

Maltgrade Ltd  
**Lincolnshire Lakes**  
Transport Assessment

232952-00

Rev A | 29 January 2016

**AMENDED**

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number Job number

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**ARUP**

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# 1 Introduction

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Ove Arup and Partners Ltd (Arup) has been appointed by Maltgrade Limited (Maltgrade) to prepare a Transport Assessment (TA) to support the outline application for the proposed residential development at the Lincolnshire Lakes site, Scunthorpe.

Three separate planning applications are submitted in relation to Maltgrade's development at Lincolnshire Lakes, comprising:

- 1 - Residential Villages;
- 2 - Highways Junction;
- 3 - The Landscape, Lakes and Great Lake.

A Transport Assessment was prepared in support of all three applications in February 2015. Following submission of the applications (ref PA/2015/0396, PA/2015/0627 and PA/2015/0628) comments have been received from North Lincolnshire Council (NLC) and Highways England in relation to the Transport Assessment and Travel Plan Framework. Subsequent additional information and discussions have been ongoing to agree the further scope of assessment. This Transport Assessment Rev A provides an updated Transport Assessment in support of the proposed application. Details of the ongoing consultation are provided at Appendix A.

The purpose of this Transport Assessment is to describe the existing transport conditions within the vicinity of the site and assess the accessibility of the proposed development by all available transport modes.

## 1.1 Development Proposal

### 1.1.1 Lincolnshire Lakes Masterplan

The Lincolnshire Lakes Development Masterplan has been produced by North Lincolnshire Council as part of the Lincolnshire Lakes Area Action Plan (AAP) Submission Draft. The proposals comprise approximately 6,000 residential dwellings and mixed use development located approximately 5km to the west of Scunthorpe town centre. The land at Lincolnshire Lakes is broadly made up of six residential plots as set out below:

- Plot 1 – 643 dwellings;
- Plot 2 – 1,217 dwellings;
- Plot 3 – 987 dwellings;
- Plot 4 – 769 dwellings;
- Plot 5 – 1,100 dwellings;
- Plot 6 – 1,361 dwellings;
- Strategic mixed use – floor areas not defined;
- Lakeside leisure development.

The Masterplan includes downgrading of the existing M181 including de-trunking to the northern section and new highway provision comprising two new roundabout junctions on the downgraded M181, upgrades to the existing Brumby Common Lane and Burringham Road and a network of new access roads into the Masterplan site.

The AAP Proposals Map and Transport Proposals are included in Appendix B.

Lucent Group have recently gained outline planning consent for development on plots 1, 2 and 5 of the Lincolnshire Lakes site. Further details are provided at Section 5.6.2 of this report. As part of the application a Transport Assessment (TA) was prepared in support of the development. Reference is made within this TA to the Lucent TA methodology where appropriate.

### 1.1.2 Maltgrade Development Proposals

Maltgrade's development broadly comprises Plot 6 and half of Plot 2 – approx. 2,400 dwellings and ancillary village and community facilities, as well as development around the lake to the south west of the Masterplan including 100 dwellings and leisure uses. The indicative Masterplan is provided at Appendix C.

The development includes new highway works comprising provision of the new roundabout junction on the downgraded M181 junction with B1450 Burringham Road and two new site accesses from Burringham Road.

The Design and Access Statement prepared as part of the planning application identifies five phases of development over a maximum 25 year timeframe. For the purposes of the assessment within this report, the phasing of the development comprises:

- Phase 1 by 2019, 600 dwellings on the land immediately north east of the new M181/B1450 Burringham Road roundabout (eastern village) and 100 lakeside dwellings to the south west Lake area;
- Phase 2 by 2028, 1,800 dwellings on land to the north west of the new M181/B1450 Burringham Road roundabout (western village).

## 1.2 Scope of Assessment

The assessment has been produced in line with best practice guidance and in consultation with North Lincolnshire Council (NLC) and Highways England (formerly the Highways Agency).

A Transport Assessment Scoping Report was submitted to NLC in August 2014 and updated and submitted in October 2014 following feedback from NLC. A meeting was also held with the Highways Agency (HA) in October 2014 and the TA Scoping Report subsequently submitted to the HA.

Following submission of the application NLC provided written comments, dated 24 July 2015. Highways England (HE) provided written comments, dated 29 July 2015. Further information was provided to NLC and HE by Arup in a technical note, dated 27 October 2015. HE provide their response to this on 10 December 2015 and NLC provide their response on 15 December 2015. Details of the consultation responses and further communication are provided at Appendix A.

This TA report is produced on the basis of the scoping discussions and further communication with NLC and the HE.

## 1.3 Report Structure

The structure of the report is as follows:

- Chapter 2 describes the existing site and surrounding transport networks;
- Chapter 3 sets out the relevant planning and transport policy context;
- Chapter 4 describes the development proposals;
- Chapter 5 provides the predicted person trip generation and traffic flows associated with the proposed development;
- Chapter 6 assesses the impact of the development in relation to sustainable modes of transport;
- Chapter 7 considers the impact of the development on the highway network;
- Chapter 8 provides a summary and conclusions to the report.

## 2 Existing Site Information

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### 2.1 Site Location and Existing Land Use

The Lincolnshire Lakes AAP site is located to the west of Scunthorpe. The area is bounded by the M180 to the south, the River Trent to the north and west and residential areas of Scunthorpe to the east.

The Maltgrade site is located to the centre and south of the AAP site, as shown on Figure 1. The majority of residential development within the site is located to the north of the B1450 Burringham Road to both the east and west of the existing M181. The lakeside development plot is located to the west of the M181 between the M180 and B1450 Burringham Road.

The site is currently predominantly agricultural land. The town of Scunthorpe is located to the east of the site with further agricultural land, farms and small villages located to the north, south and west.

### 2.2 Strategic Transport Links

The strategic transport links are presented in Figure 2.

The M180 runs along the south of the site in an east-west direction, between the M18 for access to Doncaster and the Midlands to the west and the A180 for access to Grimsby and the east coast to the east. The M180 is a dual carriageway road with grade separated junctions providing access to the north and south.

The M181 runs in a north-south direction from junction 3 of the M180 and effectively dissects the site into two. The M181 is a two lane dual carriageway motorway and runs between the M180 to the south and the A1077 to the north. The A1077 heads in a northerly direction towards Barton-upon-Humber and subsequently the Humber Bridge.

The A18 runs in an east-west direction between Doncaster, Scunthorpe and Grimsby, connecting with the M181 and A1077 roundabout to the north of the site.

### 2.3 Local Highway Network

The site location and local highway network are shown on Figure 3.

#### 2.3.1 Key Links

##### 2.3.1.1 B1450 Burringham Road

The B1450 Burringham Road runs in an east-west direction through the Lincolnshire Lakes site, providing access to Burringham village and local agricultural land from Scunthorpe.

The B1450 Burringham Road dissects the Maltgrade development site; the proposed east and west villages lie to the north of the B1450 Burringham Road, and the lakeside dwellings and leisure facility lie to the south of the road.

Westwards, the B1450 Burringham Road is a reasonably straight, single carriageway road which travels out of Scunthorpe, bridging over the M181 and onto the village of Burringham. Eastwards the B1450 Burringham Road travels through predominantly residential areas of Scunthorpe towards Ashby where it turns into Ashby High Street and continues eastwards until it reaches Grange Lane South. Within the urban area to the east of the site, the road has a footpath on the northern side, street lighting and is subject to a 40mph speed limit. In the rural area the road does not have footpaths nor street lighting and the speed limit increases to the national speed limit.

### 2.3.1.2 Scotter Road

Scotter Road runs in a north-south direction to the east of the site connecting B1450 Burringham Road with the A18 Doncaster Road roundabout (Berkeley Circle) in the north. Scotter Road is a single carriageway road providing links to various residential areas along the western edge of Scunthorpe. It also provides access to the Asda superstore close to the junction with Burringham Road. Scotter Road generally has a shared cycleway/footway along the eastern side of the road and street lighting. The speed limit is 40 mph.

### 2.3.1.3 Brumby Common Lane / West Common Lane

Brumby Common Lane runs in an east-west direction along the northern boundary of the Maltgrade site connecting the village of Burringham with Scunthorpe. It is a lightly trafficked single carriageway surfaced road of approximately 5-6m width in the vicinity of the site. The road is unlit and is subject to the national speed limit of 60mph. Brumby Common Lane is currently used to provide access to a number of agricultural fields along its length.

To the east of its junction with Scotter Road, the road becomes West Common Lane. West Common Lane is a wide single carriageway road providing access to residential areas. Footways and street lighting are provided on both sides of the road and a 30mph speed limit applies. A segregated cycle path is provided along sections of the north side of West Common Lane and an on-street cycle lane is provided on the south side.

### 2.3.1.4 Brumby Wood Lane

Brumby Wood Lane provides an east-west link between Scotter Road and A18 Kingsway. It is a single carriageway road with street lighting and a footway on its southern side and is subject to a 40mph speed limit. A 7.5t restriction, except for loading, applies.

## 2.3.2 Key Junctions

### 2.3.3 B1450 Burringham Road / Scotter Road Roundabout

The B1450 Burringham Road / Scotter Road junction is a 4-arm roundabout. All four approach roads have a single lane approach flaring into two lanes at the roundabout.

Uncontrolled pedestrian crossing facilities are provided across Burringham Road (east) and Scotter Road (north) arms only.

Asda's site entrance/egress on Scotter Road comprises of a left-in, left-out junction to the immediate north of the roundabout. The absence of a right-in movement necessitates traffic travelling to Asda from the north to u-turn at the roundabout and then make a left turn into the site.

Asda also has a left-out egress on Burringham Road, causing traffic travelling to the west to u-turn at the roundabout.

### **2.3.4 Scotter Road / West Common Lane / Brumby Common Lane Junction**

The junction of Brumby Common Lane, Scotter Road and West Common Lane is a priority crossroads, with priority given to traffic travelling north-south along Scotter Road. A right-turn lane is provided on Scotter Road for traffic turning into West Common Lane. West Common Lane has a single lane approach flaring to two lanes to provide separate right and left-turn lanes at the junction.

Dropped kerb pedestrian crossing facilities are provided across West Common Lane and the northern Scotter Road approach arm.

### **2.3.5 Scotter Road / Brumby Wood Lane Junction**

The junction of Brumby Wood Lane and Scotter Road is a priority controlled T-junction, with priority given to traffic travelling north-south along Scotter Road. A right-turn lane is provided on Scotter Road for traffic turning into Brumby Wood Lane and a short flare is provided on Brumby Wood Lane for traffic turning right and left.

Dropped kerb pedestrian crossing facilities are provided across Brumby Wood Lane.

### **2.3.6 Berkeley Circle Roundabout**

Berkeley Circle is a 5-arm roundabout junction of Scotter Road, A18 Doncaster Road, Doncaster Road and A18 Kingsway. It provides access to the M181 (to the west) and to central and eastern Scunthorpe. An improvement scheme has been drawn up as part of the consented Gallaghers residential development located north of the A18. This involves the rationalisation of the junction into a four arm roundabout and the installation of traffic signals between Doncaster Road and A18 Kingsway.

## **2.4 Base Traffic**

Traffic count data was obtained from figures set out in the Lucent Development TA, based on traffic count surveys undertaken on:

- Thursday 15 March 2012;
- Thursday 21 March 2013;
- Thursday 19 April 2013.

Surveyed traffic flows were factored to 2014 Base using either National Traffic Model (NTM) modified by Temprow or Temprow local factors for the Scunthorpe area as identified within the Lucent TA and shown in Table 1

Table 1: TEMPRO local growth factors

Year	AM	PM	Notes
2012-2013	1.004	1.005	NTM modified by Temprow local and national factors
2013-2014	1.006	1.006	NTM only*

\* NTM only used as NTM modified by Temprow local and national resulted in a negative growth for the year 2013-2014.

Peak hour turning count surveys were undertaken at the Burringham Road / Scotter Road (Asda) roundabout and Asda site access on Thursday 15 October 2015. These have been added to the 2014 Base Year traffic flow network and the data provided at Appendix D.

The M180 link flows have been taken from the TRADS database using available monthly flows for March 2014. The selection criteria and full output can also be found in Appendix D.

Detail of the base traffic flows for the AM and PM peak hours are provided on Figures 8 and 9.

## 2.5 Base Year Capacity Assessment

2014 Base year traffic models of the key junctions in the vicinity of the site have been developed. This enables an assessment of the capacity and performance of the surrounding highway network under the current conditions, which forms the basis for the proposed development impact assessment in the later stages of the report. The base year capacity assessment has included the following junctions:

- B1450 Burringham Road / Scotter Road (Asda) roundabout;
- Scotter Road / West Common Lane / Brumby Common Lane priority junction;
- Scotter Road / Brumby Wood Lane priority junction;
- Berkeley Circle roundabout;
- Burringham Road / A159 Messingham Road signal controlled junction;
- Burringham Road / Ashby Road signal controlled junction.

The assessment of each of the above junctions is provided below. The full modelling outputs for the 2014 base year are presented at Appendix E.

Where a junction is a roundabout or priority controlled, it has been assessed in 'Junctions' modelling software, which calculates the Ratio to Flow Capacity (RFC) and average queues experienced by all vehicles on each arm of a junction. The RFC is a key indicator of the likely performance of a turning movement at a junction under a given set of traffic flows. It is generally accepted that a junction approach with an RFC value of less than 0.85 is operating within its practical

capacity. A modelled RFC of greater than 1.0 indicates that an approach is operating in excess of theoretical capacity.

Where a junction is signalised, (including signalised roundabouts) 'LinSig' software has been used. LinSig is used to indicate the performance of a signalised junction under a given set of traffic flows. The software calculates the 'degree of saturation', expressed as a percentage, for each approach to a junction.

Approaches where the degree of saturation is forecast to exceed 90% are considered over-capacity. Alongside this the 'mean maximum queue' (MMQ), is calculated, to represent the average position of the furthest vehicle from the stop line in each cycle.

### 2.5.1 B1450 Burringham Road / Scotter Road Roundabout

The operation of the B1450 Burringham Road / Scotter Road roundabout in the 2014 base year has been assessed using a Junctions<sup>1</sup> model. The full modelling outputs for the 2014 base year are presented at Appendix E, and summarised in Table 2.

Table 2: Summary of 2014 Base Year Capacity Assessment - Burringham Road / Scotter Road roundabout

Period	Approach	Max RFC	Max Q (pcu)
AM Peak	Burringham Road E	0.45	1
	Scotter Road S	0.43	1
	Burringham Road W	0.33	1
	Scotter Road N	0.57	1
PM Peak	Burringham Road E	0.49	1
	Scotter Road S	0.46	1
	Burringham Road W	0.36	1
	Scotter Road N	0.57	1

The modelled RFCs for this junction are below the normal threshold value of 0.85 during both AM and PM peak periods on all approaches, indicating that the junction currently operates within practical capacity. Average queue lengths of less than 2pcus are modelled on all approaches across the junction.

### 2.5.2 Burringham Road / A159 Messingham Road

The operation of the B1450 Burringham Road / A159 Messingham Road junction in the 2014 base year has been assessed using a Linsig model. The full modelling outputs for the 2014 base year are presented at Appendix E, and summarised in Table 1.

<sup>1</sup> Formerly Arcady1

Table 1: Summary of 2014 Base Year Capacity Assessment - Burringham Road / A159 Messingham Road Junction

Period	Approach	Deg Sat	Mean Max Queue (pcu)
AM Peak	Messingham Road S	75%	7
	Burringham Road W	72%	4
	Priory Road N	20%	1
	Burringham Road E	30%	2
PM Peak	Messingham Road S	109%	37
	Burringham Road W	48%	3
	Priory Road N	29%	1
	Burringham Road E	39%	3

The modelled degree of saturation is generally under 85% apart from the Messingham Road south arm in the PM peak period which is over theoretical capacity and experiences a high number of queuing vehicles.

### 2.5.3 Burringham Road / Ashby Road

The operation of the B1450 Burringham Road / Ashby Road junction in the 2014 base year has been assessed using a Linsig model. The full modelling outputs for the 2014 base year are presented at Appendix E, and summarised in Table 2.

Table 2: Summary of 2014 Base Year Capacity Assessment Ashby Road/Burringham Road

Period	Approach	Deg Sat	Mean Max Queue (pcu)
AM Peak	Ashby High Street	97%	25
	The Link	11%	0
	Burringham Road W	86%	15
	Ashby Road N	97%	17
PM Peak	Ashby High Street	104%	43
	The Link	26%	1
	Burringham Road W	106%	37
	Ashby Road N	106%	53

The results show that the junction is currently operating over capacity on a number of links in both the AM and PM peak hours assessed and experiences significant queues.

### 2.5.4 Scotter Road / West Common Lane / Brumby Common Lane Junction

The Junctions program has been used to assess the current operation of the Scotter Road / West Common Lane / Brumby Common Lane junction. The results of the base year assessment are summarised in Table 5 and presented in full at Appendix E.

Table 3: Summary of 2014 Base Year Capacity Assessment – Scotter Road / West Common Lane / Brumby Common Lane

Period	Approach	Max RFC	Max Q (pcu)
<b>AM Peak</b>	West Common Lane (T LT)	0.23	0
	West Common Lane (T RT)	0.28	0
	Scotter Road N (RT)	0.00	0
	Brumby Common Lane	0.11	0
	Scotter Road S (RT)	0.42	1
<b>PM Peak</b>	West Common Lane (T LT)	0.59	1
	West Common Lane (T RT)	0.56	1
	Scotter Road N (RT)	0.03	0
	Brumby Common Lane	0.04	0
	Scotter Road S (RT)	0.52	1

The modelled RFCs for this junction are below the normal threshold value of 0.85 during both AM and PM peak periods on all approaches with minimal queuing, indicating that the junction currently operates within practical capacity.

### 2.5.5 Scotter Road / Brumby Wood Lane Junction

The Junctions program has been used to assess the current operation of the Scotter Road / Brumby Wood Lane junction. The results of the base year assessment are summarised in Table 6 and presented in full at Appendix E.

Table 4: Summary of 2014 Base Year Capacity Assessment – Scotter Road / Brumby Wood Lane

Period	Approach	Max RFC	Max Q (pcu)
<b>AM Peak</b>	Brumby Wood Lane to Scotter Road S (LT)	0.2	0
	Brumby Wood Lane to Scotter Road N (RT)	0.11	0
	Scotter Road S to Brumby Wood Lane (RT)	0.54	1
<b>PM Peak</b>	Brumby Wood Lane to Scotter Road S (LT)	0.77	3
	Brumby Wood Lane to Scotter Road N (RT)	0.35	1
	Scotter Road S to Brumby Wood Lane (RT)	0.26	0

The modelled RFCs for this junction are below the normal threshold value of 0.85 during both AM and PM peak periods on all approaches with minimal queuing, indicating that the junction currently operates within practical capacity.

## 2.5.6 Berkeley Circle Roundabout

The Junctions program has been used to assess the current operation of the Berkeley Circle roundabout. The results of the base year assessment are summarised in Table 7 and presented in full at Appendix E.

Table 5: Summary of 2014 Base Year Capacity Assessment – Berkeley Circle Roundabout

Period	Approach	Max RFC	Max Q (pcu)
AM Peak	Doncaster Road E	0.24	0
	Kingsway	0.45	1
	Scotter Road S	0.74	3
	Doncaster Road W	0.59	1
	Scotter Road N	0.68	2
PM Peak	Doncaster Road E	0.23	0
	Kingsway	0.55	1
	Scotter Road S	0.66	2
	Doncaster Road W	0.63	2
	Scotter Road N	0.73	3

The modelled RFCs for this junction are below the normal threshold value of 0.85 during both AM and PM peak periods on all approaches, indicating that the junction currently operates within practical capacity. Average queue lengths of less than 3pcus are modelled on all approaches across the junction.

## 2.6 Accident Data

Accident data in the vicinity of the site, over a five year period between 01/01/2009 and 31/12/2013 has been obtained from Humberside Police. The full data set is presented at Appendix F, and are summarised in the following sections.

### 2.6.1 M180 / M181 Junction

Fourteen accidents occurred at the M180 / M181 junction, all of which resulted in slight injuries. All of the accidents involved cars, vans or HGVs.

Four of the accidents occurred in bad weather conditions which caused the road to be slippery, one of the accidents was due to an animal or object being in the carriageway and another was due to a deposit on the road. One accident was caused by an inexperienced driver and another was due to temporary road layout which the driver was unaware of. The remaining six accidents were as a result of a poor turn or manoeuvre, the driver losing control or the driver failing to look properly.

### 2.6.2 M181

There were two accidents along this stretch of motorway between Frodingham Grange roundabout and the M180 / M181 junction.

One of the accidents was caused by a driver trying to overtake and failing to notice the lane was closed for road works resulting in a collision with an HGV. The car driver sustained serious injuries. The other accident was caused when a car driver failed to notice the vehicles in front had stopped and collided into the rear of the car in front. The accident resulted in one casualty with serious injuries and six casualties with slight injuries.

### **2.6.3 M181/A1077/A18 Froddingham Grange Roundabout**

Fourteen accidents occurred on this roundabout over the five years analysed.

Two accidents involved cyclists. One accident resulted in serious injuries to a cyclist, the cyclist was hit by a van who failed to look properly and then drove off. A similar accident occurred whereby a car failed to look properly and collided with a cyclist, the car failed to stop and the cyclist suffered slight injuries.

The other twelve accidents involved cars, vans or HGVs and all resulted in slight injuries. The most common factors behind the accidents at this roundabout were recorded as sudden breaking, failing to look, failing to judge others path or speed or poor turn/manoeuvre. One of the accidents was a result of an inexperienced driver.

### **2.6.4 Doncaster Road**

There was a total of fifteen accidents along this stretch of road between Berkeley Circle and Froddingham Grange Roundabout during the five year analysis period. All of the fifteen accidents resulted in slight injuries.

One of the accidents involved a pedestrian, a car hit a pedestrian who ran out into the carriageway without looking, the pedestrian suffered slight injuries. Seven of the accidents were caused by the driver failing to look properly. Other common factors included following too closely, sudden breaking or a distraction in the vehicle.

### **2.6.5 Berkeley Circle**

There was a total of 17 accidents recorded at this roundabout during the five year period. One of the accidents resulted in serious injuries, this accident occurred when a car driver failed to see the car in front had stopped and therefore collided into the back.

One accident involved a cyclist who collided into the rear of the vehicle in front. The accident was recorded as being caused by the cyclist failing to look properly and failing to judge other persons path or speed. The cyclist sustained slight injuries. The remaining accidents recorded at the junction were due to a variety of reasons including carelessness, failure to look properly, following too close, failure to judge other persons path or speed, an inexperienced driver and sudden breaking. All accidents were due to human error.

### 2.6.6 Scotter Road

A total of 40 accidents occurred along Scotter Road between B1450 Burringham Road and Berkeley Circle. Of these 40 accidents, four resulted in a casualty sustaining serious injuries with the remaining resulting in slight injuries.

One accident was caused by a cyclist who disobeyed the traffic signals and entered the road into the path of a motorcyclist, a collision occurred. The motorcyclists sustained serious injuries and the pedal cyclist sustained serious injuries. One accident involved a pedestrian; a car turned right and failed to see the pedestrian crossing the road. The pedestrian sustained serious injuries. Another accident involved a pedestrian masked by stationary vehicles who stepped out into the carriageway into the path of an oncoming vehicle. The pedestrian suffered serious injuries.

One accident involving a motorcyclist and a car and resulted in serious injuries to the motorcyclist.

Three other accidents involved pedestrians, resulting in slight injuries; two of which were a result of the pedestrian stepping out into the road without looking and the third involved dangerous action by an HGV.

All of the other accidents involved cars, vans or HGVs and resulted in slight injuries. They were caused by a variety of reasons, the most common included failing to look, following too close, failing to judge other persons path or speed and poor turn/manoeuvre.

### 2.6.7 B1450 Burringham Road / Scotter Road Roundabout

There were nine accidents recorded at this roundabout during the five year period analysed, one of which resulted in serious injuries the remaining eight resulted in slight injuries.

The accident resulting in serious injuries was caused by aggressive driving whereby the driver was exceeding the speed limit and turned the wrong way at a roundabout colliding with an oncoming car, the offending vehicle drove off.

One accident involved a pedestrian, the pedestrian stepped out from between stationary vehicles into the path of a moving vehicle, the pedestrian sustained slight injuries.

One of the recorded accidents involved a cyclist. A car driver misjudged the space required to exit the roundabout and collided into a cyclist causing them slight injuries.

The accidents recorded at this roundabout were caused by a variety of factors including following too close, failure to look, carelessness, a distraction in the vehicle or an inexperienced driver.

### 2.6.8 B1450 Burringham Road

Eleven accidents occurred on B1450 Burringham Road, not including those which occurred at the roundabout. Two of the eleven accidents resulted in serious injuries, the rest resulted in slight injuries.

Three accidents were caused by the driver being impaired by alcohol, one of these accidents the vehicle was also a stolen vehicle, and the accident resulted in serious injuries. Four accidents were caused by the road being slippery due to weather conditions and drivers driving too fast for these conditions, one of these accidents resulted in serious injury. The other accidents were caused by failing to look, failing to judge other drivers path or speed or following too closely.

## 2.6.9 Summary

In the assessment study area there have been 122 accidents 11 of which resulted in serious injuries. The majority of the accidents were of slight severity with the data suggesting that none of road layout, inadequate or masked signs or poor or defective road surface were contributory factors in the accidents.

## 2.7 Public Transport Provision

The public transport networks servicing the site are presented in Figure 4.

### 2.7.1 Bus

As the site is currently rural open space there is limited existing bus infrastructure and services.

Currently the site is served by a single bus route, with the closest bus stops located along B1450 Burringham Road adjacent to the Asda store / Ashfield caravan site, approximately 600m from the eastern edge of the site. Service route no. 12 operates from Scunthorpe through to East Butterwick via Burringham. Services operate every 30 minutes throughout the day Monday to Saturday, between Scunthorpe and Ashfield. However, services extending beyond Ashfield operate only four times a day to Burringham and on Tuesdays and Fridays only to East Butterwick.

Additional services are served by bus stops on Bristol Road and Scotter Road, located over 1km east of the site. These are:

- Service 10 – Hourly service between Scunthorpe Bus Station and Ashby Market
- Service 31/32 – 3 services per hour, excluding evenings, between Scunthorpe Bus Station, Ashby and Frodingham
- Service 31a/32a – 3 services per hour in the evenings between Scunthorpe Bus Station, Ashby and Brumby
- Service 33/34 – Hourly service between Scunthorpe Bus Station, Bottesford and Ashby

Best practice for bus services to new developments should include a bus stop within 400m of the dwelling and a service frequency of at least one service every half hour. Walking distances from the site to existing bus provision are dependent on the location within the proposed development itself. Figure 5 is attached to illustrate existing walking distances from within the site. It is clear that existing bus provision is not adequate for the proposed development. Bus stops are generally located outside of acceptable walking distances with services being relatively infrequent.

## 2.7.2 Rail

The closest station to the proposed development is Scunthorpe railway station, located approximately 4km north east of the proposed development. The station is serviced by three rail services per hour. Hourly services run from Manchester Airport to Cleethorpes, Cleethorpes to Manchester Airport and Lincoln/Sheffield (alternate each hour).

Best practice states that developments should ideally be located within 800m of the nearest rail station in order to benefit from this mode public transport. It is therefore considered that Scunthorpe railway station is inaccessible via foot from the proposed development.

There is a potential for future users of the site to access Scunthorpe railway station via car or cycle. Car parking is available at the station. The car park is operated by NCP on behalf of First TransPennine Express, and is open 24 hours a day. There are 45 car parking spaces with three accessible spaces. In addition to this, cycle stands are available on platform 1 with storage available for 15 cycles. CCTV is in operation to ensure that the spaces are secure.

## 2.8 Cycling Infrastructure

The existing cycle infrastructure is shown on Figure 6. Cycling infrastructure within the immediate vicinity of the site is limited. The nearest cycle route is located to the east of the site and runs in a north-south direction along Scotter Road. This route, known as the Trent Valley route, comprises a mixture of traffic-free and on-road cycling infrastructure.

From Scotter Road a cycle route is provided westwards along West Common Lane. This route comprises an off road route to the northern edge of the carriageway and on-road cycle lane in the westbound direction.

National Cycle Route 169 runs from north Scunthorpe to south Scunthorpe through the Trent Valley. This route, known locally as the Scunthorpe Ridgeway, allows cyclists to travel from the north of Scunthorpe to the south, and passes through green, open spaces. At its closest point to the site, National Route 169 is approximately 1km away and can be accessed off Burringham Road. This route is traffic-free.

The nearest long distance cycle route is National Route 1 running from Hull to Fakenham. This intersects the M180 near to Barnetby-le-Wold and is not linked to Scunthorpe through cycle paths. This route is mostly on-road.

## 2.9 Pedestrian Infrastructure

Given the rural nature of the site, the existing pedestrian infrastructure is limited. Pedestrian infrastructure within the vicinity of the site comprises footways on the northern side of Burringham Road, extending between Carisbrooke Manor Lane and Scotter Road and towards the far eastern point of the site. On the immediate boundary of the site, due to its rural nature there are no footways on B1450 Burringham Road or Brumby Common Lane. Street lighting is provided along the carriageway where footways are provided. Pedestrians are not permitted on the M181.

A network of rough tracks / paths cross the open agricultural land providing connections between local villages and Scunthorpe.

## 3 Planning Policy Framework

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### 3.1 Introduction

The proposed development has been designed with full regard to national and local transport planning policies. A summary of the key relevant policies and a discussion of how the proposed development fits with these policies is presented below.

### 3.2 National Planning Policy Context

The National Planning Policy Framework (NPPF) was produced by Communities and Local Government (CLG) in March 2012. NPPF sets out the Government's planning policies for England and how these are expected to be applied.

Chapter 4 of NPPF discusses how developments should promote sustainable transport. It states that *'all developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment.'*

Up to 2,500 dwellings are proposed to be built as part of the proposed development. Accordingly, the development is likely to generate a significant volume of traffic and therefore a Transport Assessment has been produced.

NPPF also states that plans and decisions should take account of whether:

- The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
- Safe and suitable access to the site can be achieved for all people; and
- Improvements can be undertaken within the transport network that effectively limits the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised.

The Lincolnshire Lakes AAP provides a Sustainable Transport Strategy and the Maltgrade development will be progressed in line with the strategy. This Transport Assessment will demonstrate the extent to which the development can be accessed by sustainable modes. A separate Travel Plan framework has been prepared to encourage access by sustainable modes.

### 3.3 Local Planning Policy Context

#### 3.3.1 North Lincolnshire Local Development Framework

The Local Development Framework (LDF) is a folder of documents that sets out the future planning policy for North Lincolnshire. The LDF is gradually replacing

the North Lincolnshire Local Plan (2003). The following documents form the LDF.

### 3.3.1.1 North Lincolnshire Core Strategy

The Core Strategy, adopted in June 2011, sets out a long term vision for North Lincolnshire and provides a blueprint for managing growth and development in the area up to 2026.

The Core Strategy sets out 10 spatial objectives for North Lincolnshire. These are as follows:

- An Area Wide Renaissance;
- Delivering the Global Gateway;
- Delivering Better Homes;
- Creating Greater Economic Success;
- Creating Thriving Towns and Villages;
- Protecting and Enhancing The World Class Environment;
- Efficient Use and Management of Resources;
- Promoting Community Health and Well Being;
- Connecting North Lincolnshire; and
- Creating a Quality Environment.

The Core Strategy identifies the Lincolnshire Lakes project “as a key component in the transformation of Scunthorpe”. In order to provide the required 15,700 homes between 2004 and 2026, schemes such as Lincolnshire Lakes are crucial.

*“Lincolnshire Lakes has the potential to make a significant contribution to effecting a positive change for Scunthorpe in the direction of a sustainable, modern and vibrant economy. Bringing with it significant financial, social and environmental benefits for North Lincolnshire, its community and the wider region. It will do this through the creation of a high quality, sustainable urban extension for Scunthorpe incorporating new homes, business parks and leisure facilities in an attractive waterside setting, which will put Scunthorpe on the map as a location of choice in the 21st century, changing its image and placing it on a new economic trajectory. This flagship project forms a fundamental part of the transformation of the town. Its delivery reflects the priorities of North Lincolnshire Council, the Scunthorpe Town Team and the North Lincolnshire Strategic Partnership. The project has captured the hearts and minds of the local community, business and media alike. Together with the other major renaissance projects in the town it will enhance Scunthorpe’s role as major sub-regional town in the wider Yorkshire & Humber region creating an area that is thriving and a location of choice to live, work and invest”*

### 3.3.1.2 Housing and Employment Land Allocations DPD

The Housing and Employment Land Allocations Development Plan Document (DPD) sets out which sites the council intend to allocate for future housing development. The revised draft version of the DPD was published April 2014 and

states “*it is essential that North Lincolnshire can provide enough homes and employment land to ensure people have access to houses that meet their needs and to enable the local economy to grow.*” Within Scunthorpe, Lincolnshire Lakes has been identified as one of the proposed sites for housing.

### 3.3.1.3 Lincolnshire Lakes Area Action Plan

The Lincolnshire Lakes Area Action Plan (AAP) will set out the planning policy framework to deliver the Lincolnshire Lakes development in a consistent and planned way.

The project will create a number of high quality, sustainable village communities, providing approximately 6,000 dwellings on land between the western edge of Scunthorpe and the River Trent, set within an attractive waterside environment with major opportunities for leisure, sport and recreation. The vision for Lincolnshire Lakes is to create an environment that will attract and retain skilled residents and investment in the sub-region and place North Lincolnshire on a new economic trajectory. The vision will create a gateway entrance to the area and a focus for sustainable development.

A submission draft version of the AAP has been published to allow local people and other bodies to have their say on its contents before it is submitted to the Government for an independent examination.

The AAP proposals are supported by a Sustainable Transport Strategy, with key aspects of the strategy identified on the AAP Movement Parameters Plan and summarised below:

- De-trunking of the M181 to provide opportunities for road links and crossing points in order to reduce severance. Two new roundabout junctions will be provided to provide access to the AAP villages;
- The B1450 Burringham Road will be upgraded to create a strategic route from the de-trunked route with options to retain the existing Burringham Road bridge for enhanced walking / cycling linkages;
- A primary route through the site is identified to connect with the strategic routes as well as Scotter Road. The primary route will be a focus for bus service provision and for non-motorised users. A secondary network of local roads will link the primary route to the main residential areas, local centres and lakes. They will provide permeability and encourage use by non-motorised users;
- Delivering access to and from the Lincolnshire Lakes via sustainable transport modes will be critical to ensuring a sustainable development is delivered. Bus routes along the primary route will ensure the vast majority of dwellings are within 400m of bus stops;
- A network of pedestrian, cycle and bridleways shall be provided throughout and between the villages that are safe, attractive and useable;
- The AAP Sustainable Transport Strategy recommends that a Framework Travel Plan is developed for the whole of the Lincolnshire Lakes, and that this should guide the preparation of site specific Travel Plans by individual developers.

The development proposals for the Maltgrade site will be developed to be consistent with the emerging AAP proposals.

### 3.3.1.4 North Lincolnshire Local Transport Plan 3

North Lincolnshire's Local Transport Plan 3 (LTP3) sets out how NLC will deliver strategic transport improvements over the 15 year period 2011 to 2026. It consists of both an overall Transport Strategy and a separate Implementation Plan.

The Transport Strategy outlines the strategic approach to transport in North Lincolnshire over the next 15 years, whilst the Implementation Plan provides specific details on how the Transport Strategy is to be delivered for a three year period.

The local transport goals for North Lincolnshire are set out within the LTP, as follows:

- Facilitate economic growth by targeting transport improvements in key development areas and along key strategic network corridors;
- Reduce transport related carbon dioxide emissions and protect and enhance the natural and built environment through sustainable transport solutions;
- Improve transport safety and security relating to death or injury from transport, in order to contribute towards safer and stronger communities;
- Provide equal opportunities through improvements in accessibility to key local hubs and services by sustainable modes of transport;
- Enhance people's health and wellbeing through the promotion of healthy modes of travel and provision of a high quality integrated transport system that contributes towards long term sustainable regeneration.

## 4 Development Proposals

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### 4.1 Proposed Development

Maltgrade's development broadly comprises Plot 6 and half of Plot 2 of the Lincolnshire Lakes development; 2,400 dwellings in the east and west villages either side of the M181, as well as 100 dwellings and leisure development around the lake to the south of the Masterplan. The indicative Masterplan is provided at Appendix C.

Full details of the development proposals are provided within the Design and Access Statement. The development proposals broadly comprise development of 2,500 new homes across the eastern and western villages, two primary schools, two village centres, community facilities, new roads and footpaths, informal areas of open space, play areas and sports facilities and new wildlife habitat and lakes and landscape.

The overall scheme will be developed in a series of phases over a period of time, indicatively up to 25 years. Due to time-scale the design and phases of individual villages / communities will be guided in part by market conditions, evidence and planning at the time of the individual reserved matters application.

For the purposes of this assessment, phasing of the development comprises:

- Phase 1 – complete by 2019, 600 dwellings on the land immediately north east of the new M181/B1450 Burringham Road roundabout (eastern village) and the lakeside development (100 dwellings and some leisure uses) to the south west;
- Phase 2 – complete by 2028, 1,800 dwellings on land to the north west of the new M181/B1450 Burringham Road roundabout (western village).

This is consistent with the timescales set out within the Lincolnshire Lakes AAP.

#### 4.1.1 Design Strategy

Details of the internal design of the development site will be brought forward as part of Reserved Matters applications. A number of design principles in relation to transport are set out as follows:

- Creating new transport junctions - The creation of a new junction on the M181, to be de-trunked, with two additional smaller junctions from B1450 Burringham Road for access to the south, east and west sites. This will help alleviate traffic on the other key routes into Scunthorpe.
- Access, circulation and car parking - Creating a unified access and movement network between the south, east and west sites and surrounding area with scope to create links to other proposed developments.
- Creating a flexible development - Mixing and distributing residential, commercial and leisure facilities across the east and west villages to enable greater connectivity and permeability of the development.

- Streetscapes for living - Integrating a street hierarchy through the site, formed by differing road, carriageways and spaces between the buildings, promoting shared street scenes.
- Safety and Security - Roads will be designed to minimise speeding traffic and encourage cycle and pedestrian activity.
- Permeability - Footpaths, streets and open space will be designed to facilitate ease of movement through the developments, between the connections to the adjacent developments and to the wider network beyond the developments. Desire lines will be anticipated and routes designed to allow fluid travel in the direction, and to the areas that people are perceived to want to move to.
- Parking - In order to create pedestrian friendly streets and lanes rather than vehicular dominated roads, a mix of parking provision will be provided within the residential areas including on street and primarily, on plot. Adequate private parking will be provided to reduce the likelihood of uncontrolled on street parking along the movement network.

## 4.2 Site Access Proposals

In accordance with the Lincolnshire Lakes AAP, the development includes highway works comprising de-trunking and downgrading of the M181 and provision of a new roundabout junction between the de-trunked M181 and B1450 Burringham Road. The existing B1450 Burringham Road over the M181 will be retained to provide an east west connection as well as pedestrian and cycle route. A new link will be provided to enable provision of the new roundabout to the north of existing Burringham Road bridge. Two new roundabouts from Burringham Road will provide access in to the development to the east and west, connecting with both the existing Burringham Road route over M181 and the new M181 / B1450 Burringham Road roundabout. The Highways Scheme layout is provided on drawing CH-010. Drawings CH015-CH017 show indicative highway layouts. These highway works will be undertaken during Phase 1 of the site development.

Drawing reference CH-016 provides indicative layout proposals for the proposed new roundabout junction of M181 with B1450 Burringham Road. Design and development of this new roundabout is being brought forward by Highways England. This layout reflects the latest proposals. Indicative layouts of the new site access roundabouts with B1450 Burringham Road are provided at Drawings references CH-015 and CH-017.

Within the development, a network of access roads will provide the primary routes and secondary local roads in accordance with the AAP. Details of the internal layout of the site are not provided within this outline application and will be subject to future reserved matters applications. Linkages to the wider AAP area will be included as part of more detailed site layout design.

The primary and secondary routes through the site will be designed in accordance with AAP policies, particularly in relation to providing access to the village centres, enabling bus circulation and providing safe crossings for cyclists and pedestrians. High quality bus stops will be provided throughout the site within 400m walking distance of dwellings.

The network of local roads will connect residential areas, local village centres and the lakes with the primary routes to encourage permeability through the site. The local roads will encourage walking and cycling access through the site and be designed in accordance with Manual for Streets.

The development proposals include improvements on the existing B1450 Burringham Road to provide walking and cycling facilities from the site accesses, on the bridge over the existing M181 route and connecting to existing facilities to the east. This will provide improved walking and cycling connections between Scunthorpe, Lincolnshire Lakes and local villages

### 4.3 Parking

Parking will be provided throughout the site, including at local centres, on-street and within plots. For the dwellings parking will be provided within the site; the total number of car parking spaces will be determined at the reserved matters stage through discussions with NLC and in line with the NLC parking standards.

## 5 Trip Generation, Mode Share and Future Year Flows

### 5.1 Introduction

This section of the report outlines the trip generation and mode share associated with the proposed development.

Trips associated with residential dwellings and Lakeside leisure facilities only have been identified, as set out below. Given the scale and nature of development, trips associated with the village, school and community facilities have not been included within this assessment. While there will be some trips associated with these uses, it is anticipated that the vast majority of these will be local trips within the Lincolnshire Lakes development area. There may be some trips to/from the external transport network associated with these uses, however, it is also acknowledged that the provision of such facilities could also result in fewer trips to/from the external transport network from the residential uses. On this basis, it is considered that identification of all residential trips to/from the external transport network provides a robust assessment of impacts.

#### 5.1.1 Assessment Periods

The following peak hours have been assessed:

- AM Peak hour (08:00-09:00hrs);
- PM Peak hour (16:15-17:15hrs).

### 5.2 Residential Trips

#### 5.2.1 Residential Person Trip Rates

Trip generation rates for residential development have been taken from the TRICS 2013 database as set out in the Lucent TA and agreed with NLC. Full TRICS outputs showing the selection criteria is included in Appendix H, a summary is shown in table 8 below.

Table 6: Person trip rates per dwelling

	TRICS Rate / dwelling	
	Arrival	Departure
AM peak hour	0.22	0.844
PM peak hour	0.634	0.404

#### 5.2.2 Modal Split

Mode share for the residential development trips has been taken from the Lucent TA. This is considered appropriate as it is based on 2011 Travel to Work Census data for eight wards across Scunthorpe; Burringham and Gunness, Froddingham, Town, Crosby and Park, Bottesford, Kingsway with Lincoln Gardens, Ashby and Brumby. The data was updated to exclude the home work mode share, the updated results are shown in Table 9 below and included in Appendix G.

Table 7: Mode Share

Mode		Scunthorpe (8 wards)	Yorkshire & Humber	England
Private Modes	Car Driver	65.94%	64.36%	60.25%
	Car Pax	8.77%	6.71%	5.29%
	Mcycle	1.33%	0.73%	0.85%
	Taxi	0.44%	0.73%	0.53%
Sustainable Modes	Walk	13.04%	12.37%	11.31%
	Cycle	5.97%	2.73%	3.17%
	Bus	3.56%	8.91%	7.93%
	Rail	0.35%	2.52%	5.60%
	Home Work	-	-	-
	Other	0.59%	0.94%	5.07%
Total		100%	100%	100%

### 5.3 Leisure Trips

In response to Highways England and NLC comments, further information regarding the proposed Leisure development and associated vehicle trip assumptions is provided.

The leisure development comprises activities based around a large leisure lake, including sailing, windsurfing, canoeing, walking and, cycling. In the future there is to be provision for events like triathlons and sailing regattas. The leisure building proposes a number of land uses including A1 (max 120m<sup>2</sup>), A3 (max 120m<sup>2</sup>), D1 (max 75m<sup>2</sup>), D3 (max 300m<sup>2</sup>) and B8 (max 825m<sup>2</sup>). In addition, 250 car parking spaces are proposed.

The TRICS database was interrogated for appropriate sites under the Leisure category. There is limited data available with only two surveys from sailing clubs. The sites were however considered reasonably appropriate with similar facilities and parking provision to the Maltgrade proposals.

Vehicle trip rates, based on parking spaces, were provided for weekdays from 0900-2000hrs. No data was available for the AM peak hour as these sites are generally not operational at this time. The PM peak (1600-1700hrs) is the busiest period on a weekday. 10 shows the trip rates and predicted trips based on the TRICS data. Full TRICS outputs showing the selection criteria are in Appendix H.

Table 10: Leisure / Watersports Centres

TRICS Vehicle trip rate / parking space				
	Arrivals		Departures	
	Trip rate	Trips	Trip rate	Trips
AM peak hour	n/a	0	n/a	0
PM peak hour	0.050	13	0.157	39

## 5.4 Total Trip Generation by Mode

The trip generation broken down by mode has been calculated, by applying the mode share figures to the total person trip generation. Details of the predicted trips for Phase 1 and Phase 2 for the defined AM and PM peak periods are summarised in Table 811.

Table 8: Trips Generation by Mode for Phase 1 and Phase 2

Mode		Phase 1 2019		Phase 2 2028	
		AM Peak	PM Peak	AM Peak	PM Peak
Car Driver	Arrivals	102	306	363	1058
	Departures	390	225	1,391	705
Car Passenger	Arrivals	14	39	48	139
	Departures	52	25	185	89
Motorcycle	Arrivals	2	6	7	21
	Departures	8	4	28	13
Taxi	Arrivals	1	2	2	7
	Departures	3	1	9	4
Walk	Arrivals	20	58	72	207
	Departures	77	37	275	132
Cycle	Arrivals	9	26	33	95
	Departures	35	17	126	60
Bus	Arrivals	5	16	20	56
	Departures	21	10	75	36
Rail	Arrivals	1	2	2	6
	Departures	2	1	7	4
Total	Arrivals	153	454	547	1,589
	Departures	587	320	2097	1,043

## 5.5 Vehicle Trip Distribution and Assignment

The trip distribution and route assignment has been reviewed based on comments received from Highways England and NLC. HE request that 2011 Census data at Mid Layer Super Output (MSOA) level is used. NLC request that the adjustments for SHG are reviewed as not all drivers will travel along M180 east from M181 and some will choose to travel through Scunthorpe via B1450 to M180 Junction 4.

In order to address the traffic distribution comments from Highways England, the data set WU03EW from 2011 Census was used at the Mid-layer Super Output

Area (MSOA) level. The North Lincolnshire area is split into 23 MSOA areas. 13 MSOA areas were selected representing the Scunthorpe town area.

Data from these 13 MSOA areas was analysed to determine the employment destination of residents. The proportion of journey to work trips were identified for the 13 Scunthorpe MSOA areas with the other MSOA areas and wards outside North Lincolnshire grouped together into areas outside of Scunthorpe using routes to the east, west, north and south as shown at Table 12. For the 13 MSOA areas sampled, 74.14% of total trips are to/from the 13 Scunthorpe areas and 25.85% of the total trips are to / from areas outside of Scunthorpe.

Table 12: Employment destinations

MSOA reference / employment area		Journey to Work Distribution
North Lincolnshire 005	Burringham and Gunness	6.61%
North Lincolnshire 007	Crosby, North Frodingham	15.75%
North Lincolnshire 008	Town	12.72%
North Lincolnshire 009	Berkley / Town	5.44%
North Lincolnshire 010	Frodingham / Brumby	15.18%
North Lincolnshire 012	Kingsway	3.62%
North Lincolnshire 014	Lincoln Gardens	1.57%
North Lincolnshire 015	Ashby	2.52%
North Lincolnshire 016	Riddings / Westcliffe areas	2.10%
North Lincolnshire 017	Bottesford	2.72%
North Lincolnshire 018	Bottesford	1.29%
North Lincolnshire 019	Yaddlethorpe	2.57%
North Lincolnshire 020	South Yaddlethorpe and Bottesford areas	2.03%
MSOA / Ward out of Scunthorpe to East (M180 / A18 Quensway / Burringham Road East)		8.50%
MSOA / Ward out of Scunthorpe to West (M180 / A18 Doncaster Road / Burringham Road West)		14.24%
MSOA / Ward out of Scunthorpe to North (A1077)		2.41%
MSOA / Ward out of Scunthorpe to South (A159)		0.71%

A route assignment exercise has been undertaken to identify which routes drivers would use between the Lincolnshire Lakes site and the MSOA / ward areas above. The journey to work trips made by residents were assigned to routes using the 11 possible options shown in Table 13 below. Where a number of route options are available the trips are split equally between the options available. The route assignment is based on the options available as a result of the Lincolnshire Lakes Masterplan development, i.e. with the new M181 / Brumby Common Lane and M181 / B1450 Burringham Road roundabouts in place.

In addition, NLC asked for the assumption that all residents employed in the South Humber Gateway will travel on the M180 East to be reviewed. As part of the Lucent TA the effects of South Humber Gateway (SHG) on trips had been considered and the same assumptions applied to the Maltgrade development:

- Estimates 5,519 new jobs to be created in North Lincolnshire;
- 80% jobs to be filled by in-migrants;
- Projected 20,000 housing growth in North Lincolnshire over the 2008-2033 period, of which the Maltgrade application forms approximately 13% (2,500 households);
- Therefore it is estimated that 550 residents of the Maltgrade application could work at SHG.

Based on a UK average 0.64 employed persons per household, this equates to 34% of all employed residents of the Maltgrade application area working at SHG.

It is assumed that the majority of trips from the Maltgrade development to the SHG would use the M180 East, as the development is located for convenient access to the M181 / M180. However, a proportion of drivers may travel east along B1450 Burringham Road and A18 to join the M180 at Junction 4. As these routes get busier, these routes may however become less attractive. For the purposes of the assessment, 80% were assumed to travel on the M180 east and 20% on Burringham Road / A18 eastwards. On this basis the distribution as a result of the journey to work census data has been adjusted. The final trip distribution is shown in Table 13 with details provided in Appendix I.

Table 13: Trip Distribution

Route		Distribution
1	Burringham Road (East)	14%
2	Brumby Common Lane	4%
3	A18 Queensway	9%
4	Ashby Road	13%
5	Scotter Road	4%
6	A1077	8%
7	A18 Donaster Road	2%
8	Burringham Road (West)	2%
9	M180 (West)	9%
10	M180 (East)	33%
11	A159 Messingham Road	3%

The trip distribution and route assignments are shown in Figures 32 to 35. The total development flows are shown in Figures 36 to 39.

It is noted that within the Lincolnshire Lakes Masterplan site area, there will be some internal trips i.e. between residential areas, village centres and business park / commercial areas. For the purposes of a robust assessment all trips from the Maltgrade development are assumed to be to / from locations outside of the Lincolnshire Lakes development i.e. no reduction for internal trips is made.

It is also noted that there will be connections between different plots within the Masterplan site. For example some trips from Lucent plot 5 may pass through Maltgrade plot 6 and vice versa. For the purposes of this assessment no

distribution of trips between plots has been made with all Lucent trips using the new Brumby Common Lane accesses and all Maltgrade trips using the B1450 Burringham Road accesses.

## 5.6 Existing Traffic Flows Redistribution

It has been recognised that in the future year, with the Lincolnshire Lakes Masterplan development in place, the new roundabout junctions along the existing M181 will impact upon the distribution of traffic in and around Scunthorpe. Brumby Common Lane and B1450 Burringham Road will provide more direct routes to the M181/M180 for areas to the south of Scunthorpe reducing traffic on routes such as Kingsway and Doncaster Road to the north. To represent this, the future 2019 and 2028 base traffic flows have therefore been re-distributed.

As part of the Lucent TA origin – destination data was collected to identify routes drivers currently use. A re-distribution exercise was undertaken based on the proposed new M181 roundabout junction with Brumby Common Lane, identifying reduction in traffic flows at junctions including Berkeley Circle and the A1077 / Doncaster Road roundabout as traffic from areas such as Ashby and Bottesford divert onto Brumby Common Lane.

These redistributed flows have been applied 2019 and 2028 Do Minimum flows with the Lucent development in place. The redistribution is shown on Figures 22 – 27

In addition, further redistribution of traffic will take place with the development of the Maltgrade proposals. The new roundabout junction with M181 / B1450 Burringham Road will divert trips to/from the south of Scunthorpe onto Burringham Road.

Building upon the redistribution assumptions as a result of the new East-West link within the Lucent TA, the further redistribution assumes that a proportion of the traffic that expected the use the new Brumby Common Lane East-West link to access Scunthorpe from the M180 would use the new Burringham Road link instead.

Entering Scunthorpe:

It is assumed that a proportion of the trips using the Brumby Common Lane eastbound, will use Burringham Road eastbound instead. This is broken down as follows:

- 50% of the trips previously travelling from Brumby Common Lane to West Common Lane would now use Burringham Road eastbound instead (25% of these diverted trips previously travelling from Brumby Common Lane to West Common Lane would now go from Burringham Road (west) to Scotter Road (north) to West Common Lane. The remaining 75% of these trips would now go Burringham Road (west) to Burringham Road (east)).
- 100% of the trips previously travelling from Brumby Common Lane to Scotter Road (south) would now use Burringham Road eastbound instead (50% of these trips previously travelling from Brumby Common Lane to Scotter Road (south) would now travel from Burringham Road (west) to Burringham Road (east), the remaining 50% of these would now travel from Burringham Road (west) to Scotter Road (south)).

## Exiting Scunthorpe:

It was assumed that a proportion of the trips using the Brumby Common Lane westbound, will use Burringham Road westbound instead. This is broken down as follows;

- 50% of the trips previously travelling from West Common Lane to Brumby Common Lane would now use the Burringham Road link (100% of these diverted trips previously travelling from West Common Lane to Brumby Common Lane would now go Burringham Road (east) to Burringham Road (west)).
- 100% of the trips previously travelling from Scotter Road (south) to Brumby Common Lane would now use the Burringham Road link (it was assumed that 25% of these trips came from Scotter Road (south) and the remaining 75% came from Burringham Road (east)).

Details of the predicted re-distribution are provided at Figures 40 – 45.

Further distribution of existing traffic has been undertaken as a result of retaining the existing Burringham Road bridge over the M181. For the purposes of the assessment it has been assumed that of all east-west and west-east base year traffic movements along Burringham Road, 80% will use the existing bridge over the M181 and 20% will use the new link and east west route through the M181 terminating junction.

## 5.7 Future Traffic Flows

Guidance on Transport Assessment (GTA) states that:

*“For the local transport network, a development should be assessed with regard to the LDF and for a period of no less than five years after the date of registration of a planning application”*

Phasing of the development comprises:

- Phase 1 – 2019, 600 dwellings on the land immediately north east of the new M181/B1450 Burringham Road roundabout and 100 lakeside dwellings to the south west;
- Phase 2 – 2028, 1800 dwellings on land to the north west of the new M181/B1450 Burringham Road roundabout.

Therefore a 2019 future year incorporating Phase 1 development and a 2028 future year incorporating Phase 2 development has been assessed. This is considered to reflect a realistic timescale for the full build out of the development and consistent with the Lincolnshire Lakes AAP.

### 5.7.1 Background Traffic Growth

Tempo and the National Transport Model (NTM) have been used to provide local traffic growth figures for use in this assessment. Discussions have been ongoing with NLC and HE to agree the growth factors used in the assessments. HE requested that NTM locally adjusted factors are used for robust assessment of the motorway network. NLC agreed that the lower Tempo growth factors should be applied to the local highway network to reduce potential double counting of

growth due to the high level of traffic added from committed developments (see below) and the Lincolnshire Lakes development which will contribute towards growth.

The resulting traffic growth factors for the 2019 and 2028 future year assessment are shown in Table 14.

Table 14: Traffic Growth Factors

Year	AM	PM	Notes
2014-2019	1.0257	1.03245	Tempo – for local highway network
2014-2019	1.0517	1.0540	Tempo / NTM – for M180/M81
2014-2028	1.0718	1.08825	Tempo – for local highway network
2014-2028	1.1617	1.1683	Tempo / NTM – for M180/M81

## 5.7.2 Committed Development

The committed developments considered within this assessment are:

- Lucent residential development at Lincolnshire Lakes consisting of 3,550 dwellings, health hub, community use, office, local shops, food store, non-food retail, hotel, gym/fitness centre. The traffic flows have been taken directly from the Lucent TA submitted with the application. As part of the development new highway infrastructure and junction improvements are proposed in accordance with the Lincolnshire Lakes AAP. The redistribution of existing trips as a result of the development has also been taken from the Lucent TA.
- Gallagher residential development consisting of 1,056 dwellings, located north of Doncaster Road. The traffic flows have been taken from the Lucent TA as agreed with NLC.
- Doncaster Road retail development located the south of Doncaster Road. The traffic flows have been taken from the Lucent TA as agreed with NLC.
- Derby Glass Site consisting of 80 residential units, located on Sunningdale Road, south of Burringham Road. Trip generation figures for this development have been extracted directly from the associated Transport Statement and manually distributed through the assessment network in line with trip distribution assumptions.
- Golf course redevelopment site on Burringham Road consisting of 80 residential units. Trip generation figures for this development have been extracted directly from the associated TA and manually distributed through the assessment network in line with trip distribution assumptions.

Due to uncertainty over the delivery of the various committed developments and their exact timescales we have assumed that all will be complete in both the 2019 and 2028 future years and have therefore included the generated trips in all scenarios except the 2014 base.

Details of the traffic flows for the above committed developments are provided on Figures 14 to 21.

### 5.7.3 Future Traffic Flows

The 2019 and 2028 Future Year Do Minimum traffic flows, comprising base traffic flows with traffic growth and committed development traffic, are presented on Figures 28 to 31.

The 2019 and 2028 Future Year Do Something traffic flows, comprising the Do Minimum traffic flows with Maltgrade development traffic, are presented at Figures 46 to 49.

Details of the highway impact assessment are provided at Section 7.

## 6 Transport Assessment: Sustainable Modes

The Lincolnshire Lakes AAP is supported by a Sustainable Access Strategy. The promotion of walking and cycling will be important to connect communities and provide vibrant places to live. The Maltgrade development will be consistent with the Lincolnshire Lakes proposals to provide a mix of development to encourage walking and cycling within the site and connecting to the wider AAP area. Cycling is realistic for longer trips connecting the Lincolnshire Lakes site with the wider town of Scunthorpe. There are also opportunities for public transport improvements to link to the wider area.

### 6.1 Pedestrian and Cyclists

#### 6.1.1 Accessibility

Although the catchment for walking is substantially lower than for motorised modes of transport, walking is the most important mode for short journeys.

Although PPG13 has been effectively superseded by NPPF, the Department of Communities and Local Government has confirmed that *PPG13: A Guide to Better Practice* remains valid guidance. This document indicates the distance considered to be appropriate for various trips on foot. However, at paragraph 7.5, the document states that “*motorised modes are rarely used for trips of around half a mile (0.8km) or less*”. The guidance also identifies that “*walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips, particularly under 2 kilometres*”.

According to Cycling England guidance:

*‘Integrating Cycling into Development Proposals’<sup>2</sup> notes that “Most cycle journeys for non-work purposes and those to rail stations are between 0.5 miles [0.8km] and 2 miles [3.2km], but many cyclists are willing to cycle much further. For work, a distance of 5 miles [8 km] should be assumed”.*

Figure 7 identifies both a 2km and 5km catchment from the approximate centre of the development site. Within the 2km catchment the majority of the core AAP development is accessible. In addition to residential villages the proposals at the Maltgrade site and wider Lincolnshire Lakes area include primary and secondary school provision and local centres providing a mix of retail, leisure, health and community facilities. The AAP also identifies the strategic mixed use area providing employment opportunities, sports and leisure facilities and healthcare facilities. These facilities would be within walking and cycling distance of the proposed Maltgrade development. Much of the town of Scunthorpe is within the 5km catchment of the development providing cycle access to a range of services and facilities, including the town centre, rail station and key employment locations.

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<sup>2</sup> Cycling England, 2009. Cycling England was abolished by the Coalition Government in 2011; however, the guidance is considered to remain appropriate for the purposes of this assessment.

## 6.1.2 Impact

Based on the person trip generation presented in Section 5.4, the pedestrian trips generated by the development are presented in Table 15.

Table 15: Pedestrian Trip Generation 2028

		AM Peak	PM Peak
<b>Walking</b>	Arrivals	72	207
	Departures	275	132

Cycling trips generated by the development during the peak hours are presented in Table 16

Table 16: Cycle Trip Generation 2028

		AM Peak	PM Peak
<b>Cycle</b>	Arrivals	33	95
	Departures	126	60

## 6.1.3 Proposals

The detailed layout of the site will be developed through reserved matters applications. Development of pedestrian and cycle infrastructure will be considered as the internal layout design progresses in accordance with the AAP design principles. The masterplan will encourage walking and cycling for trips within the site by providing safe and accessible routes. Connections to the wider AAP area and links towards Scunthorpe will be included as part of the proposals.

In particular it is noted that the AAP proposals comprise a network of pedestrian, cycleways and bridleways connecting villages within Lincolnshire Lakes to built-up areas of Scunthorpe and local villages including Burringham. Footway / cycle links linking Scotter Road in the east to the village of Burringham in the west will improve access between the Trent bank, the new villages and the town. The AAP shows footway / cycleway / bridleway links to the east of the AAP along the new West Common Lane link provided as part of the Lucent development, immediately north of the Lagoon at Ashfield Park connecting with Scotter Road / Meredith Avenue and along Burringham Road. Detail design of the internal layout will ensure internal pedestrian / cycle routes connect with these links. This will provide connectivity between Lincolnshire Lakes and Scunthorpe residential areas and amenities including the town centre and rail station.

The development proposals include retaining the existing B1450 Burringham Road Bridge over the existing M181 promoting it as a walking and cycling route. New pedestrian infrastructure will be provided on the existing Burringham Road. No pedestrian or cyclist facilities will be provided at the new junction between existing M181 / Burringham Road given the scale of roundabout and volume of traffic.

Cycle routes will be integrated with the enhanced pedestrian routes in and around the site and surrounding area. Improved cycle access will provide good access to and from the development site and Lincolnshire Lakes area for those walking or cycling to work or the accessing the local area.

Cycle parking facilities will be conveniently located close to community and residential hubs and the leisure facilities. The cycle parking facilities will be available to residents and visitors. It is proposed to provide cycle parking worked out as a percentage of the overall scheme as reserved matters applications are brought forward. The provision of cycle parking will be kept under review as the development progresses.

## 6.2 Public Transport

### 6.2.1 NLC Total Transport Project

NLC are currently reviewing public transport provision as part of the Total Transport project. This includes a review of bus routes in Scunthorpe, including Lincolnshire Lakes and a number of Demand Responsive Transport (DRT) pilots, a service which may be appropriate in the Lincolnshire Lakes development. Public transport provision for the development will need to be developed in coordination with NLC and bus operators as the scheme and the NLC review progresses.

### 6.2.2 Public Transport Accessibility

'Planning for Public Transport in Developments'<sup>3</sup> (paragraph 6.20) states that: *"the maximum walking distance to a bus stop should not exceed 400m and preferably be no more than 300m"*. The North Lincolnshire Core Strategy refers to the North Lincolnshire Accessibility Criteria which, in the Housing and Employment DPD, defines that the maximum walking distance to a bus stop from residential development should not exceed 400m.

As identified within Section 2 the site currently has poor bus service provision with existing bus stops located some distance from the site. Service 12 operates along Burringham Road and while regular service are provided through Scunthorpe to Ashfield the service is infrequent to Burringham and East Butterwick.

The detailed layout of the site will be developed through reserved matters applications. Development of bus routes and bus stop infrastructure will be considered as the internal layout design progresses in accordance with the AAP design principles and the outcomes of the NLC review of public transport.

### 6.2.3 Public Transport Impact

Table 17 summarises the predicted public transport trip generation related to the proposed development by full build out in 2028.

Table 17: Public Transport Trip Generation 2028

		AM Peak	PM Peak
<b>Public Transport</b>	Arrivals	22	62
	Departures	82	40

<sup>3</sup> Chartered Institution of Highways and Transportation, 1999.

## 6.2.4 Proposals

As identified above the site currently has poor bus service provision. It is considered that enhancements to bus infrastructure and services will be required to ensure that bus is an attractive mode of transport for users of the site.

The public transport strategy will be developed through co-ordination with local bus operators (principally Stagecoach), other developers within the AAP (Lucent) and NLC public transport officers. Public transport provision for the Lincolnshire Lakes development is being considered by NLC as part of the Total Transport project. Initial discussions with officers at NLC have identified that, at this stage, they would wish to extend existing services in to the site and provide a 30 minute frequency in both directions. Ideally a circular route through the site would be provided, however more detailed discussions would be required with NLC and local bus operators to identify suitable routes and frequency.

The strategy will likely provide a phased approach to public transport provision as development is brought forward and coordinated with the Lucent development at Lincolnshire Lakes. It is anticipated that the existing network of services would be used initially, and then extending services incrementally before providing more bespoke services for the site. The detail of service routing will be defined during subsequent reserved matters applications.

The primary and secondary routes through the site will be designed to accommodate two way bus movements and bus stops provided at regular intervals so that residential dwellings are within suitable walking distances.

There are a number of existing bus services, described at 2.7 above, which currently serve Burringham Road and Scotter Road. The Lucent development TA suggested an extension of existing bus routes (possible service no.s 10, 16, 31, 32, 33, 34 from Scotter Road) into the site, phased as the development grows. This should be coordinated with the Maltgrade development.

During the initial stages of Maltgrade development it is suggested that the existing no. 12 bus service is extended into the site. This extended no. 12 service could be extended as the Maltgrade development grows.

In addition, as the Lucent scheme grows it is possible that service diversions into the Lucent site are continued in to the Maltgrade site and similarly, the extended no. 12 service continues into the Lucent development. Details of this will need to be discussed and agreed with NLC, bus operators and developers as the schemes are brought forward.

To accommodate the additional journey lengths associated with the diverted services it is likely that additional buses may be required. As part of the Travel Plan, Maltgrade could initially part fund the service 12 extension, details of this will be agreed with NLC. Alternatively, if NLC bring forward alternative public transport schemes such as DRT, a contribution towards these could be agreed.

NLC has confirmed that bus stopping facilities should be provided at approx. 400m intervals throughout the site. One in three of these would require a higher level of infrastructure comprising a shelter, seating and the provision of Real Time Information etc.

## 6.2.5 Rail services

The Lincolnshire Lakes scheme is located some distance from Scunthorpe Rail Station, beyond reasonable walking distances. However, the scheme and accompanying Travel Plan will highlight bus and cycle connectivity to the rail station to ensure the sustainable route connections are promoted.

## 7 Transport Assessment: Highway Network

### 7.1 Introduction

The junction models used for the purposes of the 2014 Base Year Capacity Assessment (see Chapter 2) have been used to undertake a capacity assessment of the following scenarios:

- **2019 and 2028 Future Years Do Minimum** – this scenario provides an assessment of the local network in the assessed future years of 2019 and 2028. This scenario was derived by factoring up the surveyed traffic flows by the growth factors outlined in Section 5.7.1, and provides a representation of the network performance with background growth. In addition all committed development trip generation and highway mitigation is included in the Do Minimum scenarios, including the redistribution of existing traffic as a result of the Lucent development.
- **2019 Future Year Do Something** – this scenario represents the build out of phase one of the proposed development with the inclusion of background growth and committed development in the assessed future year of 2019. Phase 1 includes; highway network changes, 600 dwellings on the land immediately north east of the new M181/B1450 Burringham Road roundabout and 100 lakeside dwellings to the south west.
- **2028 Future Year Do Something** - this scenario represents the full build out of the proposed development along with the inclusion of background growth and committed development in the assessed future years of 2028. In addition to Phase 1 traffic, Phase 2 includes; 1,800 dwellings on land to the north west of the new M181/B1450 Burringham Road roundabout

Based on an assessment of the above scenarios, the forecast impacts of the traffic generated by the proposed development on the transport networks serving the site have been provided below.

Where a junction is a roundabout or priority controlled, it has been assessed in 'Junctions' modelling software, which calculates the Ratio to Flow Capacity (RFC) and average queues experienced by all vehicles on each arm of a junction. The RFC is a key indicator of the likely performance of a turning movement at a junction under a given set of traffic flows. It is generally accepted that a junction approach with an RFC value of less than 0.85 is operating within its practical capacity. A modelled RFC of greater than 1.0 indicates that an approach is operating in excess of theoretical capacity.

Where a junction is signalised, (including signalised roundabouts) 'LinSig' software has been used. LinSig is used to indicate the performance of a signalised junction under a given set of traffic flows. The software calculates the 'degree of saturation', expressed as a percentage, for each approach to a junction. Approaches where the degree of saturation is forecast to exceed 90% are considered over-capacity. Alongside this the 'mean maximum queue' (MMQ), is calculated, to represent the average position of the furthest vehicle from the stop line in each cycle.

## 7.2 Local Highway Network

### 7.2.1 Burringham Road / Scotter Road Roundabout

The impact of development on the B1450 Burringham Road / Scotter Road (Asda) roundabout has been assessed using the Junctions model used in the 2014 base year capacity assessment. The modelling results for the 2019 and 2028 future years are summarised below in tables 18 and 19, and full results are available in Appendix J

Table 18: Junction Capacity Assessment 2019 Burringham Road / Scotter Road Roundabout

Period	Link	Do Minimum 2019		Do Something 2019	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Burringham Road E	0.56	1	0.68	2
	Scotter Road S	0.53	1	0.57	1
	Burringham Road W	0.39	1	0.60	2
	Scotter Road N	0.80	4	0.86	6
PM Peak	Burringham Road E	0.66	2	0.84	5
	Scotter Road S	0.64	2	0.72	2
	Burringham Road W	0.44	1	0.66	2
	Scotter Road N	0.71	2	0.77	3

Table 19: Junction Capacity Assessment 2028 Burringham Road / Scotter Road Roundabout

Period	Link	Do Minimum 2028		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Burringham Road E	0.59	1	0.77	3
	Scotter Road S	0.56	1	0.62	2
	Burringham Road W	0.42	1	0.91	9
	Scotter Road N	0.84	5	1.06	47
PM Peak	Burringham Road E	0.70	2	1.13	75
	Scotter Road S	0.68	2	0.86	6

Period	Link	Do Minimum 2028		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
	Burringham Road W	0.47	1	0.84	5
	Scotter Road N	0.75	3	0.94	11

The results indicate that in 2019 the majority of approaches are predicted to operate within practical capacity in both the Do Minimum and Do Something scenarios, with minimal queues beginning to form. The Scotter Road North approach is the worst affected, in the Do Something scenario it operates with an RFC 0.86 in the AM however, this is very slightly over practical capacity and as a result of this queues are predicted are small.

In 2028, there are a number of approaches operating over capacity in the 'Do Something' scenarios in both the AM and PM peaks. The additional trips generated by the completion of phase 2 results in the roundabout operating over practical capacity on Burringham Road West and Scotter Road North and in the AM peak and on Burringham Road East and Scotter Road North in the PM peak with significant queues forming.

The assessment has demonstrated that the roundabout will require improvements in order to cater for the additional trips generated by the development, therefore potential mitigation has been explored. In addition to geometry improvements at the priority roundabout, signalised roundabout and signalised crossroad options were tested.

### 7.2.1.1 Burringham Road Proposed Mitigation

The proposed mitigation scheme comprises geometry improvements to the existing priority roundabout, as shown Drawing Ref CH-019. Flare lengths have been increased on all the approach arms, and the number of lanes have been increased where possible. All the roundabout exits would remain as single exits and the circulatory carriageway would remain as two lanes. Pedestrian crossing facilities are provided across the Scotter Road North and South arms as well as across Burringham Road East. These improvements are achievable within the highway boundary.

Table 20 below provides the results of the junction assessments for the 2019 and 2028 Do Something scenarios. .

Table 20: Junction Capacity Assessment - Burringham Road /Scotter Road – Mitigation

Period	Link	Do Something 2019		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Burringham Road E	0.56	1	0.66	2
	Scotter Road S	0.52	1	0.57	1
	Burringham Road W	0.55	1	0.85	5

	Scotter Road N	0.70	2	0.85	5
PM Peak	Burringham Road E	0.70	2	0.94	12
	Scotter Road S	0.65	2	0.82	4
	Burringham Road W	0.61	2	0.79	4
	Scotter Road N	0.63	2	0.76	3

The results show that the proposed mitigation scheme will operate within its practical capacity in both the AM and PM in 2019.

In 2028 in the AM peak hour, the junction is predicted to operate close to practical capacity, however the resulting queues are low. In 2028 in the PM peak hour, the Burringham Road East approach is predicted to operate over practical capacity but within theoretical capacity, with a predicted queue of 12.

## 7.2.2 Scotter Road / West Common Lane / Brumby Common Lane Junction

The impact of development on the Scotter Road / West Common Lane / Brumby Common Lane Junction has been assessed. As part of the Lucent development highway mitigation measures are proposed, comprising the provision of traffic signal controls at the junction. It has been agreed with NLC that the Lucent development is included as a committed development, therefore the proposed junction mitigation layout has been modelled. The modelling outputs are summarised in tables 21 and 22 below.

Table 21: Junction Capacity Assessment 2019 – Lucent Proposals - Scotter Road / West Common Lane / Brumby Common Lane Junction

Period	Link	Do Minimum (Lucent Mitigation) 2019		Do Something (Lucent Mitigation) 2019	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Scotter Road (N) Ahead Left	57	4	59%	4
	Scotter Road (N) Right	31%	1	17%	1
	West Common Lane Left Ahead	50%	3	46%	3
	West Common Lane Ahead Right	30%	1	22%	1
	Scotter Road (S) Left Ahead	83%	6	63%	6
	Scotter Road (S) Right	52%	3	56%	3
	East West Link Road Left Ahead	86%	5	64%	5
	East West Link Road Right Ahead	80%	4	63%	4

PM Peak	Scotter Road (N) Ahead Left	70%	5	66%	4
	Scotter Road (N) Right	61%	2	43%	1
	West Common Lane Left Ahead	58%	2	67%	3
	West Common Lane Ahead Right	41%	2	39%	2
	Scotter Road (S) Left Ahead	86%	8	70%	4
	Scotter Road (S) Right	66%	2	69%	2
	East West Link Road Left Ahead	52%	3	50%	2
	East West Link Road Right Ahead	84%	5	52%	2

Table 22: Junction Capacity Assessment 2028 – Lucent proposals - Scotter Road / West Common Lane / Brumby Common Lane Junction

Period	Link	Do Minimum (Lucent Mitigation) 2028		Do Something (Lucent Mitigation) 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Scotter Road (N) Ahead Left	59%	5	55%	4
	Scotter Road (N) Right	35%	1	21%	1
	West Common Lane Left Ahead	52%	4	53%	3
	West Common Lane Ahead Right	38%	1	21%	1
	Scotter Road (S) Left Ahead	87%	14	69%	8
	Scotter Road (S) Right	58%	2	76%	5
	East West Link Road Left Ahead	87%	12	53%	3
	East West Link Road Right Ahead	83%	6	70%	4
PM Peak	Scotter Road (N) Ahead Left	74%	5	69%	5
	Scotter Road (N) Right	71%	2	43%	1
	West Common Lane Left Ahead	59%	3	77%	4
	West Common Lane Ahead Right	43%	2	72%	4

Scotter Road (S) Left Ahead	90%	10	71%	4
Scotter Road (S) Right	54%	3	86%	4
East West Link Road Left Ahead	90%	6	37%	2
East West Link Road Right Ahead	90%	6	66%	1

The results show that Lucent's proposed mitigation scheme will operate within its practical capacity in the 2019 and 2028 Do Something scenarios. On some links the Maltgrade development improves capacity as the new link to the M181 diverts traffic off the Brumby Common Lane East West Link. Queue lengths are generally predicted to be relatively short with minimal differences between the Do Minimum and Do Something scenarios. It is considered that Lucent proposed improvement scheme can accommodate future changes in traffic flows as a result of the Maltgrade scheme.

### 7.2.3 Scotter Road / Brumby Wood Lane

The impact of development on the Scotter Road / Brumby Wood Lane Junction has been assessed. As part of the Lucent development highway mitigation measures are proposed, comprising the provision of traffic signal controls at the junction. It has been agreed with NLC that the Lucent development is included as a committed development, therefore the proposed junction mitigation layout has been modelled. The modelling outputs are summarised in tables 23 and 24 below.

Table 23: Junction Capacity Assessment 2019 – Lucent Proposals - Scotter Road / Brumby Wood Lane

Period	Link	Do Minimum (Lucent Mitigation) 2019		Do Something (Lucent Mitigation) 2019	
		Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Scotter Road North	48%	7	48%	7
	Brumby Wood Lane	61%	3	67%	4
	Scotter Road South	67%	10	67%	10
PM Peak	Scotter Road North	72%	16	72%	16
	Brumby Wood Lane	73%	10	75%	10
	Scotter Road South	75%	17	75%	17

Table 24: Junction Capacity Assessment 2028 – Lucent Proposals - Scotter Road / Brumby Wood Lane

Period	Link	Do Minimum (Lucent Mitigation) 2028		Do Something (Lucent Mitigation) 2028	
		Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Scotter Road North	50%	7	50%	7
	Brumby Wood Lane	63%	4	70%	4
	Scotter Road South	69%	11	73%	13
	Scotter Road North	76%	18	78%	19

PM Peak	Brumby Wood Lane	76%	10	79%	11
	Scotter Road South	78%	18	80%	19

The results show that Lucent's proposed mitigation scheme will operate within its practical capacity upon full build out of Maltgrade's development. Some queues are predicted to form in both the 2019 and 2028 future years although the impact of the Maltgrade traffic increases queues by 1-2pcus. It is considered that Lucent proposed improvement scheme can accommodate future increase in traffic.

## 7.2.4 Berkeley Circle Roundabout

The impact of development on the Berkeley Circle junction has been assessed. Improvement schemes are being considered as part of the Gallagher scheme committed development. In addition, NLC have provisionally secured £2.9 million from the Greater Lincolnshire LEP for improvements to Berkeley Circle in 2016/17. Therefore the impact of the development with a proposed junction improvement layout has been assessed. Pell Frishcman have been developing the highway improvement scheme design with a number of options proposed. The latest plans (titled 'option 2') received from NLC on the 16/12/14 have been assessed. These comprise Doncaster Road and Kingsway merging at a signalised junction and the existing 5-arm roundabout becoming a 4-arm roundabout. Both the roundabout and the new signalised T junction have been assessed and the outputs are summarised in the tables below.

The results of assessment of the operation of the proposed roundabout are presented in Tables 25 and 26 below.

Table 25: Junction Capacity Assessment 2019 – Proposed Mitigation - Berkeley Circle Roundabout

Period	Link	Do Minimum 2019		Do Something 2019	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Scotter Rd N	0.88	6	0.89	7
	Doncaster Rd / Kingsway	0.53	1	0.53	1
	Scotter Road S	0.77	3	0.79	4
	Doncaster Road W	1.04	40	1.06	54
PM Peak	Scotter Rd N	0.86	5	0.88	6
	Doncaster Rd / Kingsway	0.77	3	0.79	4
	Scotter Road S	0.8	4	0.82	4
	Doncaster Road W	0.85	5	0.86	6

Table 26: Junction Capacity Assessment 2028 – Proposed Mitigation - Berkeley Circle Roundabout

Period	Link	Do Minimum 2028		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	Scotter Rd N	0.92	8	0.92	8
	Doncaster Rd / Kingsway	0.55	1	0.56	1
	Scotter Road S	0.81	4	0.89	7
	Doncaster Road W	1.08	61	1.18	122
PM Peak	Scotter Rd N	0.93	9	1.00	16
	Doncaster Rd / Kingsway	0.81	4	0.87	6
	Scotter Road S	0.85	5	0.91	9
	Doncaster Road W	0.89	7	0.93	11

The results show that the proposed Scotter Road / Doncaster Road roundabout is predicted to operate over capacity on some links in both the Do Minimum and Do Something scenarios in both 2019 and 2028 assessment years. The Doncaster Road West approach is predicted to operate over theoretical capacity in the AM peak hour with queues of 40 and 61 in the Do Minimum 2019 and 2028 assessment years respectively. As the approach is significantly over capacity the addition of a low level of Maltgrade traffic exacerbates the predicted queuing. On all other approach arms the impact of the Maltgrade traffic is relatively minor (1-7 pcus).

It is understood that NLC are developing options in conjunction with the Gallagher scheme developer for improvement schemes at the Berkley Circle junction and the proposals may change. As the operation of the junction is an existing issue and the impact of the Maltgrade development traffic relatively minor, no further improvements are proposed as part of this assessment.

The results of assessment of the operation of the proposed traffic signal control junction are presented in Tables 27 and 28 below.

Table 27: Junction Capacity Assessment 2019 – Proposed Mitigation - Kingsway / Doncaster Road junction

Period	Link	Movement	Do Minimum 2019		Do Something 2019	
			Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Doncaster Road	Right Left	57%	4	61%	5
	Doncaster Road	Right	59%	5	64%	5
	Kingsway Westbound	Ahead	15%	2	15%	2

	Kingsway Westbound	Ahead	17%	2	17%	2
	Kingsway Eastbound	Left	63%	11	65%	11
	Kingsway Eastbound	Ahead	38%	6	38%	6
	Kingsway Eastbound	Ahead	38%	6	38%	6
PM Peak	Doncaster Road	Right Left	44%	4	46%	4
	Doncaster Road	Right	46%	5	48%	5
	Kingsway Westbound	Ahead	24%	3	24%	3
	Kingsway Westbound	Ahead	26%	4	26%	4
	Kingsway Eastbound	Left	48%	7	49%	7
	Kingsway Eastbound	Ahead	30%	4	29%	4
	Kingsway Eastbound	Ahead	30%	4	29%	4

Table 28: Junction Capacity Assessment 2028 – Proposed Mitigation - Kingsway / Doncaster Road junction

Period	Link	Movement	Do Minimum 2028		Do Something 2028	
			Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Doncaster Road	Right Left	59%	5	70%	5
	Doncaster Road	Right	61%	5	72%	6
	Kingsway Westbound	Ahead	15%	2	16%	2
	Kingsway Westbound	Ahead	18%	2	18%	2
	Kingsway Eastbound	Left	65%	11	73%	14
	Kingsway Eastbound	Ahead	39%	6	38%	6
	Kingsway Eastbound	Ahead	39%	6	38%	6
PM Peak	Doncaster Road	Right Left	45%	5	51%	5
	Doncaster Road	Right	47%	5	53%	5
	Kingsway Westbound	Ahead	25%	3	27%	3

	Kingsway Westbound	Ahead	27%	4	29%	4
	Kingsway Eastbound	Left	50%	7	54%	8
	Kingsway Eastbound	Ahead	31%	5	30%	4
	Kingsway Eastbound	Ahead	31%	5	30%	4

The results show that the proposed signal junction of Kingsway / Doncaster Road is predicted to operate within capacity in both the AM and PM peak periods in both the 2019 and 2028 future years with limited queues forming.

### 7.2.5 Burringham Road / A159 Messingham Road

The impact of development on the Burringham Road / A159 Messingham Road has been assessed. The results for 2019 and 2028 Do Minimum and Do Something scenarios are presented in Tables 29 and 30 below.

Table 29: Junction Capacity Assessment 2019 – Burringham Rd / A159 Messingham Rd

Period	Link	Do Minimum 2019		Do Something 2019	
		Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Messingham Road S	112%	44	118%	54
	Burringham Road W	62%	5	110%	38
	Priory Road N	20%	1	15%	1
	Burringham Road E	30%	2	43%	2
PM Peak	Messingham Road S	108%	36	123%	69
	Burringham Road W	61%	4	84%	9
	Priory Road N	30%	1	29%	1
	Burringham Road E	50%	3	64%	5

Table 30: Junction Capacity Assessment 2028 – Burringham Rd / A159 Messingham Rd

Period	Link	Do Minimum 2028		Do Something 2028	
		Deg Sat	MMQ pcu	Deg Sat	MMQ pcu
AM Peak	Messingham Road S	117%	56	129%	80
	Burringham Road W	64%	5	132%	121
	Priory Road N	21%	1	21%	1
	Burringham Road E	30%	2	45%	3
PM Peak	Messingham Road S	115%	52	130%	86
	Burringham Road W	59%	4	125%	92
	Priory Road N	57%	1	31%	1
	Burringham Road E	47%	3	73%	6

The results of the junction assessments indicate that the Burringham Road / Messingham Road junction is predicted to operate over capacity in both the 2019 and 2028 Do Minimum scenarios, with significant queues forming on some links. As the junction is over capacity, the addition of Maltgrade development traffic exacerbates existing queues.

Due to the nature of the local built up area there is not space available to provide physical junction improvements. It is suggested that improvements to operation of the signals are considered through the introduction of MOVA or SCOOT systems which will optimise signals and respond to traffic conditions.

## 7.2.6 Burringham Road / Ashby Road

Table 31 and 32 present the results for the Burringham Road / Ashby Road junction in 2019 and 2028 for both the Do Minimum and Do Something scenarios.

Table 31: Junction Capacity Assessment 2019 –Burringham Road / Ashby Road

Period	Approach	Do Minimum 2019		Do Something 2019	
		Deg Sat	Mean Max Queue (pcu)	Deg Sat	Mean Max Queue (pcu)
AM Peak	Ashby High Street	114%	81	118%	104
	The Link	11%	0	11%	0
	Burringham Road W	89%	18	118%	99
	Ashby Road N	102%	25	102%	28
PM Peak	Ashby High Street	112%	76	115%	100
	The Link	30%	2	29%	2
	Burringham Road W	113%	61	121%	102
	Ashby Road N	112%	77	123%	116

Table 32: Junction Capacity Assessment 2028 - Burringham Road /Ashby Road

Period	Approach	Do Minimum 2028		Do Something 2028	
		Deg Sat	Mean Max Queue (pcu)	Deg Sat	Mean Max Queue (pcu)
AM Peak	Ashby High Street	121%	106	131%	159
	The Link	13%	0	13%	1
	Burringham Road W	90%	20	128%	139
	Ashby Road N	107%	39	101%	29
PM Peak	Ashby High Street	116%	92	130%	175
	The Link	31%	2	32%	2
	Burringham Road W	115%	75	129%	134
	Ashby Road N	117%	94	128%	146

The results of the junction assessments indicate that the Burringham Road / Ashby Road junction is also predicted to operate over capacity in both the 2019 and 2028 Do Minimum scenarios, with significant queues forming on some links. As the

junction is over capacity, the addition of Maltgrade development traffic exacerbates existing queues.

Due to the nature of the local built up area there is not space available to provide physical junction improvements. It is suggested that improvements to operation of the signals are considered through the introduction of MOVA or SCOOT systems which will optimise signals and respond to traffic conditions.

### 7.3 Strategic Highway Network

Following discussion with the Highways England, an initial assessment has been undertaken to determine the likely impact that the additional traffic generated by the proposed Maltgrade development would have on the operational performance of the existing M180 /M181 junction.

The predicted AM and PM peak flows for the Do Minimum and Do Something scenario have been assessed against the relevant Design Manual for Roads and Bridges Standards for each of the four slip-roads at the junction.

It can be seen that in all instances two lanes on the mainline are sufficient to accommodate the AM and PM peak flows, with only one lane required intra-junction. The existing layout has three lanes to the west of the junction, reducing to two lanes through the junction and beyond to the east. This is achieved by lane drop and lane gain type junction arrangements for the eastbound and westbound carriageways respectively. Therefore, in terms of mainline capacity the existing provision would be sufficient to accommodate the 2028 do-something peak hourly flows. Furthermore, each of the existing slip-roads have two lanes, which will also provide sufficient capacity for the 2028 do-something connector road flows.

All of the merge diagrams prescribe a lane gain type junction arrangement with one lane upstream and two lanes downstream on the mainline. A lane gain is provided in the existing situation at the westbound merge, therefore this does not present an issue. The existing eastbound merge is a simple taper merge, which it is accepted may present an issue for merging vehicles due to the comparatively high volume of merging traffic and limited opportunity to merge. However, it should be noted that this issue would also be present in the 2028 do-minimum scenario and would actually become an issue in the 2019 do-minimum scenario. The introduction of a lane gain type arrangement is not considered appropriate as this would either require reduction of the M180 upstream of the merge to one lane or widening of the M180 to three lanes downstream of the merge.

For both of the diverges the diagrams prescribe a lane drop junction arrangement with two lanes upstream and one lane downstream on the mainline. A lane drop is provided at the eastbound diverge, therefore this does not present an issue. Whilst a lane drop junction is not provided at the westbound diverge, it is considered that as two lanes are maintained through the junction that this does not present an issue.

### 7.4 Proposed New Development Access Junctions

As part of the development proposals and consistent with the Lincolnshire Lakes AAP, three new roundabouts junctions are provided for access to the development:

- Roundabout 1 is located on the B1450 Burringham Road to the west of the existing M181 and provides access to the Maltgrade Phase 2 development plot as well as the Lakes area to the south west;
- Roundabout 2 comprises the new junction of the de-trunked M181 with B1450 Burringham Road providing a new access route from the M181 to Scunthorpe and local villages via Burringham Road;
- Roundabout 3 is located on the B1450 Burringham Road to the east of the existing M181 and provides access to the Maltgrade Phase 1 development plot as well as potential future Lincolnshire Lakes development to the south east of the AAP.

The impact at the roundabouts has been assessed for the Do Something scenarios in the AM and PM peak hour for both 2019 and 2028 future years. The future year flows include uplifted 2014 base flow, committed development flows and the Maltgrade development flows. This assumes full build out of the Lincolnshire Lakes development as set out in the proposed Masterplan. The operation of the junctions has been assessed using the Junctions programme. The full modelling outputs can be found in Appendix J.

### 7.4.1 Roundabout 1 – Western Site Access

Roundabout 1 will provide access from B1450 Burringham Road into the western Maltgrade development site (plot 6) and to the proposed Lake development adjacent to the M180 junction. The proposed junction comprises of a 5 arm roundabout as shown on Drawing Ref CH-015.

As this is a new roundabout the geometry of the roundabout has been designed to accommodate the future predicted traffic flows. The performance of the proposed roundabout has been assessed using Junctions model. The results of the assessment are presented in table 33 below.

Table 33: Junction Capacity Assessment – Proposed Western Access Roundabout

Period	Link	Do Something 2019		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	North	0.00	0	0.73	3
	North East	0.07	0	0.22	0
	South East	0.20	0	0.28	0
	South	0.05	0	0.06	0
	West	0.20	0	0.23	0
PM Peak	North	0.00	0	0.36	1
	North East	0.08	0	0.72	3
	South East	0.21	0	0.51	1
	South	0.03	0	0.05	0
	West	0.18	0	0.25	0

The results of the assessment show that the roundabout will operate satisfactorily during the AM and PM peak hours in both 2019 and 2028 future years. The

modelled RFC on each approach is below the normal practical capacity threshold of 0.85 with minimal queues forming.

### 7.4.2 Roundabout 2 – M181 / Burringham Road

Roundabout 2 will provide a new roundabout junction of the existing M181 with the B1450 Burringham Road. The existing M181 will be de-trunked from north of this new junction. The proposed junction comprises a 4 arm roundabout as shown on Drawing CH-016.

The junction layout is based on the proposals being developed by Highways England. Following assessment of operation of the junction with the predicted future year flows, further improvements have been included comprising additional lane width and flare length on the northern and southern approaches to the junction. The performance of the proposed roundabout has been assessed using Junctions model. The results of the assessment are presented in table 34 below.

Table 34: Junction Capacity Assessment – M181 Terminating Junction

Period	Link	Do Something 2019		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	East	0.40	1	0.57	1
	South	0.63	2	0.74	3
	West	0.08	0	0.62	2
	North	0.71	2	0.88	7
PM Peak	East	0.28	0	0.40	1
	South	0.71	2	0.92	10
	West	0.07	0	0.35	1
	North	0.65	2	0.82	4

The junction assessment shows that in 2028, the northern arm in the AM and the southern arm in the PM are very slightly over capacity. However, the resulting queues are small and considered to be acceptable.

### 7.4.3 Roundabout 3 – Eastern Site Access

Roundabout 3 will provide access from B1450 Burringham Road into the eastern Maltgrade development site (Plot 2) and to potential future development at plots 3 and 4. The proposed junction comprises a 5 arm roundabout as shown on Drawing CH-017.

As this is a new roundabout the geometry of the roundabout has been designed to accommodate the future predicted traffic flows. The performance of the proposed roundabout has been assessed using Junctions model. The results of the assessment are presented in table 35 below.

Table 35: Junction Capacity Assessment - Proposed Eastern Access Roundabout

Period	Link	Do Something 2019		Do Something 2028	
		Max RFC	Max Queue (pcu)	Max RFC	Max Queue (pcu)
AM Peak	North	0.24	0	0.29	0
	East	0.49	1	0.57	1
	South	0.00	0	0.00	0
	South West	0.25	0	0.55	1
	North West	0.20	0	0.30	0
PM Peak	North	0.14	0	0.14	0
	East	0.50	1	0.70	2
	South	0.00	0	0.00	0
	South West	0.23	0	0.38	1
	North West	0.31	0	0.37	1

The results of the assessment show that the roundabout will operate satisfactorily during the AM and PM peak hours in both the 2019 and 2028 future years. The modelled RFC on each approach is below the normal practical capacity threshold of 0.85 with minimal queues forming.

## 8 Summary and Conclusions

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This TA has been produced to support the outline application for the proposed Maltgrade residential development at the Lincolnshire Lakes site, Scunthorpe.

Three separate planning applications are submitted in relation to Maltgrade's development at Lincolnshire Lakes, comprising:

- 1 - Residential Villages;
- 2 - Highways Junction;
- 3 - The Landscape, Lakes and Great Lake.

This TA is an update to the original TA (dated February 2015) submitted in support of all three applications. It has been updated following comments and discussions with officers from NLC Highways as well as Highways England. The TA has examined the existing transport networks in the vicinity of the proposed development, outlined the development proposals and considered the resulting impact on the transport network.

### 8.1 Development Proposals

NLC has developed a Submission Draft AAP for development of approximately 6,000 dwellings and other mixed uses at the Lincolnshire Lakes site immediately west of Scunthorpe.

Maltgrade's development broadly comprises approx. 2,400 dwellings and ancillary village and community facilities to the north of Burringham Road, as well as development around the lake to the south west of the Masterplan including 100 dwellings and leisure uses. The development proposals are consistent with the Lincolnshire Lakes AAP.

As identified within the AAP, the development includes new highway works to provide access to the Lincolnshire Lakes villages and relieve congestion on the local highway network. This comprises provision of a new roundabout junction on the downgraded M181 junction with B1450 Burringham Road. In addition, two new site access roundabouts are provided from Burringham Road.

Consistent with the AAP timescales and for the purposes of this assessment, phasing of the development comprises:

- Phase 1 by 2019, 600 dwellings on the land immediately north east of the new M181/B1450 Burringham Road roundabout (eastern village) and 100 lakeside dwellings to the south west Lake area;
- Phase 2 by 2028, 1,800 dwellings on land to the north west of the new M181/B1450 Burringham Road roundabout (western village).

### 8.2 Sustainable Transport

In accordance with the AAP sustainable access strategy, access by all modes will be provided for. The design of the internal highway layout will accommodate future diversion of bus services into the site with high quality bus stops provided such that all dwellings are within walking distance of the bus stops.

Discussions have been ongoing with NLC to identify possible improvements to bus services so that the new development has good links to the town centre and local amenities, including the rail station. Existing services could be enhanced and diverted in to the site; these would connect with additional bus service provision for the neighbouring Lucent development at Lincolnshire Lakes. Details of service improvements would be agreed with NLC, Operators and Developers as the schemes progress. It is also understood that NLC are currently reviewing bus services across the town and piloting Demand Responsive Transport. Bus service provision will therefore be developed in line with NLC emerging plans.

Pedestrian and cycle links will be included throughout the site to connect the site with the wider Lincolnshire Lakes mixed use development as well as local rural areas and the town of Scunthorpe. Works to the existing B1450 Burringham Road bridge over the M181 will be undertaken to provide a pedestrian and cycle route connecting the Phase 1 and Phase 2 development plots and improving links between Burringham village, the Lincolnshire Lakes and south west Scunthorpe.

The use of sustainable modes of transport and the reduction in reliance on the car will be promoted through the Travel Plan developed for the site. Ongoing liaison with NLC as well as bus operators will continue as the site design is developed and reserved matters applications brought forward.

### 8.3 Highway Impact Assessment

Highway impact assessment has been undertaken for the local highway network comprising:

- New M181 / B1450 Burringham Road roundabout;
- 2 new site access / B1450 Burringham Road roundabouts;
- B1450 Burringham Road / Scotter Road (Asda) Roundabout;
- Scotter Road / West Common Lane / Brumby Common Lane Junction;
- Scotter Road / Brumby Wood Lane Junction;
- Berkeley Circle Roundabout;
- Burringham Road / Messingham Road signal control junction;
- Burringham Road / Ashby Road signal control junction;
- M180/M181 slip road link assessments.

Assessment of the operation of these junctions in future years demonstrates that the development can be accommodated on the local highway network.

The proposals provide a new roundabout junction of the existing M181 with B1450 Burringham Road, and a new east-west link which will provide an alternative route into Scunthorpe from the motorway. Two new roundabout junctions will be provided along B1450 Burringham Road to provide access to the plots. These junctions have been designed to accommodate the predicted traffic generated by the development as well as redistributed existing local traffic.

As part of this assessment the requirement for mitigation at the B1450 Burringham Road / Scotter Road (Asda) roundabout has been identified. A scheme has been developed comprising additional lanes and flare lengths at the existing priority controlled roundabout, which will alleviate the impact at this

roundabout. Detailed design of the junction will be discussed and developed with NLC as the scheme progresses.

The assessments demonstrates that the Burringham Road junctions with Messingham Road and Ashby Road are predicted to operate over capacity in both the Do Minimum and Do Something scenarios. It is suggested that the introduction of MOVA or SCOOT systems are introduced at these junctions to optimise the signals and respond to traffic conditions.

The operation of other local junctions has been undertaken based on mitigation schemes developed for agreed committed developments. As part of the Lucent development traffic signal controls are proposed at the junctions of Scotter Road / West Common Lane / Brumby Lane and Scotter Road / Brumby Wood Lane. Assessment of the operation of these demonstrate that committed development and Maltgrade development traffic can be accommodated in future years.

Proposed improvements works at Berkeley Circle have been assessed on the basis of the latest proposals comprising the provision of traffic signal controls at the junction of Doncaster Road / Kingsway and a 4-arm roundabout at Berkeley Circle. The assessment indicates that the junction is predicted to operate over capacity in both the Do Minimum 2019 and 2028 assessment years before the addition of Maltgrade development traffic. The inclusion of Maltgrade development traffic exacerbates the problem although the impact of the development is generally minor. No mitigation is proposed for the junction as it is understood NLC are developing improvement proposals.

An initial assessment of the operational performance of the existing M180 /M181 junction has been undertaken. In all future year scenarios the existing junction would have sufficient capacity to accommodate predicted traffic flows.

## 8.4 Conclusion

In conclusion, on the basis of this assessment, it is considered that the transport impacts of the Maltgrade development Lincolnshire Lakes can be satisfactorily accommodated on the transport network.

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- Figure 2 Strategic Highway Network
- Figure 3 Local Road Network
- Figure 4 Public Transport in the Vicinity of the Site
- Figure 5 Represented Distances from the Site in relation to the Public Transport Network
- Figure 6 Cycle Links in Vicinity of the Site
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- Figure 8 Traffic Flows 2014 Base AM
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Figure 44 Traffic Flows 2028 Maltgrade East West Link Traffic Redistribution AM

Figure 45 Traffic Flows 2028 Maltgrade East West Link Traffic Redistribution PM

Figure 46 Traffic Flows 2019 Do Something AM

Figure 47 Traffic Flows 2019 Do Something PM

Figure 48 Traffic Flows 2028 Do Something AM

Figure 49 Traffic Flows 2028 Do Something PM

## Drawings

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Drawing 1 CH-010 Highways General Arrangements

Drawing 2 CH-015 Highways General Arrangements – West Access Roundabout

Drawing 3 CH-016 Highways General Arrangements – Terminating Junction

Drawing 4 CH-017 Highways General Arrangements- Eastern Access Roundabout

Drawing 5 CH-019 Asda Roundabout Option 1 – Priority Junction

## **Appendix A**

### **NLC and HE Consultation**

# A1

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## **Appendix B**

### **AAP Proposals**

# B1

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## Appendix C

### Indicative Masterplan

# C1

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## Appendix D

### Base Year Traffic and TRADS Data

# D1

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## **Appendix E**

### **Base Year Capacity Assessments**

# E1

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## Appendix F

### Accident Data

# F1

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## Appendix G

### Mode Share

# G1

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## Appendix H

### TRICS Output

# H1

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## Appendix I

### Trip Distribution and Assignment

# I1

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## Appendix J

### Future Year Modelling Results

# J1

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