

Barnham Court Farm, Barnham

Construction Traffic Management Plan

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Client Name: BNRG Heather Ltd.
Client Address: Festival House, Jessop Avenue, Cheltenham, Gloucestershire,
GL50 3SH
Site Address: Barnham Court Farm, Barnham, West Sussex.

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1.0 Introduction

1.1 Background

Curtins is an engineering consultancy that has provided expert services to public and private sector clients for more than 50 years.

This Construction Traffic Management Plan (CTMP) has been prepared by Curtins' transport professionals on behalf of *BNRG Heather Ltd.* (herein referred to as "the Applicant") in support of a planning application for the development of a solar photovoltaic park of approximately 7MW capacity at Barnham Court Farm, Barnham.

The development comprises the installation of solar panels erected on ground-mounted frames, fixed to pile-driven steel supports and arranged in rows.

Construction is anticipated to commence in autumn 2015 and is anticipated to continue for a 14 week period.

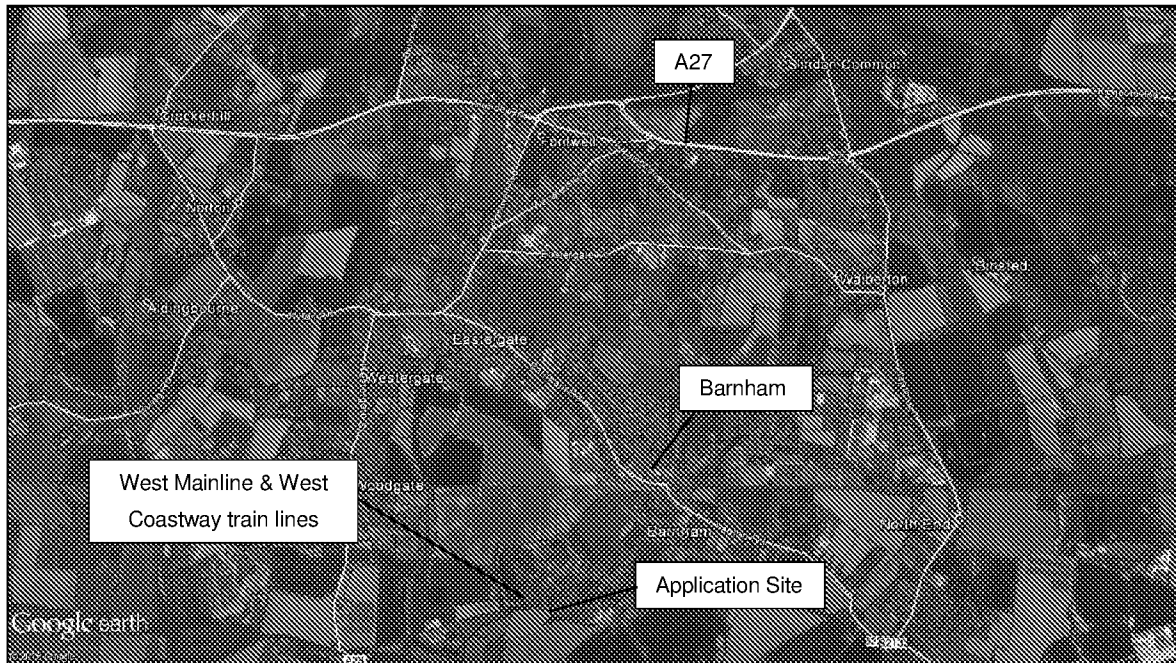
1.2 Site Location

The site is situated approximately 1.2 kilometres to the south west of the village of Barnham, with Bognor Regis located some 5 kilometres to the south of the proposed development. The proposed development area comprises circa 2 hectares of agricultural grassland bound by the West Mainline and West Coastway train lines to the west of the site with agricultural land delineating the site's southern boundary. Woodland forms the eastern extent of the site whilst the northern boundary is defined by the public footpath (ref. 200/1) routing east to west.

The site currently benefits from a formal means of access via the adjacent Barnham Court Farm. The existing track in place to the south of the farm will be also temporarily surfaced with compacted aggregate to reduce ground damage by heavy vehicles.

The locational characteristics of the application site are shown in the following Figure.

Figure 1 - Location Plan



1.3 Report Overview

This CTMP has been prepared in support of a planning application for the proposed development. It considers the methods by which materials, equipment and site workers will arrive at the site, and the availability and quality of transport infrastructure in order to identify a suite of traffic management initiatives designed to mitigate and minimise any impacts.

It is noteworthy that the development is notifiable under the Construction Design and Management regulation (CDM) 2007 and, as such, the management of construction traffic will be reassessed as the design develops, and will be finalised in the Construction Phase Health and Safety Plan. The proposals outlined within this CTMP are based on the preliminary design.

The remainder of this report is structured as follows:-

- ◆ Section 2.0 – Construction Traffic Generation

This section of the report sets out the anticipated composition and volume of traffic during the construction phase of development.

- ◆ Section 3.0 – Appraisal of the Highway Network

Within this section, the report provides an appraisal of the highway geometry of the identified construction route, having regard to current design guidance in combination with the volume and type of traffic generated by the development.

- ◆ Section 4.0 – Traffic Management

Taking on board the findings of the preceding section, a suite of traffic management measures are identified in order to mitigate and minimise the highlighted issues.

- Section 5.0 – Report Conclusion

2.0 Construction Traffic Generation

2.1 Introduction

This Section of the report sets out the estimated volume and type of vehicles that would be generated throughout the construction phase of development. This information has been used in subsequent sections that consider the geometry and safety of the adjoining highway networks, in order that the severity of the risk may inform the suite of management measures proposed.

2.2 Trip Generation

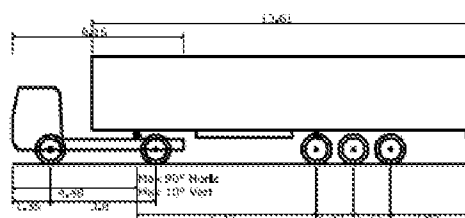
The trip generation potential of the construction phase of development has been informed by the Applicant's anticipated construction programme, which is based on their extensive experience of delivering similar developments throughout the Country.

In this regard, the proposed development would be likely to generate 200 deliveries over the construction period specified. This equates to an average of 3 deliveries, or 6 two-way HGV movements per day. The significance of these trip generations are considered in the context of the highway geometry in the subsequent section of this report.

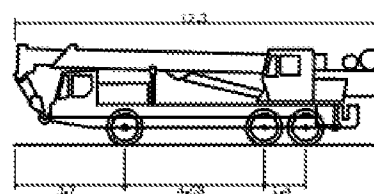
2.3 Construction Vehicles

It is noted that a variety of vehicles will need to access the site during construction. This will include low loaders to deliver plant machinery and articulated goods vehicles to deliver the requisite materials (including aggregate, mounting frames and the solar panels). Cranes shall also be required to assist during the construction and the Applicant confirms that these would be standard road-going mobile cranes. On this basis, the dimensions of the largest vehicles likely to visit the development during construction are shown below.

Figure 2 - Construction Vehicle Dimensions



FTA Design Articulated Vehicle (1998)	
Overall Length	16.480m
Overall Width	2.550m
Overall Body Height	3.870m
Min Body Ground Clearance	0.515m
Max Track Width	2.470m
Lock to Lock Time	3.00s
Kerb to Kerb Turning Radius	6.550m



Large Mobile Crane	
Overall Length	12.300m
Overall Width	2.430m
Overall Body Height	3.386m
Min Body Ground Clearance	0.590m
Track Width	2.430m
Lock to Lock Time	6.00s
Kerb to Kerb Turning Radius	10.000m

2.4 Construction Staff

During construction there is a balance to be made between the intensity of on-site activity and the duration of that activity. In the case of the proposed development, the construction schedule is likely to require no more than 40 construction personnel per day, although car sharing will be employed to minimise traffic so far as is practicably possible.

Construction personnel will arrive and depart prior to and after the respective morning and evening network peak hours.

Construction will take place on Monday-Friday from 08:00-20:00, with efforts to reduce noise levels post 18:00, and Saturdays 08:00-13:00. Work outside these hours will not be undertaken unless agreed with the Local Planning Authority.

The development will provide suitable on-site parking facilities, ensuring no overspill parking occurs the local network. Additionally, two HGV parking spaces will be provided on-site, commensurate with the levels of activity for the proposed development.

As such all vehicles will be parked on site to avoid obstruction to the operation of the public highway and this shall be strictly enforced (see Section 4.0 for details).

2.5 Maintenance

Once operational, the proposed development will be unmanned and will not require significant maintenance, with the exception of monthly visits made by 4x4 vehicle or panel van vehicles.

Thus, in view of the sporadic and insignificant nature of maintenance visits, they can be ignored for the purposes of any CTMP.

2.6 Decommissioning

The decommissioning of the proposed development will be expected to generate a similar (or fewer) number of trips as the construction phase. The traffic associated with the decommissioning phase will be discussed with Local Highway Authority prior to commencement, and appropriate measures will be agreed as necessary at that time.

The decommissioning phase is expected to take half of the construction time and will consist of the exact opposite construction sequence: starting with disconnecting the plant from the grid, removing the substations, inverters, opening of trenches to remove DC and / or AC cables, disconnecting all solar modules, and dismantling the modules and supporting structure.

3.0 Route Appraisal

3.1 Introduction

This section of the report sets out an appraisal of highway geometry and considers the safety performance of the study area highway network to ensure that vehicles are able to travel safely and efficiently to the site, having due regard to the traffic volumes and vehicle types identified previously.

3.2 Route Appraisal

The Applicant is aware of the low railway bridge on the B233 –Yapton Road which has a height limit of 3.6 metres. Considering this together with the proximity of the Strategic Road Network (SRN) via the A27 some 11 kilometres north of the site, construction traffic will follow one of two strict routes to the application site.

The primary route provides the most direct journey to the site and comprise the A29 – Fontwell Avenue, and the B2233 – Barnham Road. Vehicles with heights in excess of the 3.6 metre limit will be required to take the slightly longer route incorporating the B2132 and B2233 – Yapton Road.

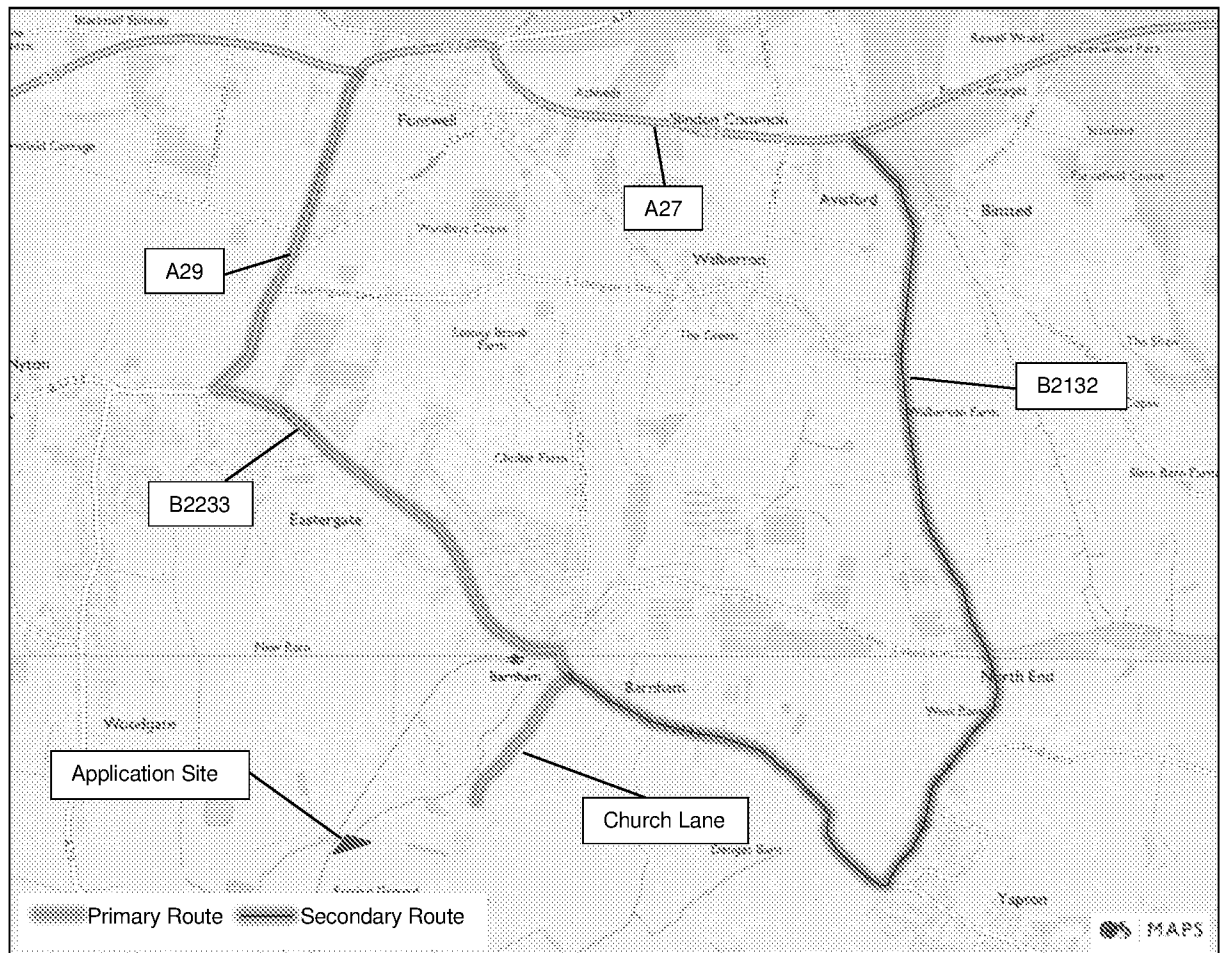
As such, the primary route will approach Church Lane from the west, where construction vehicles will turn right onto Church Lane and proceed south toward the site access. The secondary Route will approach from the east, subsequently, construction vehicles will turn left onto Church Lane.

Vehicles will exit the site onto Church Lane and travel north towards the Church Lane / B2233 junction. At this point vehicles will turn to match their corresponding entry route.

In view of the localised routing, the salient issue is to ensure that the geometry of the road allows for sufficient opportunities for a car and a heavy goods vehicle to pass side-by-side. In this respect, the CTMP references the *Manual for Streets* (Department for Transport, 2007) road width of 4.8 metres.

The proposed construction traffic routing is shown in the below Figure.

Figure 2 - Routing Strategy



3.2.1 A27 / A29 – Fontwell Avenue

All goods vehicles below 3.6 metres in height shall travel via the A27 and turn onto the A29 – Fontwell Avenue via a 4-arm roundabout incorporating Arundel Road.

The junction has an Inscribed Circle Diameter (ICD) of circa 55 metres, consisting of a kerbed central island of 25 metres and a circulatory carriageway 15 metres in width. The A27 eastbound approach consists of a flared three lane entry whereas the A27 westbound approach comprises a flared two lane approach. All entry lanes are of sufficient width to accommodate the types of vehicle associated with the construction of the application site.

The junction is street-lit and appears compliant with DMRB standards.

At this location the A29 – Fontwell Avenue accommodates a single lane two-way carriageway of circa 6 metre width, which is sufficient to enable two goods vehicles to pass side-by-side with relative ease.

3.2.1 A27 / B2132 – Yapton Lane

Goods vehicles with an overall body height greater than 3.6 metres shall travel via the A27 and turn onto the B2132 – Yapton Lane via a left-in/left-out priority junction that incorporates a ghost right turn lane.

The ghost right turn lane is circa 4 metres in width and provided over some 100 metres west of the junction, which appears to be compliant with DMRB guidance and would therefore be suitable in accommodating HGV movements. The diverging taper from the westbound approach of the A27 is approximately 100 metres in length, with the merging taper is provided over some 170 metres.

In view of the above, the junction is considered to be suitable to accommodate the type and volume of traffic anticipated within the construction of the application site.

At this location the B2132 – Yapton Lane comprises a single lane two-way carriageway circa 7 metres in width, sufficient to enable two goods vehicles to pass side-by-side.

Approximately 1 kilometre south of the A27 / B2132 junction the B2132 forms a 3-arm mini roundabout junction incorporating The Street, with the B2132 continuing south. Both B2132 approaches consist of flared entries of approximate 5 metre widths which is sufficient for a HGV and car to enter side-by-side. Visibility at the junction is measured from a set-back of 2.4 metres and is attainable over an approximate distance of 40 metres in the northern direction, whilst visibility from the southern approach measures circa 50 metres. In view of the above, the junction is considered suitable to accommodate the type and volume of traffic anticipated within the construction of the application site.

It has been noted that approximately 1.4 kilometres to the south of the aforementioned roundabout signposts prior to the level crossing on the B2132 Yapton Lane require drivers of long low vehicles to phone before crossing. This has subsequently been addressed within the traffic management (Section 4.0) of this report.

3.2.2 A29 – Fontwell Avenue / B2233 – Barnham Road

Approximately 1.6 kilometres south of the aforementioned roundabout the A29 –Fontwell Avenue forms a standard 3-arm roundabout with the B2233 – Barnham Road and A29 – Nyton Road.

The junction has an ICD of some 25 metres, comprising a kerbed central island of 9 metres and a circulatory carriageway 8 metres in width, the noted deposition of detritus suggests a single lane operation.

The A29 and B2233 approaches consists of a single flared lane entry with carriageway widths of some 4 metres. The A29 - Nyton Road approach comprises a flared two-lane entry circa 6 metres, sufficient to enable two goods vehicles to pass side-by-side. Whilst the B2233 – Barnham Road approach consists of a single lane entry of some 3.2 metres in width. Visibility measures circa 115 metres for the

A29 approach, with the B2233 approach measuring approximately 21 metres, from a set-back of 2.4 metres.

The junction is street-lit and appears broadly compliant with DMRB standards, subsequently, is considered suitable to accommodate the types of vehicles anticipated in connection with proposed development.

At this location the B2233 – Barnham Road comprises a single lane two-way carriageway approximately 6 metres in width, which is sufficient to enable two goods vehicles to pass side-by-side.

3.2.3 B2132 – Yapton Lane / B2233 – Yapton Road

Vehicles associated with the construction of the application will then turn right onto the B2233 – Yapton Road via a 3-arm mini roundabout, approximately 3 kilometres east of the application site. The junction has an ICD of approximately 15 metres, with a possible overrun area of some 4 metres. The B2132 approach is provided as a flared two lane entry circa 6 metres in width, whereas, an overrun area is present on the B2233 eastbound approach narrowing the entry to an effective 3.5 metres. Visibility measures and approximate 25 metres 34 metres, at a set-back of 2.4 metres, for the respective entries.

The junction is street-lit and appears compliant with DMRB standards, subsequently, is considered suitable to accommodate the types of vehicles anticipated in connection with proposed development.

3.2.4 B2233 – Yapton Road / Church Lane

Vehicular access to the proposed development will utilise Church Lane which forms a priority junction with the B2233 approximately 1.6 kilometres north east of the site access. The priority junction provides a spur, approximately 26 metres in length, for vehicles approaching from the east, separated by a triangular island.

Visibility from the junction is provided at circa 15 metres towards traffic approaching from the west and approximately 60 metres to the east, from a set-back of 2.4 metres. The reduced visibility to the west is reflective of the fact that traffic shall not be travelling at the posted speed limit due to 'SLOW' markings in place prior to the low bridge in place, approximately 100 metres to the west of the junction.

The junction radii measure approximately 8 metres to the west and circa 31 metres to the east. In combination with the width of highway in these areas, the junction is able to accommodate the swept-path requirements of large goods vehicles.

In view of the above, the junction is considered suitable to accommodate the type and volume of traffic anticipated within the construction of the application site.

Church Lane comprises an unmarked road varying in width throughout its extent, ranging from approximately 4.8 metres to 3.7 metres. The Swept path analysis provided at Appendix A has identified

numerous sections along the lane which offer sufficient width to allow goods vehicles to pass cars, with several sections sufficiently wide to allow HGV's to pass side-by-side. Further analysis of the lane has defined intervisibility between unpassable sections, consequently, the traffic management section of this report (Section 4.0) identifies measures to allow vehicles to pass safely.

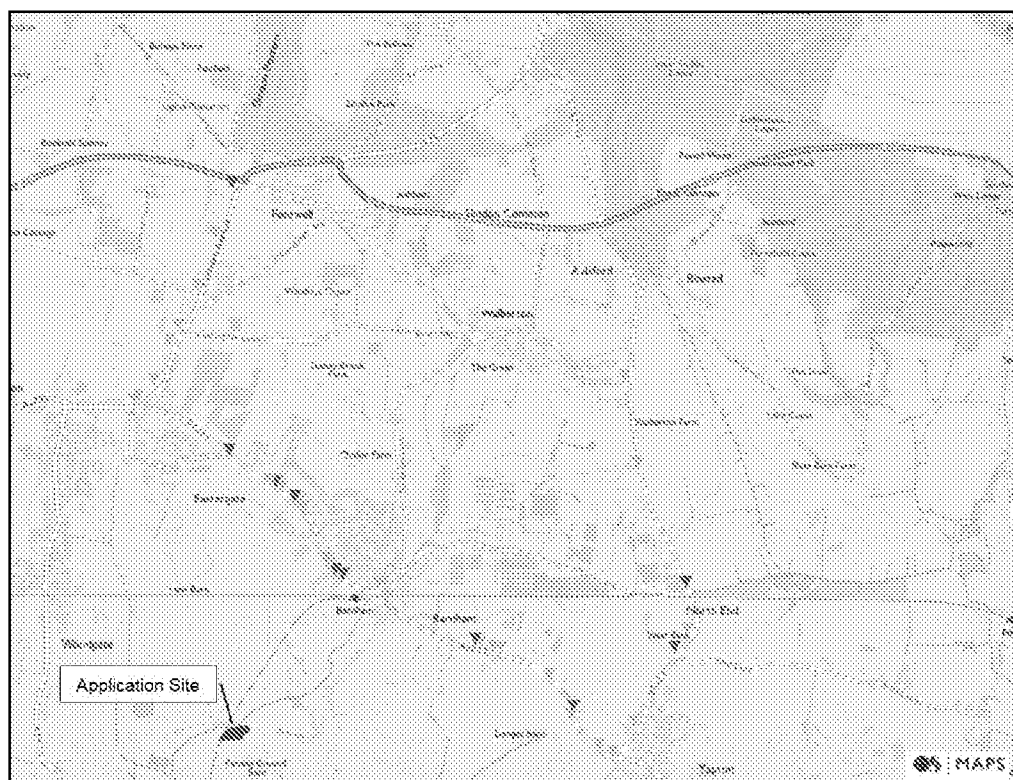
3.3 Highway Safety

Personal Injury Accident data has been analysed for the length of the A29, B2233 – Barnham Road / Yapton Road and B2132 – Yapton Lane for the period between 01/01/2009 and 31/12/2013.

The data indicates that a total of 42 accidents occurred on the study area highway network within the aforementioned period, which equates to eight accidents per year. Of all the accidents, 10 were classified as resulting in 'serious' injury with the remaining 32 accidents having resulted in 'slight' injury.

For the sake of clarity, a 'slight' injury is defined as an injury of a minor character such as a sprain (including whip lash), bruise or cut, or slight shock requiring roadside attention. A 'serious' injury is defined as one that requires hospitalisation or includes fractures, concussion, internal injuries, crushing, burns etc. The accident data is plotted on the Figure below.

Figure 3 - Personal Injury Accident Data



It is evident from the above that there are very few accidents within the vicinity of the proposed site. It is noted that 24 accidents occurred along Barnham Road and Yapton Road, consisting of 7 'serious' and 17 'slight' incidents.

Whilst the causation of the accidents identified has not been analysed in great detail, there is no clustering or pattern of accidents that is suggestive of a deficiency in the geometry of the highway network that could be materially worsened by the low volume and temporary nature of construction traffic associated with the proposals.

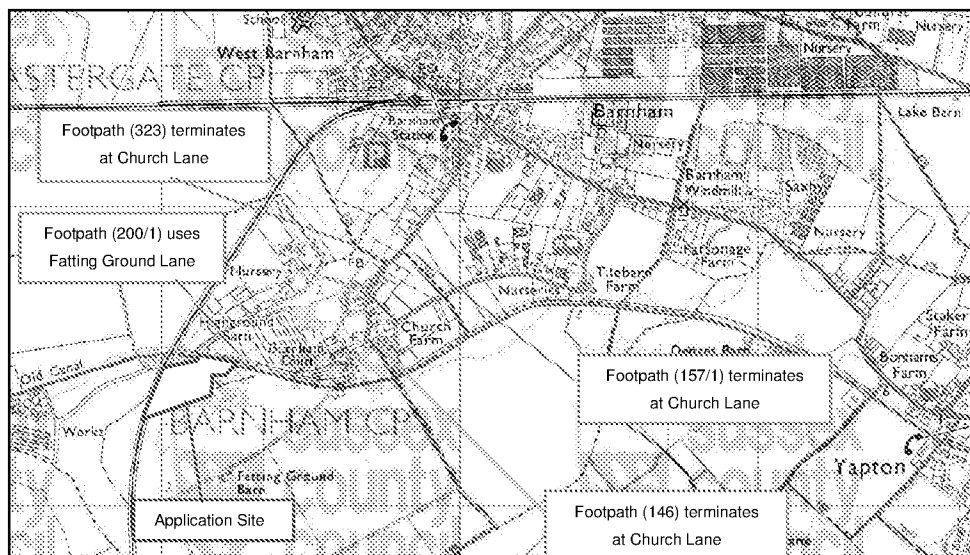
3.3.1 Conclusion

In view of the above, there is no pattern or frequency of accidents that would suggest a deficiency in the layout of the road network that is leading to an unacceptable safety record. Notwithstanding this, however, accidents were recorded within the village of Barnham and it would be prudent to mitigate for construction traffic in these areas given the size of construction vehicles relative to the geometry of the road (see Section 4.0 for details).

3.4 Public Rights of Way (PRoW)

West Sussex County Council's online Definitive Public Rights of Way map below indicates the footpaths present within the vicinity of the application site. Footpath (200/1) routes east to west along the northern boundary of the site and crosses the site access. In addition, three other footpaths terminate along Church Lane; footpaths (157/1) and (323) terminate prior approximately 870 and 900 metres north east of the site respectively. Footpath (146) also terminates opposite St. Mary's Church, some 600 metres east of the application site.

Figure 4 - Public Rights of Way (PRoW) Network



Consideration is therefore required within the CTMP regarding the management of potential conflict between users of the PROW network and construction traffic.

4.0 Traffic Management

The previous sections of this report have confirmed that there are no significant issues that would preclude the construction of the proposed development. Notwithstanding this however, the Applicant is keen to minimise the impact of their operations so far as is practicably possible and thus, this Section of the report identifies a suite of traffic management initiatives that have been designed to respond to the findings of the preceding analyses.

4.1 Proposed Measures

1. Drivers of goods vehicles travelling to the site shall be made aware of the routing strategy in place at the site prior to setting off, although temporary road signs shall be provided at the junctions of the;
 - A27 / A29 roundabout
 - A27 / B2132
 - A29 / B2233 roundabout
 - B2132 / B2233 roundabout
 - B2233 / Church Lane
2. The Applicant is willing to enter into a Routing Agreement controlled by a Section 106 Agreement to ensure that all deliveries are made via the A29 / B2233 or B2132 / B2233 turning onto Church Lane, depending on vehicle type, with the reverse for outbound journeys.
3. As such, and considering the composition of the Church Lane, route management will need to be implemented to ensure vehicles associated with construction do not meet each other on the sensitive sections of the route, shown at Appendix A.
4. Temporary warning signs shall be erected prior to more narrow sections along Church Lane, alerting all drivers to the increased presence of goods vehicles. The signs will also act to remind HGV drivers of the approaching narrow section of the network and to consider entering if an approaching vehicle is observed. At the locations, vegetation within the highway verge shall also be trimmed where necessary in order to reinstate sightlines and to maximise intervisibility.
5. A shuttle working system will be implemented from the lay-by prior to The Old Vicarage extending over an approximate distance of 340 metres to the application site. Where inbound vehicles will have priority over vehicles egressing the site. The shuttle system will utilise a real-time internal communication system, directed by the site Traffic Manager, informing vehicles

approaching / within the site of vehicles using the aforementioned 340 metre length of Church Lane. Ensuring vehicles are 'held back' in specified locations when necessary.

6. A vehicle compound shall be created using compacted gravel to ensure that vehicles are able to arrive and depart the site in a forward gear, avoiding the need for reversing manoeuvres onto the public highway. The compound shall also be capable of accommodating a turning vehicle whilst at least one vehicle is parked, to allow for vehicles to be 'held back' during restricted periods (see below).
7. Warning signs shall be positioned where the PRow network meets with Church Lane in order to warn pedestrians of the possibility of approaching goods vehicle traffic. At these locations, vegetation within the highway verge shall be trimmed-back where necessary in order to reinstate the sight-lines to maximise inter-visibility. Warning signs shall also be erected within the village of Barnham to pedestrians of approaching goods vehicle traffic.
8. Vehicles using the secondary route will be made aware of the level crossing and requirement to phone before crossing.
9. A variety of vehicles from a number of suppliers will arrive and depart the site during construction and to ensure there is sufficient capacity on-site to accommodate the vehicles, their arrival and departures will be sequenced. A site Traffic Manager will be appointed to supervise this process in 'real-time' and procedures will be put in place whereby all HGV arrivals will call the Traffic Manager 24 hours before departure and 1 hour before arrival. This continuous line of communication will ensure there is always adequate space on-site to accommodate the parking and manoeuvring requirements of construction traffic.
10. Prior to commencement on site, the pro-forma contained at [Appendix C](#) shall be completed by the Applicant in order to provide the Local Highway Authority and nearby stakeholders with the contact details of relevant site manager. It shall be the responsibility of this named individual to respond to any complaints raised by the Local Highway Authority or local members of the public.

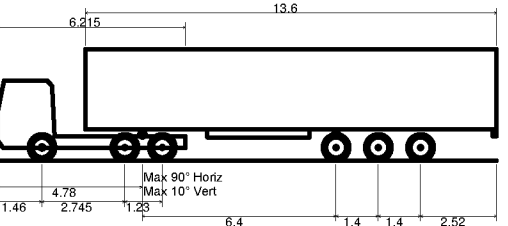
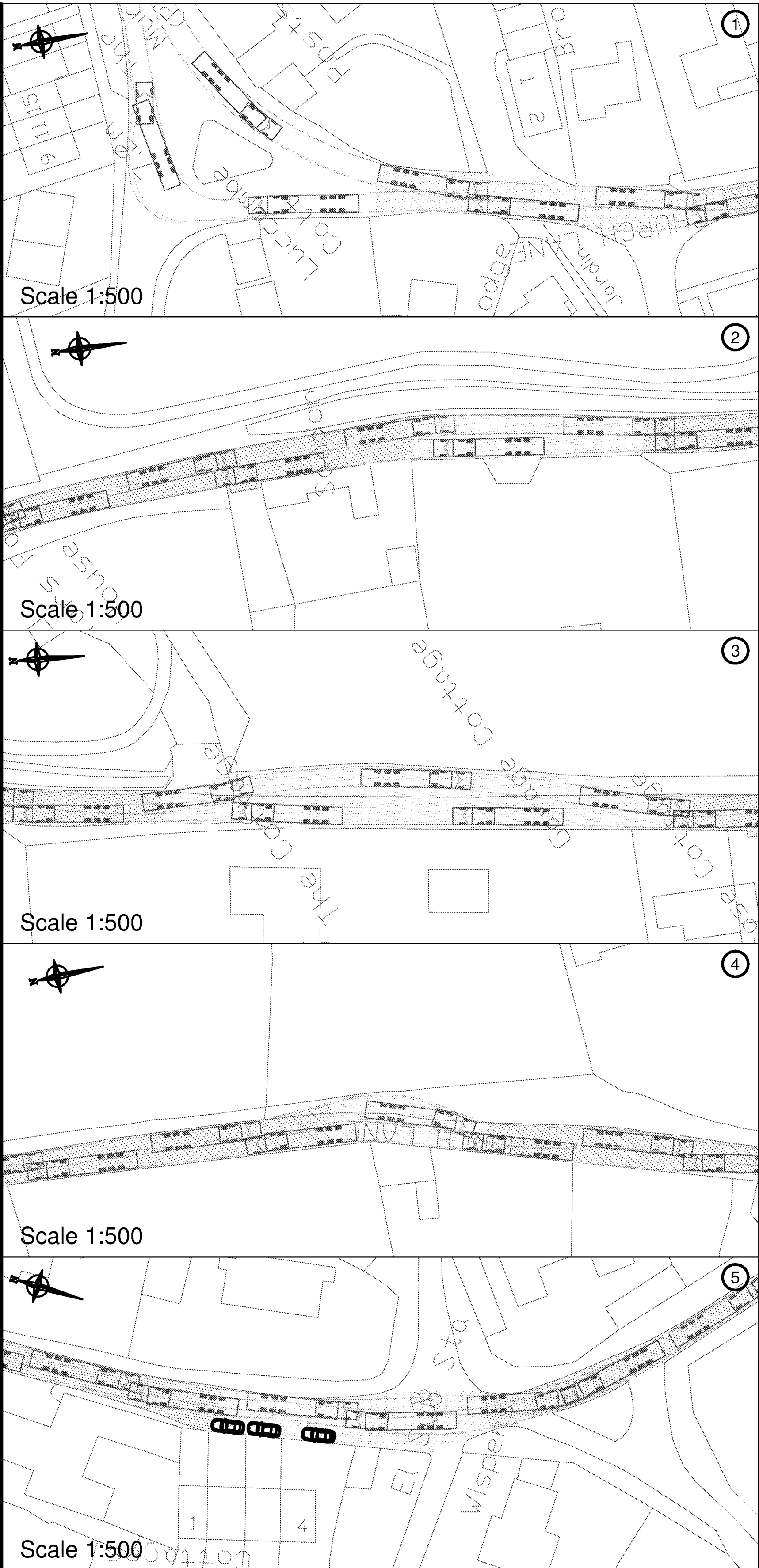
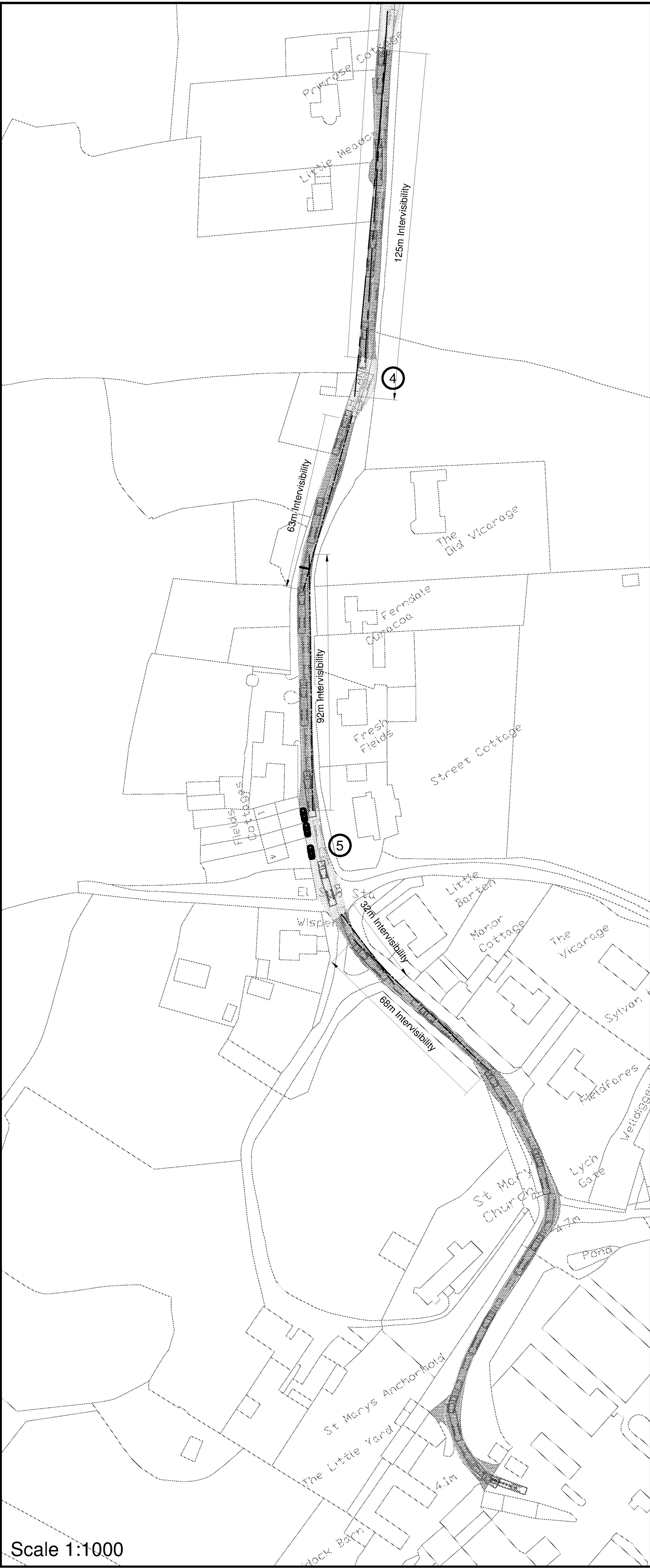
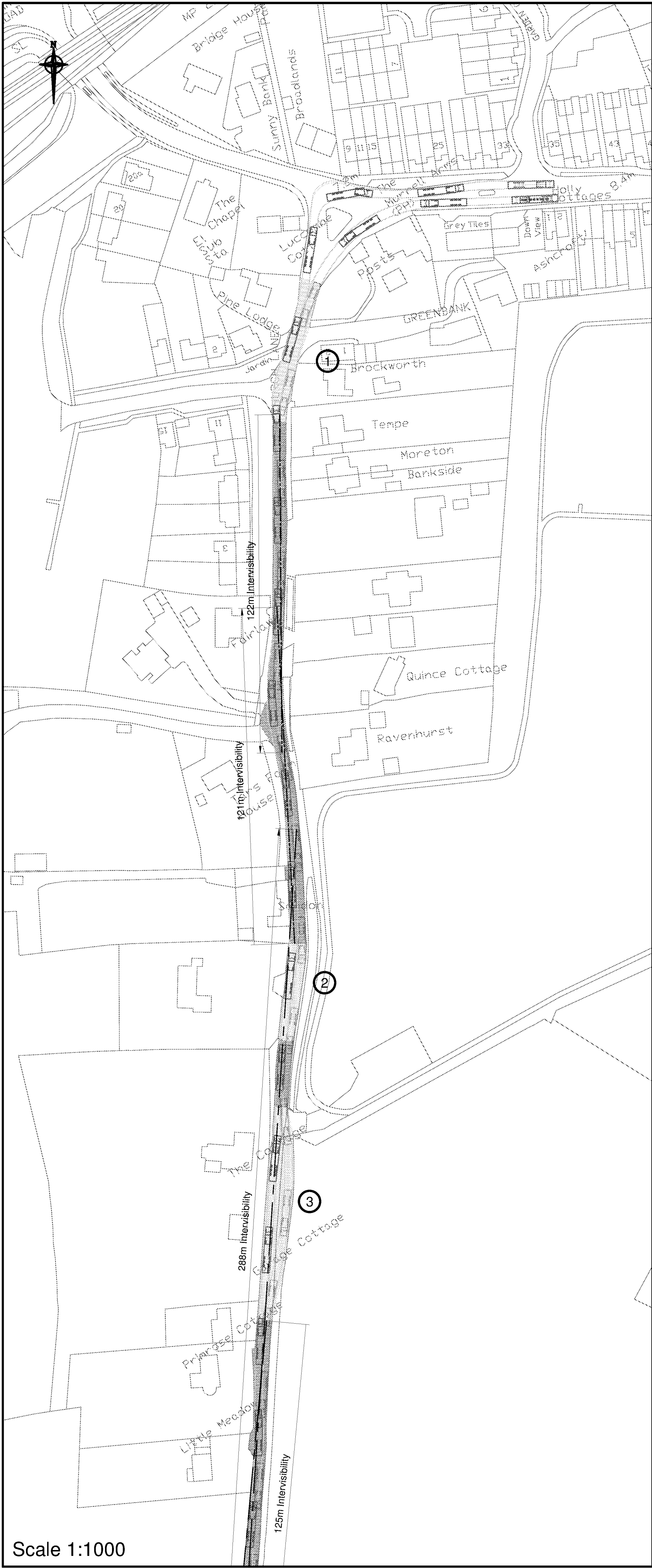
5.0 Report Conclusion

This CTMP has evaluated the likely traffic effects associated with the construction of the development of a solar farm at Barnham Court Farm, Barnham, West Sussex.

The report has calculated the typical trip generations and used these to inform a view of the likely significance of any potential issues that were identified in the appraisal of the adjoining highway networks. The resultant evaluation identified a number of areas where mitigation of the impacts would be advisable but no area where the impacts would be unacceptable, even without mitigation.

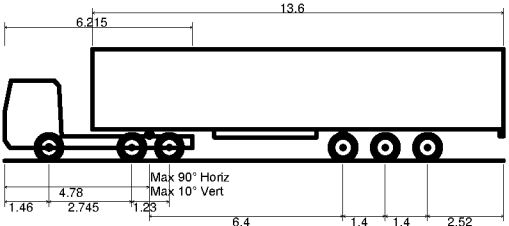
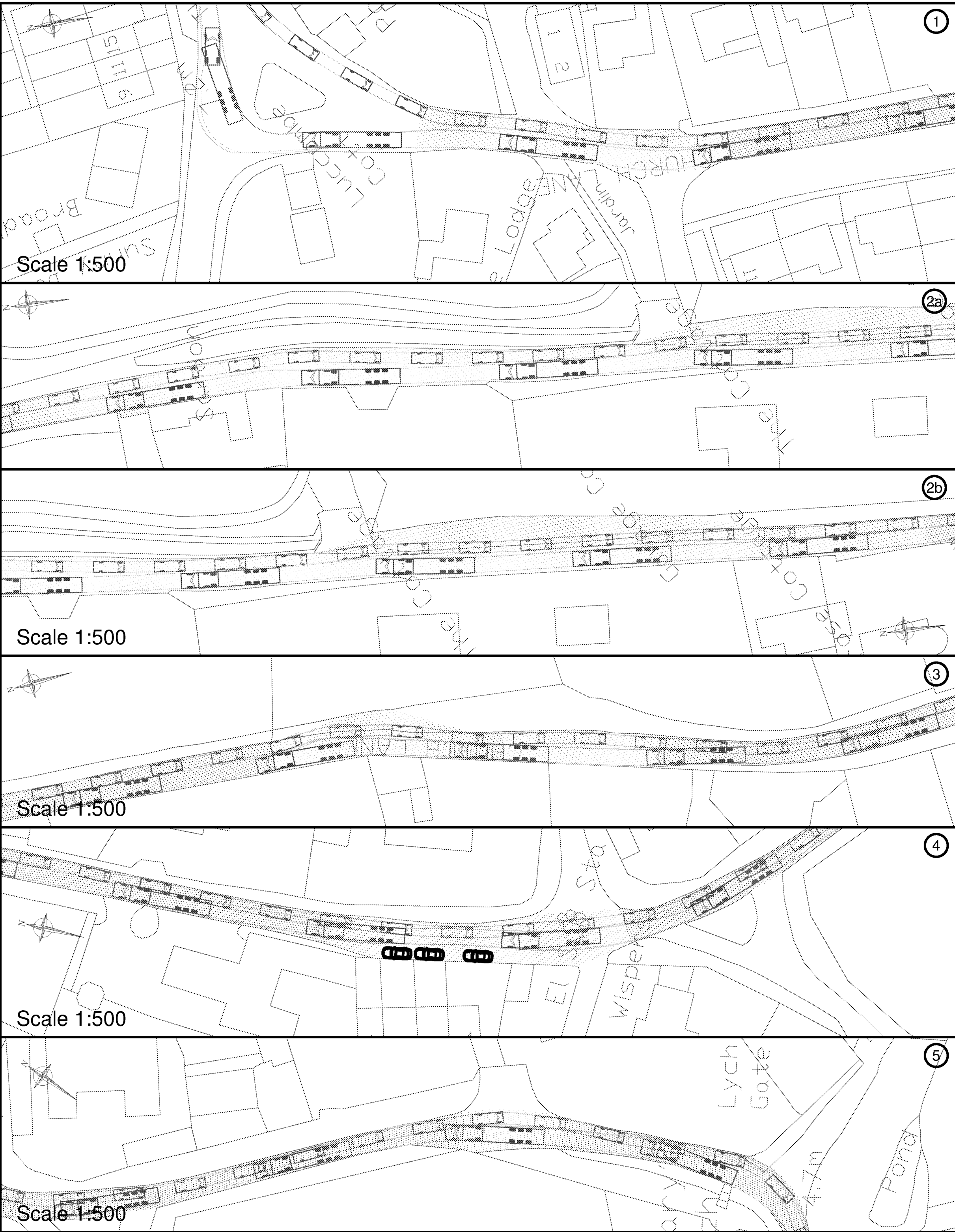
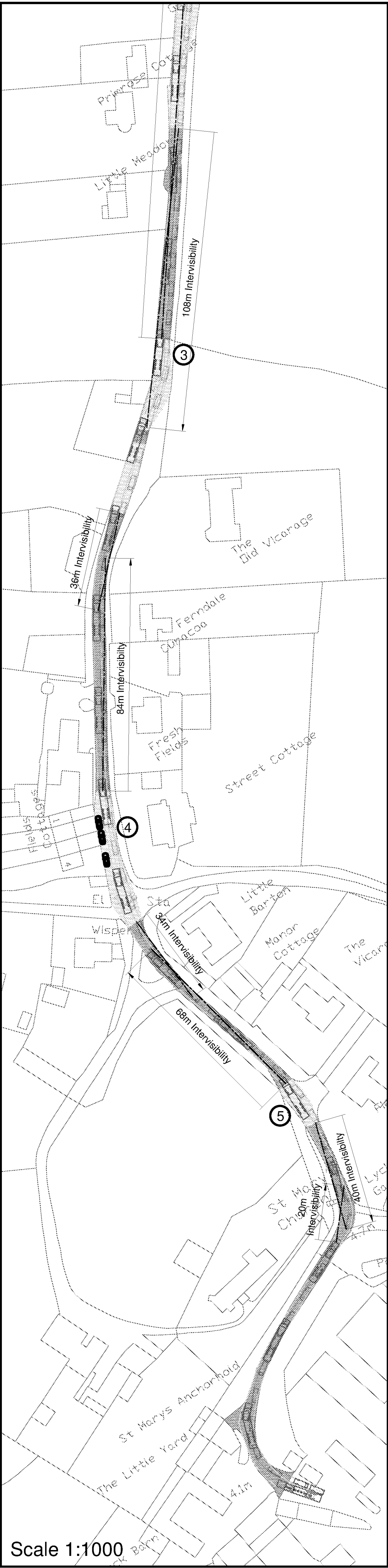
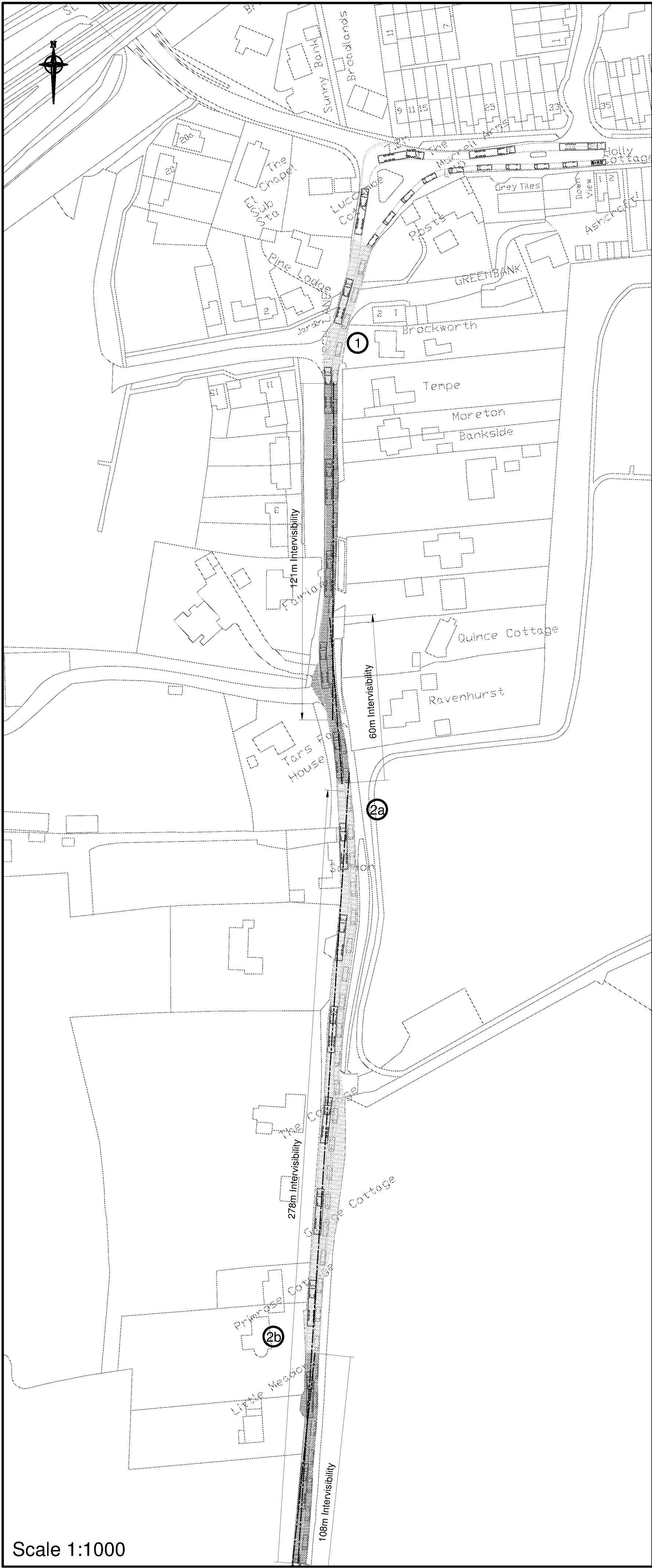
In view of this, the CTMP and its incorporated measures work towards providing for a continued safe and efficient highway network during the particularly limited construction phase.

Appendix A – Swept Path Analyses

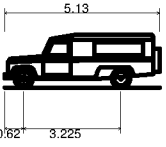


Articulated Vehicle with Twin Steered Tractor
Overall Length 16.500m
Overall Width 2.550m
Overall Body Height 3.691m
Min Body Ground Clearance 0.426m
Max Track Width 2.500m
Lock to Lock Time 6.00s
Kerb to Kerb Turning Radius 6.987m

Rev	Description	Date	By	Chk
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Information				
Client:				
Project: Barnham Court Farm, Barnham				
Drawing: Passing Opportunities Along Church Lane Articulated Vehicles				
Scale: As Shown	Size: A1	First Issue: 07/15	Drawn: LJ	Checked: RW
Drawing Number: TPBR0111-H-001				



Articulated Vehicle with Twin Steered Tractor
Overall Length 16.500m
Overall Width 2.500m
Overall Body Height 3.691m
Min Body Ground Clearance 0.426m
Max Track Width 2.500m
Lock to Lock Time 6.00s
Kerb to Kerb Turning Radius 6.987m



Utility 4x4 (LWB) (2006)
Overall Length 5.130m
Overall Width 1.790m
Overall Body Height 1.750m
Min Body Ground Clearance 0.289m
Track Width 1.701m
Lock to Lock Time 4.00s
Kerb to Kerb Turning Radius 7.540m

Rev	Description	Date	By	Chk
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Information

Client:

Project: Barnham Court Farm, Barnham

Drawing: Passing Opportunities Along Church Lane
Articulated Vehicle & Utility 4x4 (LWB)

Scale:	Size:	First Issue:	Drawn:	Checked:
As Shown	A1	07/15	LJ	RW

Drawing Number: © This drawing is the copyright of Curtins Consulting Ltd. Revision:

TPBR0111-H-002

Appendix B – Summary of Measures



APPENDIX C – CONTACT LIST

Project Manager

Name	T.B.C
Contact Number	T.B.C
Contact Email	T.B.C

Site Supervisor

Name	T.B.C
Contact Number	T.B.C
Contact Email	T.B.C

Local Planning Authority

Name	T.B.C
Contact Number	T.B.C
Contact Email	T.B.C
Planning Permission Number:	T.B.C

Local Highway Authority

Name	T.B.C
Contact Number	T.B.C
Contact Email	T.B.C

Local Resident Representative

Name	T.B.C
Contact Number	T.B.C
Contact Email	T.B.C

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