Mr W Phipps

Michelins Farm, Essex

Access Appraisal

Report Ref

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1 Introduction

Arup has been instructed by Mr W Phipps to investigate the potential of providing a new access to the Michelins Farm, Rayleigh, Essex from the A1245 road. Consideration is being given to more intensive use of the site with potential industrial type development with associated longer wheel base vehicles. Thus a higher standard access to the local road network is considered desirable.

This note reviews the site in terms of existing access arrangements and proposes alternative access from the A1245. Consideration will be given to the access alternatives in relation to the standard and characteristics of the adjacent highway, design speed, operating characteristics, infrastructure constraints, as well as the scale and nature of potential development. Consideration will be given to the benefits arising from the introduction of a lower speed limit and the rationale therefore.

In addition the note examines the impact that a potential redevelopment of the site to industrial uses would have on the surrounding road network.

The note also investigates the possibility of combining the new access to Michelins Farm with the existing light industrial development adjacent to the site.

2 Site Description

The site and vicinity are shown in **Figure 1**. This figure also shows the site dimensions with the various roads described below. The site area is approximately 9.87 hectare.

The site is currently described as dis-spoiled land and access is achieved from the A127 eastbound off-slip of the A127/A1245 signalised roundabout junction. A further access is located on the northbound section of the A1245 dual carriageway.

The site is bounded to the south for some 100 metres by an eastbound exit slip road of the A127 Southend Arterial Road as well as a light industrial estate development. The western boundary is formed by farm land and the A130 dual carriageway beyond. The embankment of the rail line to Southend-on-Sea forms the northern boundary. The eastern boundary abuts the A1245 dual carriageway for some 225 metres.

There are presently gated field type accesses to the site from the A127 slip road as well as the A1245. The former is in close proximity to the access to the Annwood Lodge Business Park, a light industrial estate development. It is important to note that due to the layout of the access only smaller type vehicles can access the site. The access is not easy and vehicles over 9.18m (30 ft) are prohibited, as is reversing on to the site.

The Annwood Lodge Business Park, a light industrial development to the south of the site, is also shown in **Figure 1**. Access to this development is from the A127 Southend Arterial Road via a left in/left out arrangement.

3 Existing Highway Network

The site has good connections with the primary road network. The site is adjacent to the A127 Southend Arterial Road, Rayleigh, Essex. It is bounded by the A1245 to the east, the A127 to the south, the Southend on Sea railway line to the north and farmland to the west which separates the site from the A130.

The A1245 is a dual carriageway road forming the eastern boundary of the site. It meets the A127 at a signalised roundabout junction at the south-east corner of the site and a rail overbridge at the north-east corner of the site. The junction of the slip road with the circulatory carriageway of the roundabout is signal controlled. There are lay-bys in both directions immediately north of the railway bridge. The road provides access to the western suburbs of Rayleigh.

The A127 Southend Arterial Road is a dual carriageway road running in an east-west direction. The speed limit on this road is 50 mph. This road crosses under the A130 dual carriageway bridge just west of the site.

The A130 is a dual carriageway road running in a north-south direction and forms a roundabout junction with the A1245 further south of the site. The A130 effectively forms a western bypass of Rayleigh.

The speed limit on the A1245 is currently 70mph, which is higher than the existing speed limit on the A127. This speed limit would appear to be inconsistent with the route function and speed limits on adjacent routes. North of the A129 London Road roundabout, the A1245 becomes single carriageway with a 60mph speed limit, whilst all side roads have speed limits of 40mph as they approach the residential areas. The route function would suggest that a graduated interface between the residential areas and the strategic routes is appropriate with perhaps an intermediate speed limit of 50mph.

The footpath on the northern side (eastbound carriageway) of the A127 terminates at the current site access. There are no footpaths alongside either carriageway of the A1245.

The location of the site with the road network and speed limits in the vicinity are shown in **Figure 2**.

4 Proposed Access Arrangements

Consideration is being given to provide access to the site from the A1245 north of the A127/A1245 signalised roundabout that would replace the existing access. It would also be proposed to close off the existing left in/left out access located at the A127 off slip.

As described previously, the speed limit on the A1245 north of the signalised roundabout is 70 mph, which is higher than the existing speed limit on the A127 (50mph). Although the roundabout has a speed limit of 70 mph it is important to note that traffic exiting the roundabout travelling north on the A1245 is unlikely to achieve this speed until a distance away from the roundabout. In this regard the exit radius at this location is commensurate to a design speed of 30 mph. Therefore, at best, quicker vehicles are likely to be travelling at 40mph. As such it is considered reasonable to assume a design speed of 50 mph on the approach to the new access. The 70mph speed limit is considered appropriate after the site access for merging traffic onto the dual carriageway.

Preliminary appraisal of the site layout and reference to the Design Manual for Roads and Bridges suggests that a taper diverge/taper merge left in/left out arrangement to serve the site from the A1245 may be possible. This proposed access arrangement would be located between the A127/A1245 signalised roundabout and the Southend-on-Sea railway line. This access layout is comparable to an existing junction just to the north of the A129 London Road roundabout.

Assuming a design speed of 50 mph (85kph) on the approach to the new junction and a design speed of 70 mph (120kph) after the new site access, TD 41/95 - *Vehicular Access to Trunk Roads* suggests that the following geometric dimensions are appropriate:

- Taper diverge length (Layout 9) – 55 metres
- Entry radius – 20 metres
- Width of access – 8 metres
- Taper merge length (Layout 10) –110 metres
- Exit radius – 25 metres
- Total length required – 218 metres

Extracts from TD41/95 are included in **Appendix A**.

From the data above the total length required to provide a left in/left out diverge/merge arrangement to serve the site is 218 metres.

It is important to note that TD41/95 also states that "*the length may be reduced as a Relaxation by one further design speed step where there are difficult site constraints*". The signalised junction to the south and the railway bridge to the north constrain the potential access layout. Should a one-step relaxation be considered appropriate then the total length required to accommodate the new access would be reduced to 183 metres.

The distance between the A127/A1245 signalised roundabout and the Southend on Sea railway line is 225 metres. Therefore the proposed access arrangements

can be accommodated within the existing eastern boundary of the site on the A1245.

It should also be noted that the proposed access is to and from a dual rather than single carriageway. As such, upstream traffic may have the opportunity to change lane to reduce conflict with exiting and entering traffic.

As described earlier there is a light industrial development adjacent to the site and access to this development is from the A127 via a left in/left out priority junction. It would be possible to utilise the proposed access arrangements for the site to accommodate the traffic movements associated with the existing light industrial development adjacent to the site. This would mean that the three existing access junctions on the A127 and A1245 could be replaced by the new proposed access junction on the A1245.

A potential combined new access from the A1245 for both the existing light industrial development and the Michelins Farm site would have the following benefits as far as the operation of the road network is concerned:

- Access by all vehicle types to both sites
- Rationalisation of the existing three access points by a single access point
- A higher standard access layout would enhance safety for all road users
- Reduced travel distance on the road network for all vehicles wishing to access both sites thus reducing the potential for congestion.

5 Proposed Development and Trip Generation

The area of the site is approximately 9.87 Ha, which could be redeveloped to provide for 'bad neighbour' type industrial land uses such as refuse and recycling centres. It is estimated that up to 25,000 m^2 gross floor space of industrial use could potentially be built on site.

The TRICS database has been used in order to identify the potential trip generation such a development is likely to generate. This database contains a number of land uses and corresponding developments and covers the majority of areas in the UK. The database is widely used to forecast trip generation of proposed developments.

The selected sites have Gross External Areas (GEAs) similar to the potential 25,000m^2 industrial development and a copy of the TRICS output is enclosed as **Appendix B**.

From the attached output the potential development would generate traffic flows between 07:00 hours and 19:00 hours. As far as development traffic impact is concerned the critical hours are the morning and evening highway peak hours. These highway peak hours occur typically between 08:00 hours and 09:00 hours in the morning and 17:00 hours and 18:00 in the evening.

Based on information from TRICS the potential industrial development is likely to generate traffic during the morning and evening highway peak hours as set out below:

Period	**Morning Peak**			**Evening Peak**		
Direction	In	Out	Sum	In	Out	Sum
Trip Rate (Vehicles/100m2 GEA)	0.101	0.053	0.154	0.025	0.115	0.140
Trips (vehicles/hour)	25	13	38	6	29	35

From the trip generation forecasts, which are based on the chosen similar sites from the TRICS database, the potential industrial development is likely to generate a two-way flow of 38 vehicles in the AM peak hour and a two-way flow of 35 vehicles in the PM peak hour.

These generated traffic flows are very small and would be unlikely to have an adverse impact on the road network in the vicinity of the site.

6 Conclusions

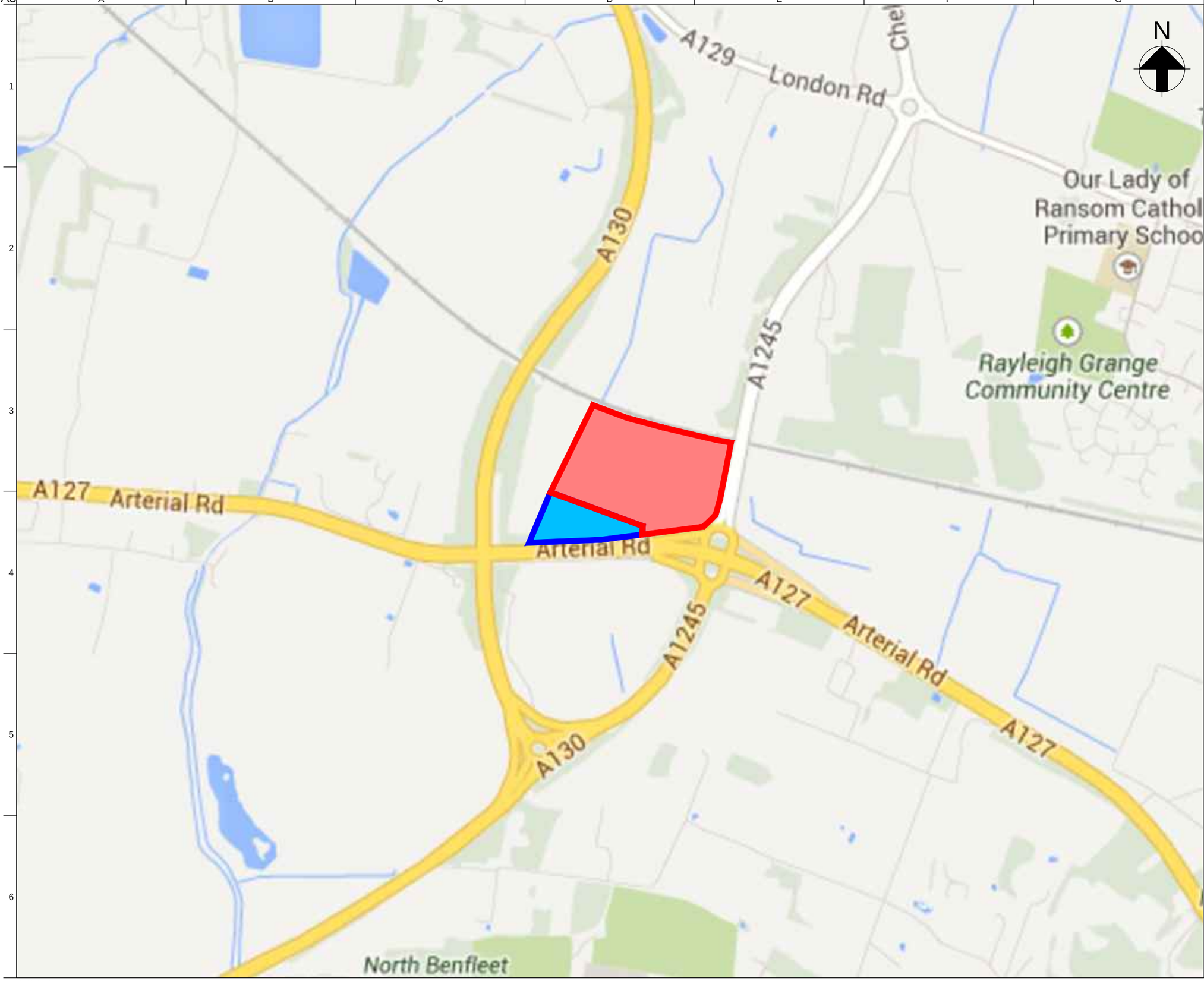
The following may be concluded as a result of this preliminary appraisal of potential access to the Michelins Farm site:

- The site has good connections with the primary road network. It is adjacent to the A127 Southend Arterial Road, Rayleigh, Essex.
- Other primary routes in the vicinity include the A130 and the A1245 dual carriageway roads.
- The site is currently accessed from the A127 eastbound off-slip of the A127/A1245 signalised roundabout junction. A further access is located on the northbound section of the A1245 dual carriageway.
- Adjacent to the site there is a light industrial development. Access to this development is from the A127 Southend Arterial Road via a left in/left out arrangement.
- It is proposed to provide a single access to the site from the A1245 north of the A127/A1245 signalised roundabout that would replace the two existing access points.
- The area of the site is approximately 9.87 Ha, which could be redeveloped to provide industrial units of 25,000m^2 gross floor area.
- The vehicle trip generation that a possible industrial development would generate has been forecast using the TRICS database. The forecast generated traffic would not have an adverse impact on the surrounding road network.

In summary it is concluded that a safer, higher standard access could be provided to the site as set out herein that could improve traffic operations to/from and in the vicinity of the site.

Figures

A3



Key

- Michelins Farm
- Existing Industrial Units

Issue	Date	By	Chkd	Appd
-	06/08/13	JG	SN	SN

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Client

Job Title
Michelins Farm

Site Location

Scale at A3
1:10000

Discipline
Transport Planning

Job No

Drawing Status
No default available

Drawing No
Figure 1

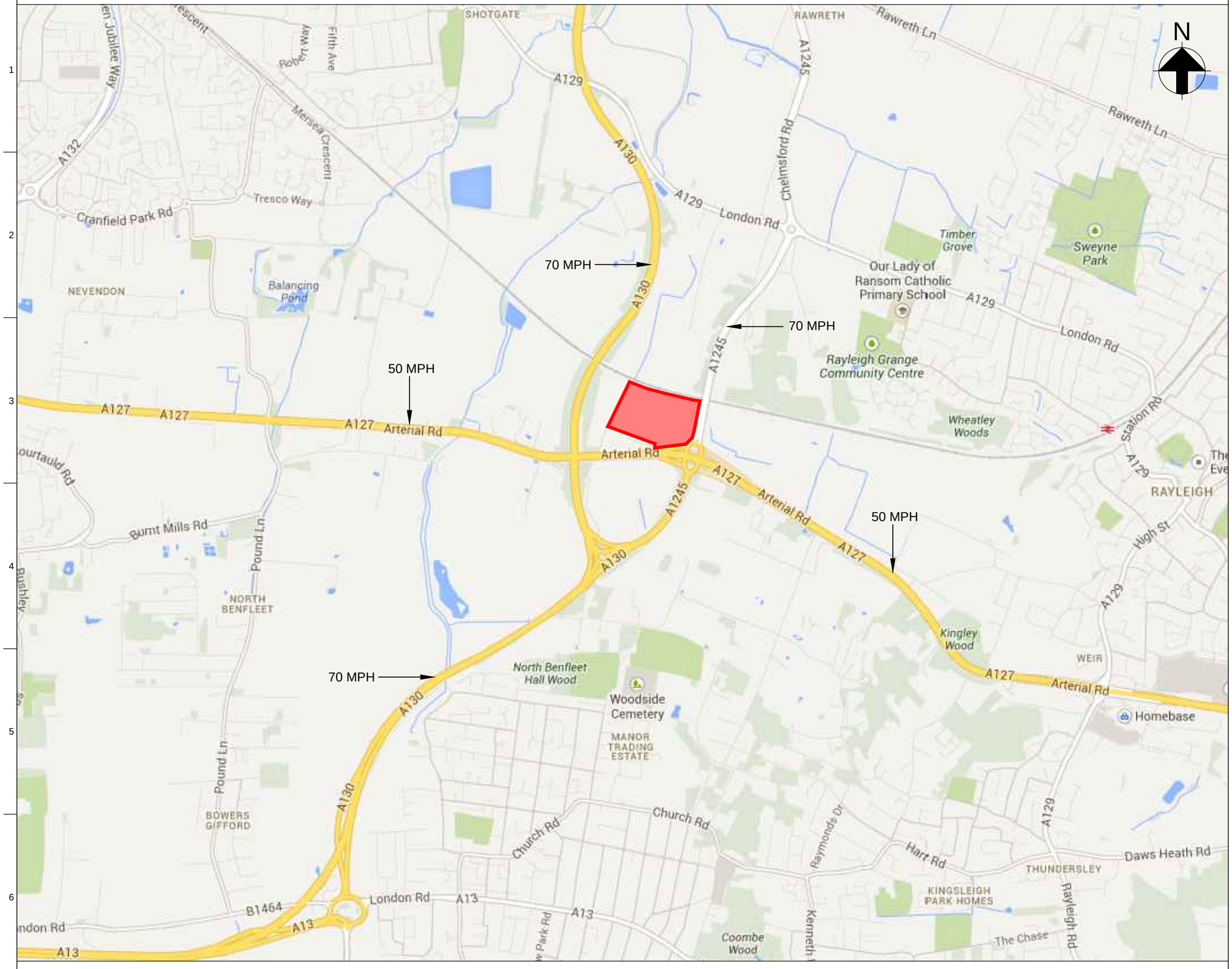
Issue
-

Do not scale

A3

A B C D E F G

1 2 3 4 5 6



Key

Michelins Farm

Issue	Date	By	Chkd	Appd
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Client

Job Title
Michelins Farm

Existing Road Network

Scale at A3
1:20000

Discipline
Transport Planning

Job No

Drawing Status
Preliminary

Drawing No
Figure 2

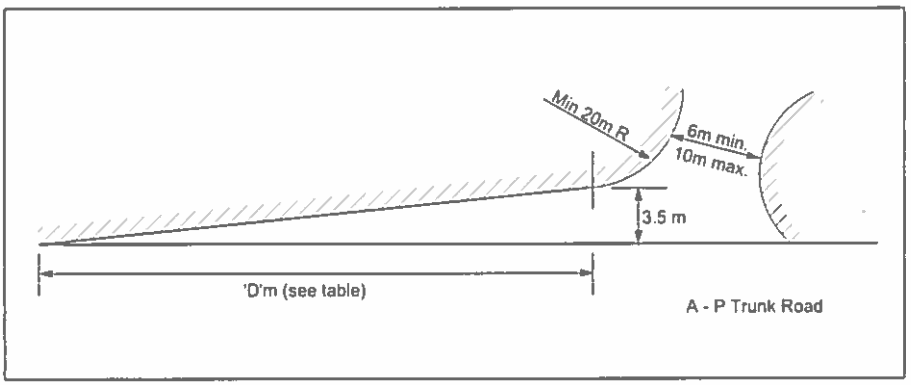
Issue
-

Do not scale

Appendix A

TD 41/95 Extracts

Layout 9 - Nearside Diverge Taper



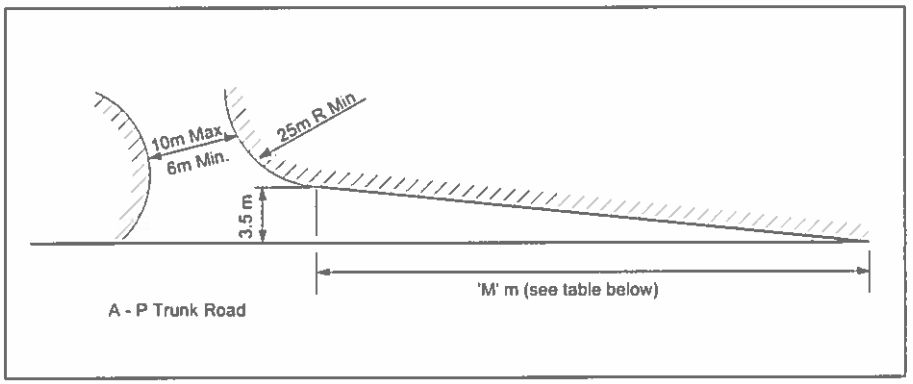
Design Speed (kph)	On Up Gradient		On Down Gradient	
	0 - 4 %	Over 4 %	0 - 4%	Over 4%
120	110	80	110	150 (110)
100	80	55	80	110 (80)
85	55	40	55	80 (55)
70	40	25	40	55 (40)
60	25	25	25	40 (25)
50	25	25	25	25

Figures in brackets may be used where the all purpose trunk road is a single carriageway

Diverge Taper Length 'D' Metres

The length may be reduced as a Relaxation by one design speed step where there are difficult site constraints.

Layout 10 - Merge Taper



Design Speed (kph)	Merge Taper Length M (m)
120	110
100	90
85	70
[70]	50

Merge Tapers shall only be used on dual carriageways of 2 lanes or wider where the design speed is 85 kph or above.

The lengths given above represent one design speed step reduction from the figures given for merge tapers at major - minor proximity junctions in **TD 42 (DMRB 6.2.6)** (See para. 2.35).

The length may be reduced as a Relaxation by one furthur design speed step where there are difficult site constraints.

Appendix B

Trip Generation

TRIC5 2013(b)v6.12.1
Trip Rate P Gross floor area

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS	
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA
00:00-00:30								
00:30-01:00								
01:00-01:30								
01:30-02:00								
02:00-02:30								
02:30-03:00								
03:00-03:30								
03:30-04:00								
04:00-04:30								
04:30-05:00								
05:00-05:30								
05:30-06:00								
06:00-06:30								
06:30-07:00								
07:00-07:3	2	21750	0.032	2	21750	0.032	2	21750
07:30-08:0	2	21750	0.163	2	21750	0.021	2	21750
08:00-08:3	2	21750	0.069	2	21750	0.032	2	21750
08:30-09:0	2	21750	0.032	2	21750	0.021	2	21750
09:00-09:3	2	21750	0.048	2	21750	0.023	2	21750
09:30-10:0	2	21750	0.03	2	21750	0.023	2	21750
10:00-10:3	2	21750	0.034	2	21750	0.03	2	21750
10:30-11:0	2	21750	0.018	2	21750	0.018	2	21750
11:00-11:3	2	21750	0.032	2	21750	0.025	2	21750
11:30-12:0	2	21750	0.021	2	21750	0.025	2	21750
12:00-12:3	2	21750	0.032	2	21750	0.051	2	21750
12:30-13:0	2	21750	0.032	2	21750	0.034	2	21750
13:00-13:3	2	21750	0.067	2	21750	0.048	2	21750
13:30-14:0	2	21750	0.189	2	21750	0.051	2	21750
14:00-14:3	2	21750	0.094	2	21750	0.292	2	21750
14:30-15:0	2	21750	0.076	2	21750	0.055	2	21750
15:00-15:3	2	21750	0.108	2	21750	0.122	2	21750
15:30-16:0	2	21750	0.055	2	21750	0.184	2	21750
16:00-16:3	2	21750	0.037	2	21750	0.053	2	21750
16:30-17:0	2	21750	0.021	2	21750	0.129	2	21750
17:00-17:3	2	21750	0.011	2	21750	0.069	2	21750
17:30-18:0	2	21750	0.014	2	21750	0.046	2	21750
18:00-18:3	2	21750	0.014	2	21750	0.023	2	21750
18:30-19:0	2	21750	0.018	2	21750	0.023	2	21750
19:00-19:30								