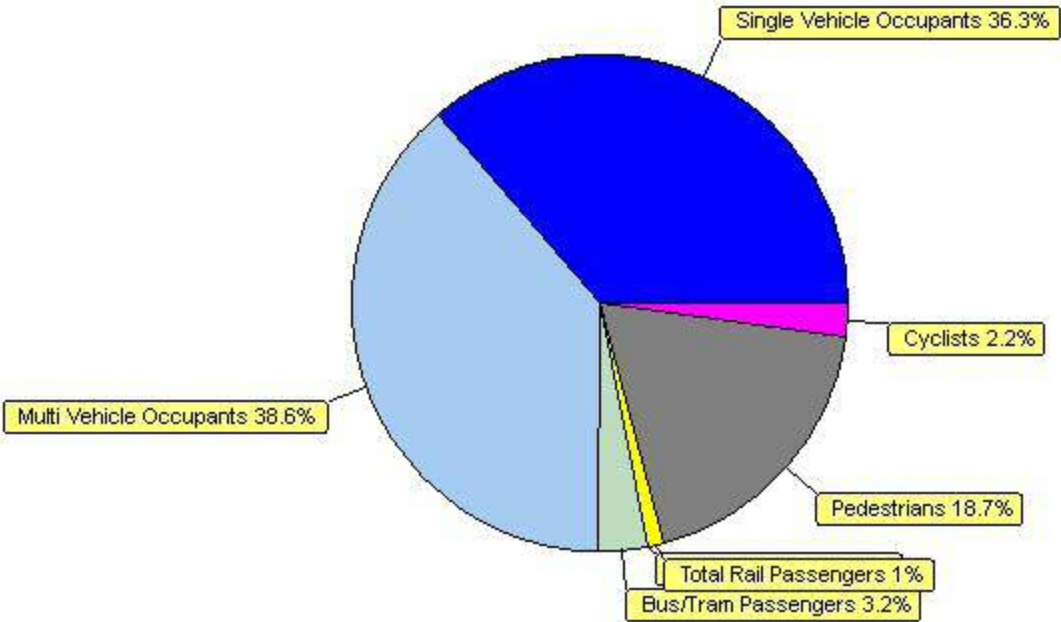
Total People to Total Vehicles ratio (all time periods and directions): 1.88

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	18	74	0.100	18	74	0.517	18	74	0.617
08:00 - 09:00	18	74	0.213	<b>18</b>	<b>74</b>	<b>0.803</b>	<b>18</b>	<b>74</b>	<b>1.016</b>
09:00 - 10:00	18	74	0.251	18	74	0.331	18	74	0.582
10:00 - 11:00	18	74	0.238	18	74	0.344	18	74	0.582
11:00 - 12:00	18	74	0.258	18	74	0.276	18	74	0.534
12:00 - 13:00	18	74	0.280	18	74	0.263	18	74	0.543
13:00 - 14:00	18	74	0.300	18	74	0.276	18	74	0.576
14:00 - 15:00	18	74	0.255	18	74	0.289	18	74	0.544
15:00 - 16:00	18	74	0.591	18	74	0.331	18	74	0.922
16:00 - 17:00	18	74	0.575	18	74	0.323	18	74	0.898
17:00 - 18:00	<b>18</b>	<b>74</b>	<b>0.612</b>	18	74	0.255	18	74	0.867
18:00 - 19:00	18	74	0.474	18	74	0.257	18	74	0.731
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.147			4.265			8.412

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.

Modal Split Percentages



Time Range/Peak Period Selection  
Direction: Totals / Use All Times

## **Appendix 4 – Gravity Model**

Origin MSOA: West Lindsey 008  
Stage 1: Trip Distribution

Vehicle Trip Generating Mode	%
1,151	49.15%
312	13.32%
221	9.44%
163	6.96%
84	3.59%
80	3.42%
55	2.35%
50	2.13%
42	1.79%
32	1.37%
29	1.24%
24	1.02%
24	1.02%
19	0.81%
19	0.81%
14	0.60%
12	0.51%
11	0.47%

### Stage 2: Traffic assignment for each O-D pair

			Application Site	
Zone	Route	Distribution Split	AM 2-Way	PM 2-Way
A	Lincoln Road (S)	52.9%	28	28
B	Ryland Road (S)	13.5%	7	7
C	Cliff Road (W)	16.8%	9	9
D	Eastfield Lane (E)	11.6%	6	6
E	Hackthorn Road (N)	5.1%	3	3
TOTAL		100.00%	53	52

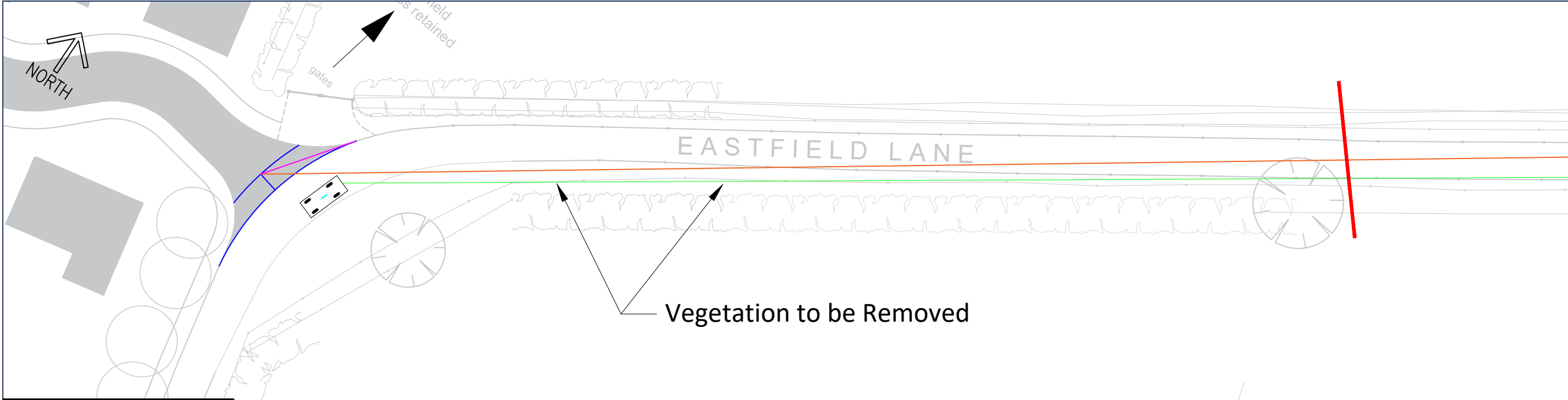
### Stage 3: Total zonal distribution of traffic

## Notes

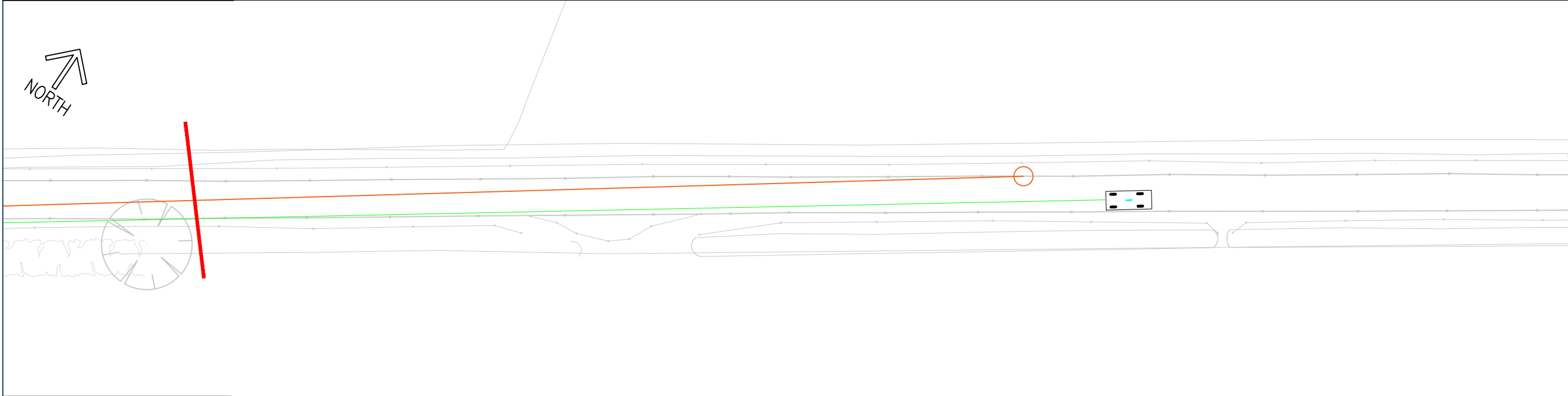
MSOA/LA with fewer than 10 people travelling by a vehicle trip generating modes have been excluded

[illegible]

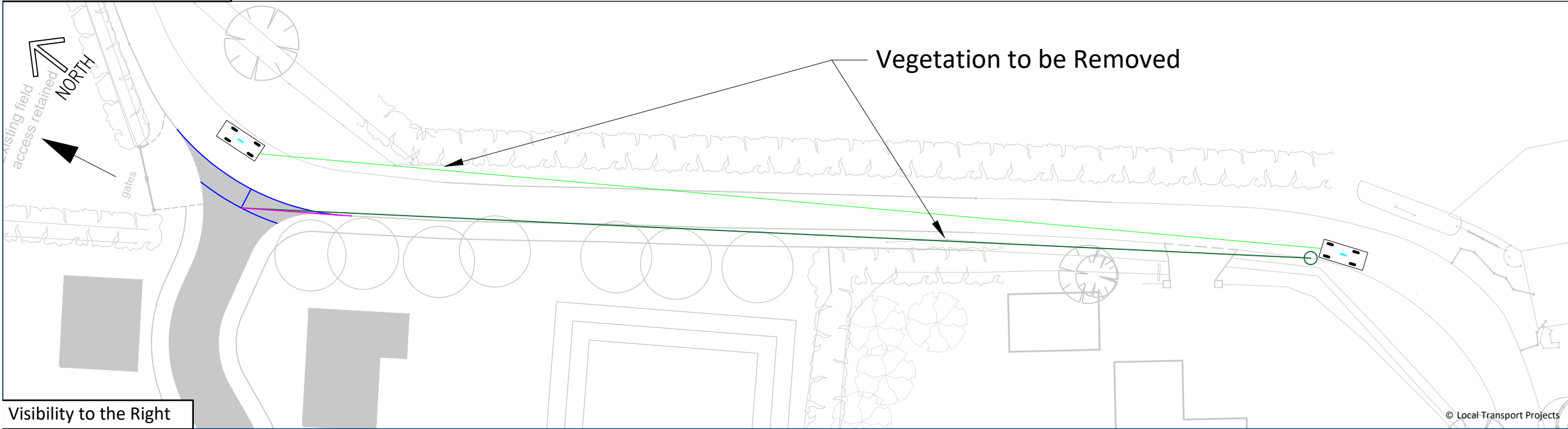
## **Appendix 5 – Visibility Splays**



Visibility to the Left (1 of 2)



Visibility to the Left (2 of 2)



Visibility to the Right

10mm

A3

Key:-

- 2.4m set back
- Required 2.4m x 215m visibility splay to the left
- Required 2.4m x 120m visibility splay to the right
- Tangent check line
- Forward visibility
- Cut Line

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vi. Based on indicative plans supplied by the client (ref: AP038224) on 26.01.2022.

-	-	-	-	-
Rev.	Date	By	Chk	Description

Client

JH Walter

Project

Proposed Residential Development  
Eastfield Lane, Welton

Title

Horizontal & Forward Visibility Splays

local transport projects

traffic engineering and transport planning

INSTITUTE OF HIGHWAY ENGINEERS

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Drawn	ZB	Date	03 02 22
Scale	1 : 500	Checked	SW
		Approved	SW

Status

DRAFT

Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/4878/ P1 /	01	01	-	

## **Appendix 6 – Highway Adoption Plan**

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