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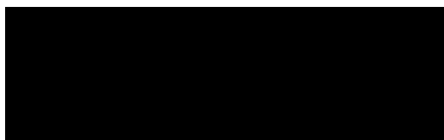
TRANSPORTATION ASSESSMENT

Burndell Road, Yapton, West Sussex BN18 0HR

For Brookworth Homes Limited

APRIL 2014

Stilwell Limited
Consulting Engineers
Satelliet House
2 Nexus Park
Lysons Avenue
Ash Vale, GU12 5QE



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Approvals

This document requires the following approvals:

Name	Title & Organisation
David Brooke	Director - Stilwell Limited

Distribution

This document has also been distributed to:

Name	Organisation
Gavin Rowley	Brookworth Homes Limited
John Escott	Robinson Escott Planning
Dominic Smith	Highways - West Sussex County Council
Cian Cronin	Planning - Arun District Council

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1.0 INTRODUCTION

- 1.1** The Stilwell Partnership has been instructed by Brookworth Homes Ltd, to undertake a Transport Assessment to accompany a Planning Application for the proposed residential development at Burndell Road, Yapton.
- 1.2** The purpose of this study is to advise the Local Authority, Arun District Council and the Highway Authority, of the Transportation Impact that the proposed development could have on the local highway network.
- 1.3** An initial scoping report was sent to the Highway Authority (see **Appendix A**) and the initial response has been included in **Appendix B**. The initial comments raised by the Highway Authority have been taken on board within this report.
- 1.4** In **Section 2** we detail the national and local Planning Policies. In **Section 3** we describe the site location in relation to the highway network and describe the existing situation and traffic conditions. In **Section 4** we look at the proposed development. **Section 5** details the likely impact of the proposals on the surrounding highway network and **Section 6** details the sustainability of the site in relation to public transport, walking and cycling opportunities. **Section 7** concludes the report.

2.0 PLANNING POLICY CONTEXT

- 2.1** This section of the report provides a summary of the policy documents which are relevant to the proposed development at Burndell Road, Yapton. These include: The Transport White Paper 'Creating Growth, Cutting Carbon', The National Planning Policy Framework (NPPF), and Arun District Council Local Plan.

TRANSPORT WHITE PAPER – CREATING GROWTH, CUTTING CARBON (JANUARY 2011)

- 2.2** 'Creating Growth, Cutting Carbon' sets out the government objectives for a greener and safer transport network that encourages economic growth and improves quality of life for communities.
- 2.3** The White Paper encourages the implementation of sustainable local transport systems and aims to remove the previous top-down approach to transport planning. Local Authorities will have the power to implement and tailor transport systems and schemes based on local needs and behaviour.
- 2.4** The economic aims of the White Paper can be achieved by increasing access to employment and services, reducing carbon emissions, increasing public transport accessibility, and as a by-product, increasing the number of people using safer transport methods with wider health benefits.
- 2.5** The White Paper notes the key role of travel planning in achieving government objectives, as set out below:

"The Government wants to encourage and enable more sustainable transport choices. [...] In transport terms, this might be exemplified by reducing unnecessary signs, posts and other street clutter to improve road safety and encourage walking, by travel planning, or by presenting information in such a way as to encourage choice"

- 2.6** Successful travel planning schemes are noted and used as examples within the White Paper, including Travel Planning for Schools, Cycle Journey Planning and Area-Wide Travel Planning. At Cambridge Science Park an initial investment of £70k brought about £200k benefits and a 5-6% reduction in journey times. The success shown in the White Paper Case Studies should be used to encourage the implementation of other travel planning schemes.

NATIONAL PLANNING POLICY FRAMEWORK (2012)

2.7 On the 27th March 2012 the National Planning Policy Framework was published, which sets out the Governments planning policies for England. The new document is a key part of the Governments reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

2.8 With regards to sustainable travel NPPF states:

Para 29

Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives. Smarter use of technologies can reduce the need to travel. The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. However, the Government recognises that different policies and measures will be required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas.

Para 30

Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.

Para 32

All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. 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 will cost-effectively limit 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.

Para 36

A key tool to facilitate this will be a Travel Plan. All developments which generate significant amounts of movement should be required to provide a Travel Plan.

ARUN DISTRICT COUNCIL LOCAL PLAN (2003 - 2011)**Policy GEN1 Sustainability**

- 2.9** All development must take full account of the need to protect the environment so that present-day demands do not compromise the ability of future generations to meet their own needs or enjoy a high quality environment. All development must reflect the need to safeguard and improve the quality of life of residents, conserve energy resources and protect and, where possible, enhance the Plan area's essential character and environmental assets such as:

- the Sussex Downs AONB;
- the general attractiveness and diversity of the landscape;
- the open and undeveloped nature of the countryside;
- areas of wildlife and ecological value;
- the setting, form and character of settlements;
- the quality of natural assets, such as air supply, water environments and high quality agricultural land;
- buildings and areas of historic and architectural interest;
- sites of archaeological importance;
- land of recreation and amenity value;
- the public rights-of-way network.

Reason

To meet the primary aim of the Plan. The importance of environmental considerations in maintaining the quality of life, including access to social and economic facilities, is widely recognised, as is the protection of the environment.

Policy GEN12 Parking in New Development

- 2.10** Policy GEN12 seeks to ensure that new development is supported by adequate car parking. It explains that parking should be provided in accordance with the adopted standards and advises that if those standards are exceeded, permission will be refused. Appendix 2 of the plan sets out the parking standards, requiring the following in estate development of 2 units or more:

<i>Unit Type/Size</i>	<i>Requirements</i>	<i>Provision</i>
Smaller house size	1 garage or forecourt space, plus 1.2 visitor parking space	2.2 spaces per unit
Larger house size	2 garage or forecourt spaces plus 1.2 visitor parking space	3.2 spaces per unit
Flats with 3 or more habitable rooms	1 parking space plus 0.7 spaces for visitors	1.7 spaces per qualifying unit

Policy GEN14 Public Transport

- 2.11** The Council will support the provision of comprehensive public transport services throughout the District, and encourage improvements to be made to services wherever possible. Where appropriate, new development will be required to make provision for public transport facilities.

Where new development can only take place with improvements to public transport services, or such improvements would be likely to influence desirable travel patterns, the Local Planning Authority will seek contributions towards the cost of improvements.

Reason

To help ensure the provision of an effective public transport system in the interests of sustainability.

Explanation

An effective public transport system is essential if the growth in private transport, particularly car transport, is to be reduced. However, the District Council has limited scope for directly influencing public transport provision, but can encourage new development to make provision for public transport (by, for example, improved or new services, provision of facilities including bus lay-bys and shelters), and can provide their support for services through lobbying etc.

Policy GEN15 – Cycling and Walking

- 2.12** The Council will continue to work with West Sussex County Council and others to encourage and support the development of safe cycle and footpath networks. Where appropriate, new development will be required to provide safe and attractive facilities for cyclists and pedestrians, both within the site and in the form of links to the surrounding area. The proposed Barnham - Felpham and River Arun cycle routes will be protected from development which would preclude their use as a safe cycle route.

Reason

To enhance the provision of safe facilities for cyclists and pedestrians.

Explanation

Safe and convenient provision for cyclists and pedestrians is an essential part of policies being pursued to reduce the use of the private motor car. New development will, where appropriate, be required to facilitate the opportunity for increased cycle use and walking by providing, as an integral part of the development, safe cycle and footpath networks. In assessing the suitability of new routes, proposals should demonstrate that they will not prejudice the effective operation of existing uses.

Cycle routes are to be created between Barnham - Felpham, together with a route along the banks of the River Arun from Littlehampton to Arundel.

3.0 SITE LOCATION AND EXISTING SITUATION

Existing Site Description

- 3.1 The site is currently a parcel of land, located to the south of Burndell Road, Yapton. The site generally consists of open agricultural land bound by trees and hedging. A Location Plan can be seen in **Figure 1** below.



Figure 1: Site Location

Burdell Road (B2233)

- 3.2 Burdell Road is a “B” classified road that serves many residential properties. To the north is the A29 and to the south is the A259. It is approximately 7.3m wide at the location of the proposed site access and is subject to a 30mph speed limit. There is currently a footway provided along the northern kerb line. There are no waiting restrictions along its length, and there are parking laybys adjacent to the site. A number of evening observations have confirmed that these laybys are not used for parking.

Accidents

- 3.3 Records of the latest five years, vehicular accident data was obtained via the crashmap website. There have been no accidents within a 500m radius of the site.
- 3.4 In our opinion, the development proposals should not give rise to any new material highway safety problems in the study area.

Existing Traffic Flows

- 3.5** An Automatic Traffic Counter (ATC) was placed on Burndell Road, in the immediate vicinity of the proposed site, between Thursday 23rd January 2014 and Tuesday 4th February 2014. This allowed us to determine the number of vehicles using the road and the speed at which they were travelling. The Full ATC data is included at **Appendix C**. and **Tables 1** and **2** below show the average weekday traffic flows recorded for the AM and PM peak hours.

Table 1 – AM Peak hour traffic (08:00am – 09:00pm)

	Westbound	Eastbound
Burndell Road	280	271

Table 2 – PM Peak hour traffic (17:00am – 18:00pm)

	Westbound	Eastbound
Burndell Road	279	361

85th Percentile Speeds

- 3.6** The 85th percentile speeds recorded were;

- **37.6mph Eastbound**
- **37.4mph Westbound**

Sustainability

- 3.7** The now withdrawn, Planning Policy Guidance 13 (PPG13) defines a distance of 5,000m, within which 'cycling can reasonably be considered as an alternative to travelling by private car'. On the basis of a relatively slow cycling speed of 15kph, Barnham, Flansham, Ford, Climping, Elmer, Middleton-on-Sea and Bognor Regis can be reached.
- 3.8** There are several bus stops on Burndell Road. There are three railway stations within 5km of the site at Barnham, Littlehampton and Ford. Public transport is discussed in greater detail in **Section 5** of the report.

4.0 PROPOSED DEVELOPMENT

Proposed Development

- 4.1 The proposal is to develop the land for residential purposes comprising 45 residential units. The development will consist of a mix of private (32 – 70%) and affordable (13 – 30%) units, with additional open space for play areas. The proposal will include a new access point from Burndell Road and improvement works to the existing highway.

Proposed Accommodation Schedule

- 2 x 1 Bedroom Coach Houses
- 14 x 2 Bedroom Houses
- 6 x 3 Bedroom Bungalows
- 19 x 3 Bedroom Houses
- 4 x 4 Bedroom Houses

Car Parking

- 4.2 According to Arun District Council Parking Standards, the **maximum** standard for the development is 112 car parking spaces. Additionally WSCC have a parking matrix which is used to determine parking requirements in new developments. As shown in the parking matrix at **Appendix D**. This indicates a maximum standard of 104 car parking spaces, including 15 unallocated spaces.
- 4.3 In line with both Arun District's and WSCC's parking standards, the development is providing 102 car parking spaces, including 13 unallocated spaces for visitors.

Proposed Access – Burndell Road

- 4.4 A new vehicular access from Burndell Road will be provided at the location of the existing gated entrance. The access will be suitable for two way traffic flows and be a minimum of 5.5m wide. A 2.0m wide footway will be provided which will link into the existing footway network. The proposed access and footway improvements can be seen in **Appendix E**. This access will serve 45 dwellings, but is designed to accommodate additional traffic. The proposed improvement works reduce the capacity of the laybys, however as detailed previously a number of evening observations have confirmed that these laybys are not used.

Road Safety Audit

- 4.5 The new access has been subject to a Stage 1 Road Safety Audit and a copy is attached at **Appendix F**. The two points raised by the auditor have been taken on board in the latest design and a Designers Response is included at **Appendix G**.
- 4.6 In order to provide appropriate sightlines and improved pedestrian facilities there will be the need to enter into a S278 agreement to secure these improvements.

Sightlines

- 4.7** Sightlines far in excess of those recommended in Manual for Streets have are achievable from the proposed access. For speeds in the region of 37mph Manual for Street suggests sightline in the region of 59m. However, the following sightlines are achievable;

- **2.4m x 72m in the leading direction**
- **2.4m x 90m in the trailing direction**

Internal Layout

- 4.8** The internal layout has been designed as a mixture of shared surfaces and dedicated pedestrian links to encourage all modes of transport. The road can be designed to adoptable standards and will be offered for adoption, subject to the detailed Planning Application. Throughout the site, turning heads will be provided for service vehicles.

Refuse Collections

- 4.9** The residential refuse will be collected in line with the existing arrangements for other residential properties within the area. Each unit will be provided 240 litres of residual waste storage/bins. The refuse collection vehicle for the area will enter the proposed development in a forward gear, service all of the properties easily and safely and exit the site in a forward gear.

5.0 HIGHWAY IMPACT

- 5.1** When undertaking a Transportation Assessment (TA) for a new site, it is normal practice to consider the likely impact of the proposed development in the peak hours (08:00 – 09:00 and 17:00 – 18:00), i.e. when the combination of the existing traffic and the proposed is at its highest. Using the nationally recognised TRICS database we have derived the likely traffic that would be generated by the site (results can be seen in **Appendix H**).
- 5.2** All of the TRICS data used is based on a variety of similar size sites, throughout the UK, for the housing and apartment elements, surveyed within the last 6 – 8 years. The TRICS data suggests the following trip rates.

Table 3 – TRICS trip rates for similar sites

	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
Proposed Houses	0.173	0.516	0.431	0.270

- 5.3** Using the trip rates in **Table 3**, the proposed residential houses could generate the following trips as shown in **Table 4** below:

Table 4 – Trips associated with proposed development using TRICs Data

	Coverage No	AM Peak Trips		PM Peak Trips	
		Arrival	Departure	Arrival	Departure
Houses	45 Units	8	23	19	12
TOTAL	45 Units	8	23	19	12

- 5.4** From **Table 4**, it can be seen that the proposed development would generate **31**, two-way movements in the AM peak hour and **31** two-way movements in the PM peak hour.

Network Traffic Growth

- 5.5** A growth factor has been applied to the trips associated with the development, based upon an opening year of 2014 and a future assessment year of 2019. Temprow data was acquired for the Yapton area as well as NRTF figures for the UK in order to obtain more reliable factors. The data tables shown in **Appendix J** demonstrate the calculated growth factors, which are summarised below in **Table 5**.

Table 5– Summary of Growth Factors

	AM Peak Trips	PM Peak Trips
2009 – 2014 Growth Factor	1.093	1.092
2009 – 2019 Growth Factor	1.164	1.160

Existing Traffic Flows

- 5.6 An Automatic Traffic Counter (ATC) was placed on Burndell Road, in the immediate vicinity of the proposed site, on Thursday 23rd January 2014. This allows us to determine how many vehicles use the road. The following vehicular flows were counted during the AM and PM peak hours in **Tables 6 and 7** below.

Table 6 – AM Peak hour traffic (08:00am – 09:00pm)

	Westbound	Eastbound
Burndell Road	280	271

Table 7 – PM Peak hour traffic (17:00am – 18:00pm)

	Westbound	Eastbound
Burndell Road	279	361

- 5.7 From **Tables 6 and 7**, it can be seen that the existing properties along Burndell Road generate 551 two-way movements in the AM peak hour and 640 two-way movements in the PM peak hour.

Committed Developments – Traffic Impact

- 5.8 The following developments have been granted permission within the past 3 years and are therefore 'Committed Developments'.

Land North of Burndell Road, BN18 0HR

- 5.9 A Planning Application for a new residential development was initially submitted in 2010. Planning Application number Y/81/10 included the; "construction of 173 new dwellings and associated car parking, public open space, including children's play areas, vehicular access and highway works". **Permission was initially refused, but was appealed and was subsequently allowed, with conditions, on 19th December 2011.** Planning Application number Y/48/13 included the "substitution of plots...following a grant of planning permission Y/81/10" on the 14th August 2013. A Transport Assessment was submitted with the application and the determined trip rates are shown in **Table 8**.

Table 8 – Predicted Trip Rates and Anticipated Traffic Generation

	AM Peak (08:30 – 09:00)		PM Peak (17:00 – 17:30)	
	Arrival	Departure	Arrival	Departure
Residential Vehicular Trip Rates	0.121	0.430	0.441	0.221
Anticipated trip generation for proposed 173 dwellings	21	74	76	38

Land South of Fellows Gardens, BN18 OHW

- 5.10** A Planning Application for a new residential development was submitted in 2013. Planning Application number Y/10/13 included; “34 dwellings (30%, 10 No affordable houses) with access and ancillary works”. **Permission was initially refused and resubmitted as application number Y/30/13 on 17th May 2013. It was approved, with conditions, on 19th December 2013.** A Transport Assessment was submitted with the application and provided the anticipated trip generation for this development, shown in **Table 9**.

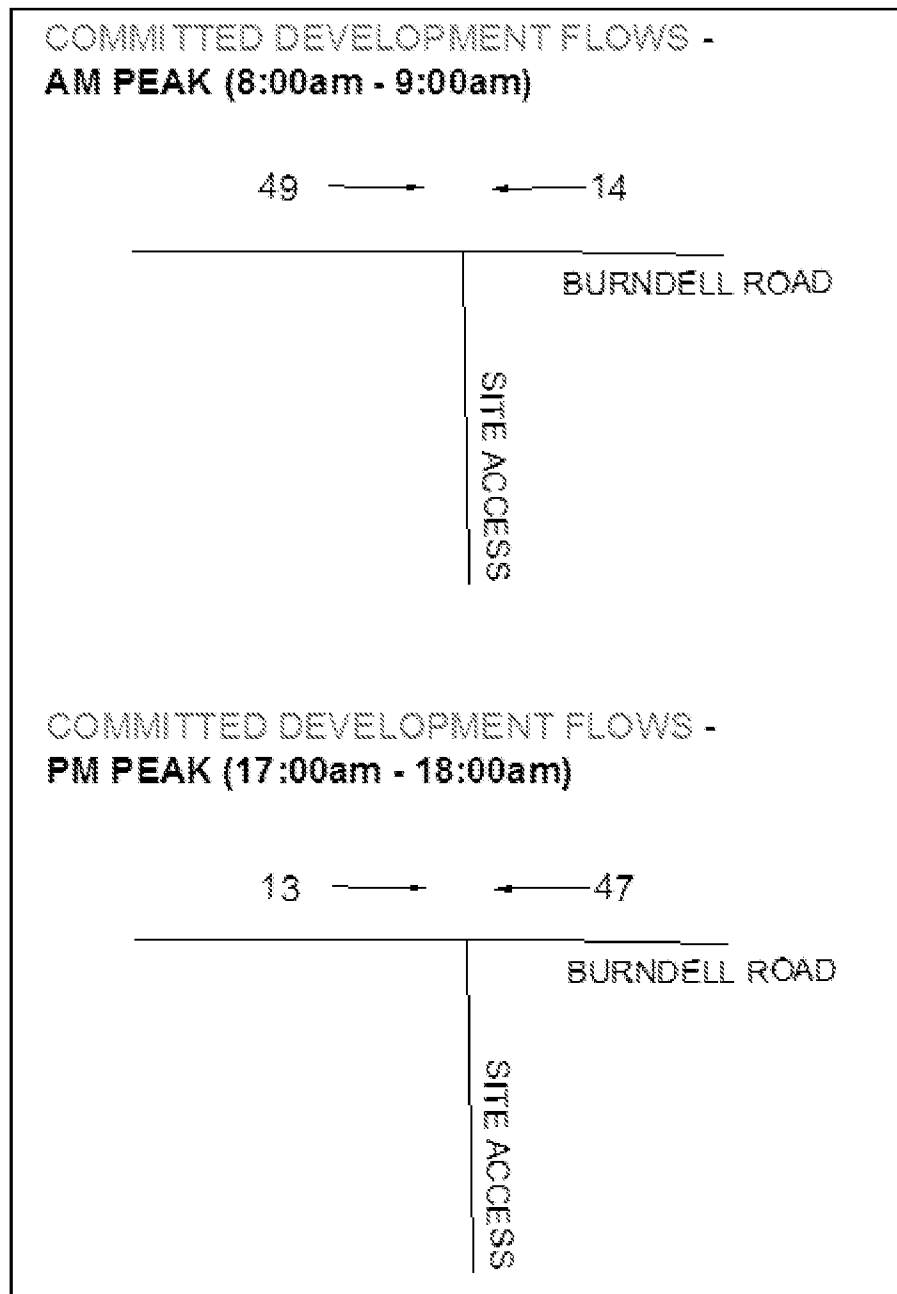
Table 9 – Development Trip Generation

	AM Peak (08:30 – 09:00)		PM Peak (17:00 – 17:30)	
	Arrival	Departure	Arrival	Departure
Pedestrians and Cyclists	1	4	3	1
Public Transport Users	1	2	1	1
Vehicle Drivers	7	24	17	11
Vehicles Passengers	1	2	1	1

Table 10 – Summary of Committed Developments

Development	AM trips		PM trips	
	Arrival	Departure	Arrival	Departure
Land North of Burndell Road	21	74	76	38
Land South of Fellows Gardens	7	24	17	11
Total Additional Trips	28	98	93	49

- 5.12** It can be seen from **Table 10** above that the committed developments could generate up to 126 trips in the AM peak and 142 trips in the PM peak. It should be noted that not all of these trips will travel past the proposed site access on Burndell Road. Both of these committed developments will have an access to the west of the application site. Based on the existing traffic flows on Burndell Road, it is likely that in the region of 50% of the committed development traffic would pass the Application Site. The flows are shown in **Figure 2** below.

Figure 2 – 50% of Committed Development Flows travelling past Application Site Access**Highway Impact (PICADY)**

- 5.13** The proposed junction that links the proposed access with Burndell Road has been modelled using the PICADY modelling software. The AM and PM peak hour analysis, with the development traffic added (as per **Figure 3** below). The result of the PICADY analysis can be found in **Appendix K** and a summary is shown in **Table 11** below:

Figure 3 – Proposed Flows at Burndell Road / Site Access Junction including committed Developments(as shown in Figure 2).

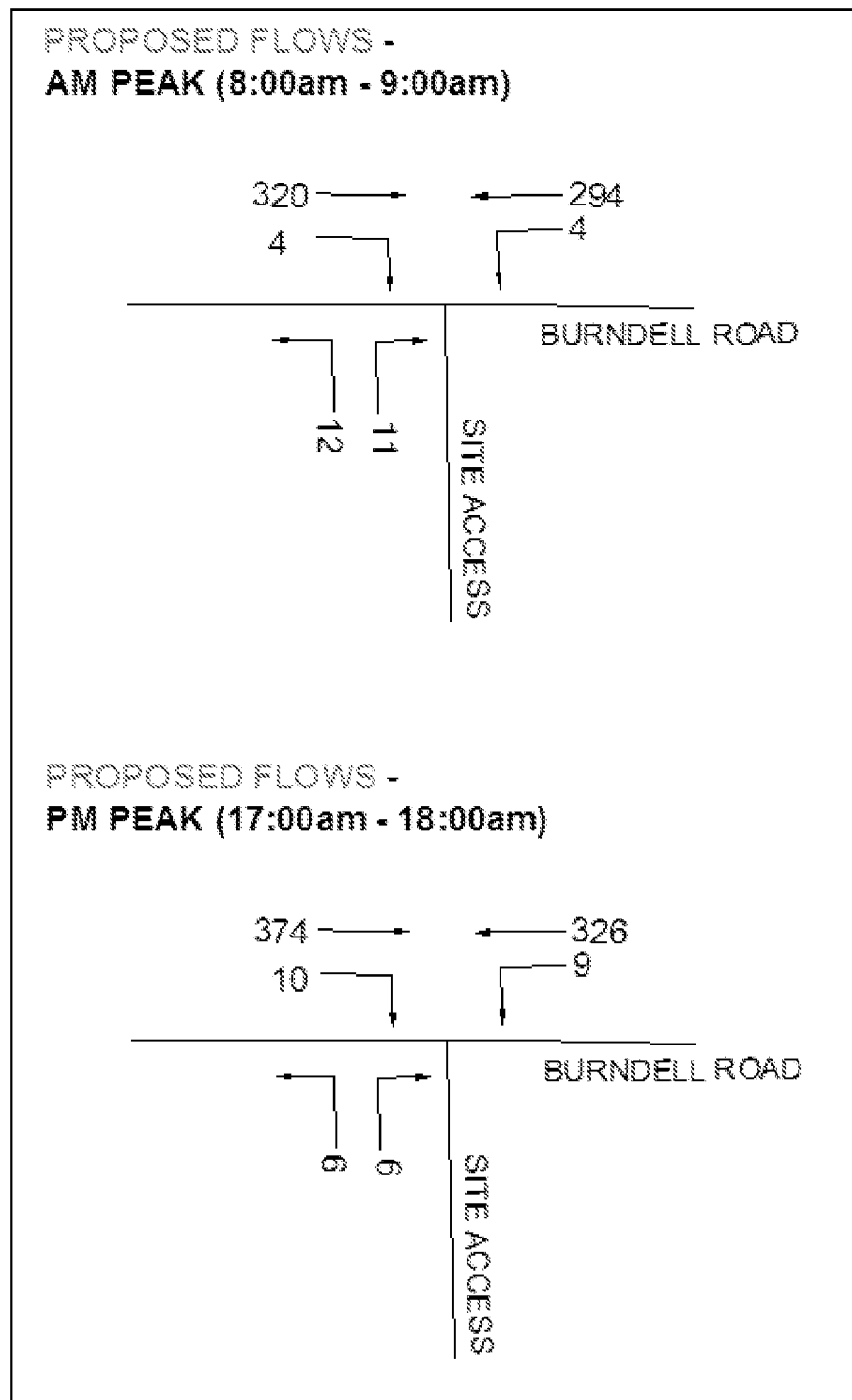


Table 11 - PICADY Result Junction Proposed access / Burndell Road East / Burndell Road West with Development Traffic

	AM Peak		PM Peak	
	Max RFC	Max Queue	Max RFC	Max Queue
Proposed Access	0.063	0.1	0.035	0.0
Burndell Road West	0.011	0.0	0.029	0.0
Burndell Road East	0.0	0.0	0.0	0.0

5.14 **Table 11** above demonstrates that the junction performs very well with no predicted queues or delays in either peak hour, with the Committed Development and Application Site traffic added. There is significant spare capacity in the proposed junction.

6.0 SUSTAINABLE TRANSPORT ISSUES

Pedestrians

- 6.1** Pedestrian access to the site will be via various footways / footpaths provided within the site. The entrance to the development will be located along Burndell Road.
- 6.2** The nearest bus stops are located adjacent to the proposed access on Burndell Road. Additionally, there are bus stops 700m to the west of the site that offer further bus services.
- 6.3** For pedestrians without mobility impairment, the Institution of Highways and Transportation (IHT) in their publication, 'Guidelines for Providing for Journeys on Foot 2000' make a series of suggested acceptable walking distances in relation to some common facilities. **Table 12** below sets out suggested acceptable walking distances in relation to some common facilities.

Table 12 – Suggested Acceptable Walking Distances

	Town Centres, Retail	Employment, School, Tourism	Elsewhere
Desirable	200m	500m	400m
Acceptable	400m	1,000m	800m
Preferred Maximum	800m	2,000m	1,200m

- 6.4** The nearest convenience store is a Co-operative food store located 650m west of the site on Main Road. In the same vicinity there are several shops and amenities including a butchers, a fish and chip shop and a hair salon. The site is also located 1.4km away from Yapton C of E Primary School and Yapton Community Pre School, below the preferred maximum number of pupils.
- 6.5** As part of the development proposal, footways / shared surface will be provided throughout the development, with suitable crossing facilities.

Cyclists

- 6.6** The now withdrawn, Planning Policy Guidance 13 (PPG13) defines a distance of 5,000m, within which 'cycling can reasonably be considered as an alternative to travelling by private car'. On the basis of a relatively slow cycling speed of 15kph, this distance could be achieved in less than 20 minutes. The towns/villages within this reachable area include Barnham, Flansham, Ford, Climping, Elmer, Middleton-on-Sea and Bognor Regis.

On Site provision

- 6.7** Cycle parking spaces will be provided for the development, in line with Arun District Council requirements, either in dedicated cycle storage areas, or secure cycle stores with private rear gardens or garages. The standards state 1 cycle space per 8 car parking spaces.

Buses

6.8 There are four different bus services which serve the site. The nearest bus stops are located just outside the site on Burndell Road, which is only applicable to the 700 Stagecoach Coastliner route. Further bus stops are also located further west on the main road and includes the bus service numbers 66, 665 (School) and C5 (Compass). The latter is a free service provided by Sainsbury's which runs from Yapton to the Sainsbury's in Chichester.

6.9 Below is a brief summary of the bus services as mentioned above.

Service 66 – Bognor Regis to Bognor Regis via Yapton

With buses running from 07:32 to 18:14, there are services approximately every 70 minutes. Destinations include Walberton, Barnham, Westergate and Shripney.

School Service 665 – Wick Courtwick Road to Chichester via Yapton

With one morning bus service running at the nearest stop from 07:40 towards Chichester, and the afternoon service running back in the opposite direction from 15:07. Destinations include Littlehampton Anchor Springs, Walberton Old Vicarage, Barnham Rail Station, Westergate Community College, Westergate, Oving High Street, Tangmere Military Aviation Museum, Halnaker Crossroads, Waterbeach Goodwood Park Hotel, Strettington New Road, Westerton Richmond Road, Chichester High School and Chichester Bishop Luffa School.

Service 700 – Southsea to Brighton via Yapton

With buses running from 06:29 to 22:22, there are services approximately every 30 minutes. Destinations include Portsmouth, Havant, Emsworth, Southbourne, Chichester, Bognor Regis, Arundel, Littlehampton, Rustington Shops, Durrington, Worthing, Lancing, Shoreham, Portslade and Hove.

Service C5 – Yapton to Chichester (Sainsbury's)

With one bus to Sainsbury's running from 10:33 and one returning bus back along the same route running from 12:55 at Sainsbury's. The service is only available on Tuesdays, Thursdays and Fridays. Destinations include Elmer, Middleton, Flansham Park, Felpham, Bognor Regis and Bersted.

Trains

- 6.10** The distances given are by cycling and vary in distance when travelling by car. The choice of station may depend on the mode of transport and so below is a brief summary of the services from each station. Each station has a car park and cycle storage facilities.

Barnham Station

This service is run by Southern and makes use of the West Coastway Line which runs from Brighton and Southampton. The London service runs from 05:23am to 22:48pm and the trains run every 15 minutes. Services to Bognor Regis run every 15 minutes. Other services run as early as 04:48 and run every 30 or 60 minutes. Destinations include: Southampton Central, Portsmouth and Southsea, Portsmouth Harbour, Brighton via Worthing, Bognor Regis, Littlehampton, Swansea, Manchester Oxford Road, Preston, Bristol and London.

Littlehampton Station

This service is operated by Southern and makes use of a short branch off the West Coastway Line. Services run from as early as 05:02am through until 23:39pm. There are typical 2 trains per hour to London Victoria, 1 train per hour to Portsmouth and Southsea and 1 to Bognor Regis. Other destinations include: Chichester, Northampton, Brighton and Clapham Junction.

Ford Station

This service is run by Southern and makes use of the West Coastway Line which runs from Brighton and Southampton. Waiting times could be up to an hour long. Destinations include: Littlehampton, Barnham, Bognor Regis, Chichester, Durrington-On-Sea, Worthing, Shoreham-on-Sea and Brighton.

Schools

- 6.11** The closest schools and colleges to the development site are listed below:

•	Yapton C of E Primary School, N End Road, BN18 ODU	1.4km
•	St Mary's C Of E Primary School, Crookthorn Lane, BN17 5QU	2.7km
•	St Philip Howard Catholic High School, Elm Grove S, PO22 0EN	5.6km
•	Barnham Primary School, Barnham, PO22 OHW	4.0km
•	Walberton & Binsted C Of E Primary School, The Street, BN18 0PH	4.5km
•	Arundel C Of E Primary School, Jarvis Rd, BN18 9HT	4.6km
•	Eastergate C Of E Primary School, Church Lane, PO20 3UT	5.3km
•	Ormiston Six Villages Academy, Lime Ave, PO20 3UE	5.6km
•	Bishop Tufnell C of E Junior and Infant School, Pennyfields, PO22 6BN	6.4km
•	Felpham Community College, Felpham Way, PO22	7.5km
•	Saint Philip's Catholic Primary School, London Road, BN18 9BA	8.0km
•	Downview Primary School, Wroxham Way, PO22 8ER	8.0km.

7.0 CONCLUSIONS

- 7.1** The Stilwell Partnership has been instructed by Brookworth Homes Ltd, to undertake a Transport Assessment to accompany a Planning Application for the proposed development at Burndell Road, Yapton.
- 7.2** The new access to be formed has been Road Safety Audited and the comments raised taken on board. The access is capable of taking the predicted traffic flows for the new development.
- 7.3** The site is in a sustainable location, maximising the potential use of local buses and trains to many locations in the area and region.
- 7.4** Ample car parking will be provided throughout the site with an average of two spaces per unit.
- 7.5** Secure cycle parking will be provided in line with West Sussex County Council parking standards.
- 7.6** In summary, we conclude that the proposed development can be accommodated without detriment to vehicular flows and road safety on the surrounding highway network.

APPENDIX A

Scoping Report

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SCOPING REPORT FOR TRANSPORT ASSESSMENT

Proposed Residential Development at:

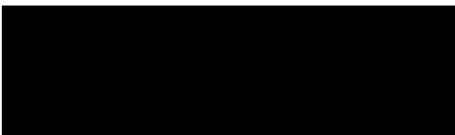
Burndell Road, Yapton

For Brookworth Homes Ltd

DRAFT FOR DISCUSSION

JANUARY 2014

Stilwell Limited
Consulting Engineers
Satelliet House
2 Nexus Park
Lysons Avenue
Ash Vale
GU12 5QE



Version No: 1.0



Stilwell Partnership
ISO 9001:2008
Certificate No: LRQ 4004624

Document Location

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S:\Clients\BrookworthHomesLtd\Burndell Road, Yapton (Highway) - P2551\Reports\Transport Assessment Scoping Report V1.0.doc

Revision History

This document has the following history:

Version No.	Version Date	Summary of Changes	Changes marked
1.0	20/01/2014	N/A	N/A

Approvals

This document requires the following approvals:

Name	Title & Organisation
David Brooke	Director, Stilwell Limited

Distribution

This document has also been distributed to:

Name	Organisation
	West Sussex County Council
	Arun District Council
Gavin Rowley	Brookworth Homes Ltd

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APPENDICES

- A Site Location Plan
- B Proposed Access Plan

1.0 INTRODUCTION

- 1.1** The Stilwell Partnership has been commissioned by Brookworth Homes Limited to undertake a Transport Assessment (TA) to accompany a Planning Application for the proposed residential development at Burndell Road, Yapton. (A Site Location Plan is attached at **Appendix A**).
- 1.2** The first stage of our investigation has been to agree the limits of the Transport Assessment. This Scoping Report sets out the headings which will enable us to examine the likely impact of the proposed development upon the Local Highway Network. It defines a proposal for how the Transport Assessment will be undertaken and the level of detail that will need to be included. The Scoping Report document will be sent to West Sussex County Council and will form the basis of further discussions.
- 1.3** The following Sections of this report summarise the details of the existing situation with regard to land use and baseline studies. It defines the extent of the proposed Study Area, the processes which will be undertaken, the scale of the proposed access and how the highway impact will be quantified.

2.0 PLANNING POLICY CONTEXT

2.1 As part of the Transport Assessment, we will assess the following Policy Documents, with particular emphasis on highway policies relevant to Arun District Council:

- Transport White Paper – Creating Growth, Cutting Carbon (January 2011)
- National Planning Policy Framework (NPPF)
- Arun District Council Local Plan (2003)

3.0 SITE LOCATION AND EXISTING / PROPOSED DEVELOPMENT

Site

3.1 The site is currently a parcel of vacant land, located to the south of Burndell Road, Yapton. The site consists of mature trees, bushes and open agricultural land. The Site Location Plan can be found at **Appendix A**.

Site Access

3.2 The proposed access will form in between the existing dwellings that front onto Burndell Road, where an agricultural strip of land links the site with the road. See **Figure 1** below.



Figure 1: Shows a gate to the left leading to the existing site.

Personal Injury Accident Data (PIA) Data Analysis

- 3.3** Records of the past five years, obtained via the Sussex Safer Roads website, have been found to show no accidents within a 500m radius of the site. This will be referred to in the report.

The Proposal

- 3.4** The proposal is to develop the existing parcel of land into developable land and build up to 50 residential units (mixture of houses and apartments). The development schedule is yet to be confirmed but will consist of a mix of private (70%) and affordable (30%) units, with additional open space for play areas. The proposal will include a new access points from Burndell Road and additional improvement works to the existing highway.
- 3.5** A new vehicular access from Burndell Road will be provided. The access will be suitable for two way traffic flows and be a minimum of 5.5m wide with a 2.0m wide footway provided. The proposed footways will link into the existing footway network. The proposed access and footway improvements can be seen in **Appendix B**. It is anticipated that this access will serve approximately 50 dwellings.
- 3.6** Sight lines of 2.4m by 70m can be achieved in both directions. The road is subject to a 30 mph speed limit, but an ATC will be installed to establish both speed and volume of traffic.
- 3.7** An independent road safety audit will be carried out on the proposed access.

4.0 HIGHWAY IMPACT

Trip Generation

- 4.1** It would be our intention to quantify trips for the site and to test the impact upon the local highway network. This would be undertaken using relevant sites from the TRICS database, which would be appropriate to the likely occupiers or users of the development. Clearly nearly all trips generated by the site will be *new* trips, as the site is currently agricultural. Trip rates from recently approved sites will also be considered.

Traffic Growth

- 4.2** The trips associated with the proposed development will be calculated and a growth factor applied to assess the traffic levels in 2014 and 2019. The growth factors will be calculated using Temprow data for the Yapton area and NRTF figures for the UK. Traffic generated from the committed developments will have growth factors applied and will be considered in the overall highway impact.

Traffic Distribution

- 4.3** Traffic distribution will be determined from the existing flows for the Goodhew Road Junction with Burndell Road. Flows will be checked by using the ATC data.

Committed Developments

- 4.4** The following developments have been granted permission within the past 3 years and are therefore “Committed Developments”.

Land North of Burndell Road, BN18 0HR

- 4.5** A Planning Application for a new residential development was initially submitted in 2010. Planning Application number Y/81/10 included the; “construction of 173 new dwellings and associated car parking, public open space, including children’s play areas, vehicular access and highway works”. Permission was initially refused, but was appealed and was subsequently allowed, with conditions, on 19th December 2011. Planning Application number Y/48/13 included the “substitution of plots...following a grant of planning permission Y/81/10” on the 14th August 2013. Any likely traffic associated with this application will be included in the Transport Assessment.

Land South of Fellows Gardens, BN18 OHW

- 4.6** A Planning Application for a new residential development was submitted in 2013. Planning Application number Y/10/13 included; “34 dwellings (30%, 10 No affordable houses) with access and ancillary works”. Permission was initially refused and resubmitted as application number Y/30/13 on 17th May 2013. It was approved, with conditions, on 19th December 2013. Any likely traffic associated with this application will be included in the Transport Assessment.
- 4.7** It is also worth noting that planning application Y/99/13 has been put forward for “10.5 hectares of residential development (comprising up to 250 dwellings (30% to be affordable) together with ancillary open space and landscaping), 14.9 hectares of public open space development to be laid out as public parkland and landscaped green corridors, vehicular access from Ford Lane”. It was received on 20th November 2013 and is likely to be considered on 19th February 2014. If granted it will be added to our assessment.

Junction Modelling

- 4.8** Junction capacity analysis will be undertaken using PICADY modelling software. The new access will be modelled for AM peak (07:00 – 08:00) and PM peak (17:00 – 18:00). This assessment will identify the reserve capacity and queue lengths where appropriate within the standard outputs from the computer software. This will be summarised within the Transportation Assessment Report.

5.0 SUSTAINABLE TRANSPORT ISSUES

- 5.1 All public transport services in the vicinity of the site will be identified. Cycle parking will be provided on site, in line with Arun District Council standards.

Local Amenities & Facilities

- 5.2 The nature and distance of all Local Amenities and Facilities will be determined as part of the TA. We will look at Schools, routes to Schools and possible improvements.

Pedestrian Access

- 5.3 Existing pedestrian routes to key facilities will be looked at as part of the TA. Public rights of way will be investigated around the site and the layout / access points designed to ensure these are not affected.

Cyclist Access

- 5.4 Cycle routes and facilities will be examined to ensure compliance with WSCC and Arun District Council standards. Nearby towns and villages in the acceptable distances will be examined.

Buses

- 5.5 Bus services within the vicinity of the site will be investigated, including bus times, frequencies, and destinations.

Railways

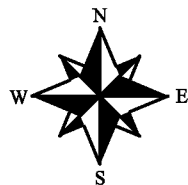
- 5.6 There are three stations within 5km of the site and these include Barnham (3.3km), Littlehampton (3.2km), Ford (3.7km). These will be looked at in more detail.

6.0 CONCLUSION

- 6.1 In concluding this Scoping Report, but without pre-empting the assessment, we believe that proposed residential development is feasible and will not be detrimental to traffic flow.

APPENDIX A

Site Location Plan



THIS IS A CONTROLLED
DOCUMENT

Stilwell
PARTNERSHIP
SAFETY, TRAFFIC & HIGHWAY
ENGINEERING CONSULTANTS

SATELLITE HOUSE, 2 NEXUS PARK
ASH VALE, SURREY, GU12 5QE

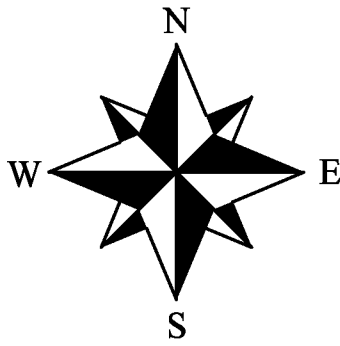
PROJECT: Land off Burndell Road Yapton, West Sussex	
TITLE: Site Location Plan	
SCALE: NTS @ A4	DRAWN: AL
DATE: JANUARY 2014	CHECKED:
DWG No:	TSP/BRO/P2555/03

APPENDIX B

Proposed Access Plan

Notes

1. All Highway works (including highway Drainage) subject to adoption shall be in accordance with the DEPARTMENT OF TRANSPORT MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS 2002, SPECIFICATION FOR HIGHWAY WORKS with additions and amendments where appropriate by West Sussex County Council.
2. Existing highway drainage to be modified to suit new layout.
3. Street lighting to be modified to suit new layout to West Sussex County Council standard.



B	Sightline Modified	16/01/14
A	Information added	02/01/14
REV	DESCRIPTION	DATE

Stilwell
PARTNERSHIP
SAFETY, TRAFFIC & HIGHWAY
ENGINEERING CONSULTANTS
SATELLIET HOUSE, 2 NEXUS PARK
ASH VALE, SURREY, GU12 5QE

PROJECT: Land off Burndell Road
Yapton, West Sussex

TITLE: Proposed Access and Highway
Improvements Plan

SCALE: 1:200 @ A1

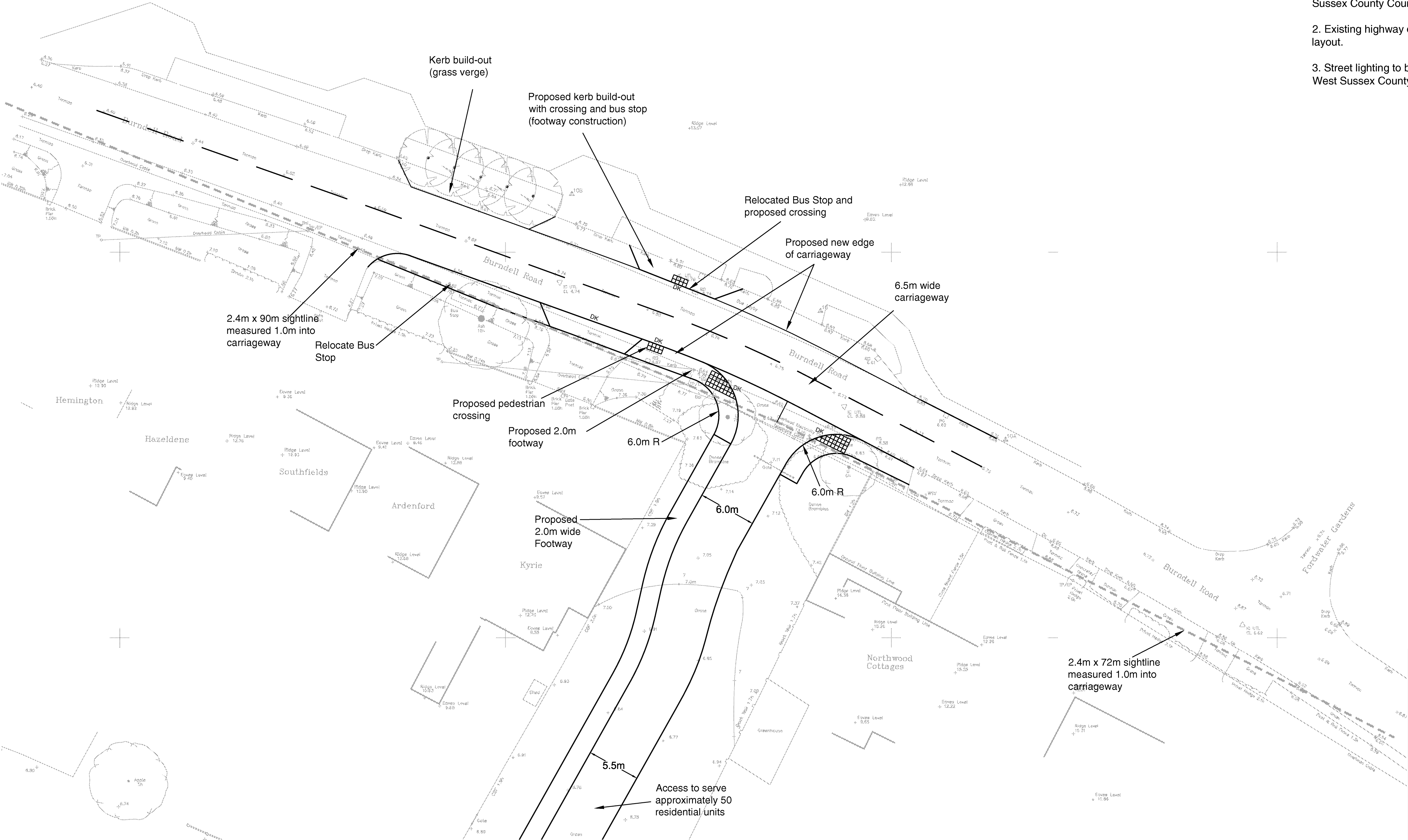
DRAWN: JH

DATE: December 2013

CHECKED:

DWG No: TSP/BRO/P2551/02 B

DRAFT
THIS IS A CONTROLLED
DOCUMENT



APPENDIX B

Highway Authority Response to Scoping Report

P2551

Anthony Lewis

From: Dominic Smith [REDACTED]
Sent: 25 February 2014 11:26
To: Anthony Lewis
Cc: David Brooke; Carol Heather
Subject: RE: Burndell Road

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Anthony,

I have had the opportunity to review the scoping document and can advise the following;

Carol – I've copied you into this email; the only part that might require your input is the bus infrastructure advice found under the 'General' section of this email.

Access

I would recommend undertaking a speed survey on both the east and westbound approach to the site access; visibility splays should be based on the recorded 85th percentile speed in accordance with Manual for Streets parameters.

A Road Safety Audit: Stage 1 is required as set out in the scoping note. This should be accompanied by a Designers Response, Exception Report (if required) and any amended drawings.

Vehicle tracking plots of the largest vehicle to use the site access should accompany the access arrangements.

Trip Generation/Capacity

Trip rates should be derived in accordance with TRICS 'Best Practice Guidance' and be accompanied by full outputs/site selection parameters.

Junction capacity modelling will be required where the development results in 30 or more additional movements through a junction during any hour. Any modelling should be supported with full outputs for auditing purposes and a copy of the PICADY file would be beneficial.

Any mitigation required as a consequence of the modelling should be supported with design commentary and be included in the scope of the RSA1.

Sustainable Access

A full review is essential as set out in the TA.

General

I've been involved in a few developments in this area recently and involved in the subsequent Committee debate. From experience there are a couple of issues in particular that will be beneficial to consider as part of the TA as they are likely to be commented on by the Planning Committee;

Bus lay-by – although they do not appear to be formal bus lay-bys (ie with a cage), buses do benefit from space to pull clear of the highway and not obstruct the through flow of traffic. It appears that the proposed build-outs will restrict this arrangement and this is unlikely to be

well received by the LPA. However; I understand that the operators are not always keen on the provision of lay-bys as it can restrict them re-entering the flow of traffic and result in delays to the service. I have copied my colleague, Carol Heather, into this email who is involved in bus infrastructure who might be able to add further comment or consult with the operators if this is indeed the intention.

Crossing – Burndell Road was noted to be a busy roads with vehicles travelling in excess of the posted speed limit. The Committee has previously sought the provision of a controlled crossing as part of the Land South of Fellows Garden; however, upon further review via PV² and design/RSA1, it was determined the provision of either a 'zebra' crossing or a light controlled crossing would be inappropriate and possibly unsafe due to lack of demand and driver compliance. I would recommend consideration be given to the appropriateness of the crossing facilities and to pedestrian desire lines for journeys to the east of the site.

Parking – the proposed build-outs would appear to result in the loss of some residential parking; again, this is unlikely to be well received and consideration should be given to as to whether this could be offset, whether the parking is required/in-use, where displacement will occur etc.

I trust this is of assistance but if you require any clarification or have any queries then please do not hesitate to contact me.

Kind regards,

Dominic

Dominic Smith | Planner, Strategic Planning, West Sussex County Council | Location: 2nd
Floor, Northleigh, County Hall, Chichester, PO19 1RH
Internal: [REDACTED] | External: [REDACTED] | E-mail: [REDACTED]

From: Anthony Lewis [REDACTED]
Sent: 14 February 2014 16:16
To: Dominic Smith
Cc: David Brooke
Subject: RE: Burndell Road

Dominic,

Thank you for replying to the request regarding Burndell Road, Yapton. Attached is the Transportation Assessment Scoping Report.

I look forward to hearing back from you with you comments.

Kind Regards,

[REDACTED]

Anthony Lewis
Consultant
The Stilwell Partnership t&sp
Consulting Engineers

[REDACTED]

APPENDIX C

Traffic Survey Data

Report Id - CustomList-884
Site Name - STLYAP01
Description - BURNDILL ROAD WEST OF FORDWATER GARDENS
Direction - East

Virtual Week (2)

Time	Total	Vbin 0 5	Vbin 5 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 55	Vbin 55 60	Vbin 60 65	Vbin 65 70	Vbin 70 75	Vbin 75 80	Vbin 80 85	Vbin 85 100	Vbin 100 140	Mean	Vpp 85	SD
Mon	3559	0	3	19	18	67	680	1602	860	241	54	13	3	1	1	0	0	0	0	0	33.4	38	5.1
Tue	2576	1	2	14	16	58	608	1175	515	148	33	8	1	0	0	0	0	0	0	0	32.7	37.4	5
Wed	1831	1	2	10	11	57	489	800	347	94	18	5	1	0	0	0	0	0	0	0	32.3	36.9	5
Thu	3487	1	2	15	16	63	747	1644	746	197	43	9	5	2	0	0	0	0	0	0	33	37.4	4.9
Fri	3770	0	2	15	19	72	876	1723	791	209	50	11	3	1	0	0	1	0	0	0	32.9	37.1	4.9
Sat	3433	0	3	20	31	62	658	1540	805	230	62	16	6	3	0	0	0	0	0	0	33.4	38	5.3
Sun	2574	0	1	18	26	42	474	1129	634	183	51	15	3	1	1	1	0	0	0	0	33.5	38.3	5.4
--	21229	2	13	110	136	419	4531	9612	4696	1300	309	74	21	7	1	1	1	0	0	0	33.1	37.6	5.1

Report Id - CustomList-884
Site Name - STLYAP01
Description - BURNDILL ROAD WEST OF FORDWATER GARDENS
Direction - East

Grand Total

Time	Total	Vbin 0 5	Vbin 5 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 55	Vbin 55 60	Vbin 60 65	Vbin 65 70	Vbin 70 75	Vbin 75 80	Vbin 80 85	Vbin 85 100	Vbin 100 140	Mean	Vpp 85	SD
--	42457	3	26	219	271	838	9061	19224	9391	2600	618	148	41	13	2	1	1	0	0	0	33.1	37.6	5.1

Report Id - CustomList-884
Site Name - STLYAP01
Description - BURNDILL ROAD WEST OF FORDWATER GARDENS
Direction - West

Virtual Week (2)

Time	Total	Vbin 0 5	Vbin 5 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 55	Vbin 55 60	Vbin 60 65	Vbin 65 70	Vbin 70 75	Vbin 75 80	Vbin 80 85	Vbin 85 100	Vbin 100 140	Mean	Vpp 85	SD
Mon	3358	1	4	23	31	108	763	1424	719	222	54	10	1	1	0	0	0	0	0	0	32.8	37.8	5.4
Tue	2446	0	3	13	26	67	667	1020	486	128	27	7	4	1	0	0	0	0	0	0	32.4	36.9	5.2
Wed	1717	0	2	12	17	66	507	706	308	76	20	6	1	0	0	0	0	0	0	0	32	36.7	5.2
Thu	3326	0	7	15	25	90	832	1491	646	180	34	4	3	1	1	0	0	0	0	0	32.4	36.9	5
Fri	3525	0	6	25	28	86	910	1512	704	200	46	7	4	0	0	0	1	0	0	0	32.5	37.4	5.3
Sat	3338	0	4	18	25	99	887	1485	613	162	35	11	2	0	0	0	0	0	0	0	32.3	36.9	5.1
Sun	2565	0	5	20	19	58	575	1130	540	168	38	11	2	1	1	0	0	0	0	0	32.9	37.6	5.4
--	20275	1	29	124	169	571	5139	8765	4015	1136	252	55	15	4	2	0	1	0	0	0	32.5	37.4	5.2

Report Id - CustomList-884
Site Name - STLYAP01
Description - BURNDELL ROAD WEST OF FORDWATER GARDENS
Direction - West

Grand Total

Time	Total	Vbin 0 5	Vbin 5 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 55	Vbin 55 60	Vbin 60 65	Vbin 65 70	Vbin 70 75	Vbin 75 80	Vbin 80 85	Vbin 85 100	Vbin 100 140	Mean	Vpp 85	SD
--	40549	1	58	248	338	1142	10278	17530	8029	2272	504	109	29	7	3	0	1	0	0	0	32.5	37.4	5.2

APPENDIX D

Parking Matrix



Ward Finder			
Postcode		Ward	gaption
RESET			

Ward data used can be checked by the user by referring to the District-Ward Data Tables. The Ward Data Tables highlight if the Census data does not include data for certain dwelling sizes. In such cases car ownership values have been obtained using the nearest sized dwelling with same tenure and ward. For example, if no data is available for a private house with 1 room then data for a private house with 2 rooms has been used. The Car Ownership Data is highlighted in purple where such an approach has been used. Where Census data contains small samples for certain sized dwellings this is highlighted in red if <20, and green if <50 in the Total Demand column. In such cases, other wards should be selected to achieve a higher sample size.

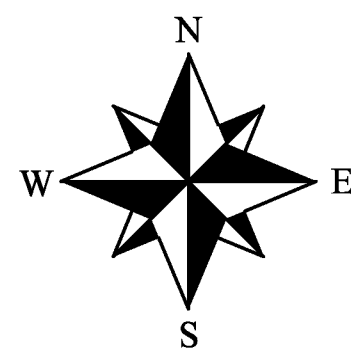
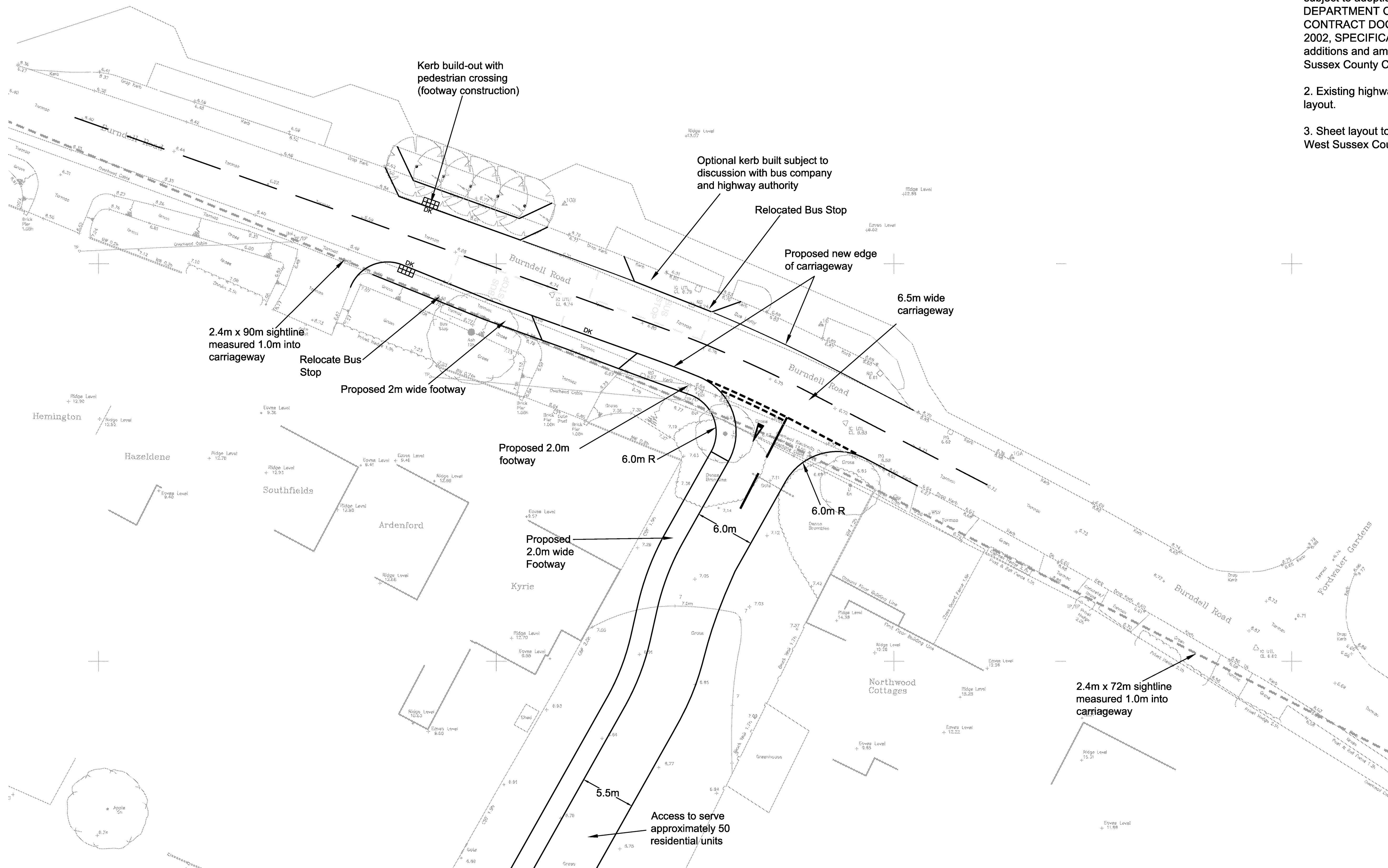
DEVELOPMENT MIX				
Ref.	Unit Type	Unit Tenure	Habitable Rooms (Per Unit)	No. of Units (Total)
A	Flats	Private	2	1
B	Flats	Private	2	1
C	Houses	Private	4	14
D	Houses	Private	5	25
E	Houses	Private	6	4
F				
G				
H				
I				
J				
K				
L				
M				
N				
O				
P				
Q				
R				
S				
Total				45

[illegible][illegible]

PROJECT
CENTRE
PEOPLE | PASSION | PLACES

APPENDIX E

Proposed Footway and Access Plan



Notes

1. All Highway works (including highway Drainage) subject to adoption shall be in accordance with the DEPARTMENT OF TRANSPORT MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS 2002, SPECIFICATION FOR HIGHWAY WORKS with additions and amendments where appropriate by West Sussex County Council.
2. Existing highway drainage to be modified to suit new layout.
3. Sheet layout to be modified to suit new layout to West Sussex County Council standard.

C	Pedestrian Crossing Relocated	27/03/14
B	Sightline Modified	16/01/14
A	Information added	02/01/14
REV	DESCRIPTION	DATE

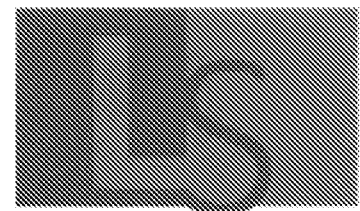
Stilwell
PARTNERSHIP
SAFETY, TRAFFIC & HIGHWAY
ENGINEERING CONSULTANTS
SATELLIET HOUSE, 2 NEXUS PARK
ASH VALE, SURREY, GU12 5QE

PROJECT: Land off Burndell Road Yapton, West Sussex	
TITLE: Proposed Access and Highway Improvements Plan OPTION 1	
SCALE: 1:200 @ A1	DRAWN: JH
DATE: Decemembr 2013	CHECKED:
DWG No:	TSP/BRO/P2551/02C

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APPENDIX F

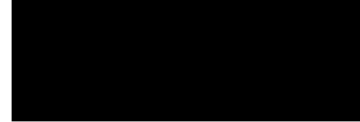
Stage 1 RSA



Laurence Shaw
ASSOCIATES

Traffic Engineering Consultants

One Dyke Close, The Street,
Poytnings, West Sussex
BN45 7BB



THE STILWELL PARTNERSHIP
PROPOSED ACCESS AND HIGHWAY IMPROVEMENTS
BURNDELL ROAD, YAPTON

ROAD SAFETY AUDIT STAGE 1
MARCH 2014

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2. Stage 1 Road Safety Audit	4
3. Audit Team Statement	5

Appendix

- A. Schedule of Documents Examined
- B. Annotated Drawings

1.0 INTRODUCTION

- 1.1 This report presents the findings of a Stage 1 Road Safety Audit (preliminary design) into the improvements to the highway at Burndell Road, Yapton, and improvements to an existing access to land on the south side of the road.
- 1.2 This Audit was carried out at the request of Mr Chris Vaughan of The Stilwell Partnership and the Audit Team has acted independently of the Design Team and has had no prior involvement in the project.
- 1.3 This Audit comprised a site visit and an examination of the documents listed in Appendix A. The site visit was carried out on Friday 21st March 2014 in daylight. The visit occurred between the hours of 11:15– 12:00 and during the visit the weather was dry with clear visibility and record photographs were taken during the inspection.
- 1.4 The Audit Team membership was as follows:
- | | |
|------------------|--|
| Laurence Shaw | Laurence Shaw Associates, Traffic Engineering Consultants
Team Leader |
| Harold Cryer BSc | Highway and traffic engineer
Team Member |
- 1.5 The terms of reference of this Audit are described in the Design Manual for Roads and Bridges Volume 5, Section 2, Part 2 HD 19/03. The audit team has only reported on the road safety implications of the existing and proposed facilities and has not examined or verified the compliance of the design or any other criteria.
- 1.6 The access road is to a development site which is on the south side of Burndell Road to the west of Fordwater Gardens and the proposals are for a 6.0m wide carriageway access road with 2.0m wide footways on both sides of the access

road at the junction with Burndell Road. There are also proposals for the realignment of Burndell Road at the new access road.

- 1.7 Burndell Road has a 30mph speed limit and has recently renewed street lighting although it should be noted that a night visit was not carried out at this time.
- 1.8 All comments and recommendations are referenced to the design drawings and the locations have been indicated on the plans supplied with the Audit Brief, annotated copies of which are attached to this report.
- 1.9 No departures from standard have been advised to the Auditor by the design team.
- 1.10 This is a Stage 1 Road Safety Audit and it has been noted that details of the drainage, landscaping, bollards and signing, etc. are not included in the information provided to the Audit Team and that any such information should be provided to the Audit Team at Stage 2 RSA unless a problem is noted as a result of the site inspection.
- 1.11 It should be noted that no information was provided on traffic flows or collision history for the roundabout or any of the arms and the designer should ensure that the roundabout will have enough capacity for the expected flows and that any collision history is considered.
- 1.12 This road safety audit has been prepared in accordance with the instructions, and for the specific use, of The Stilwell Partnership and their clients. The authors shall not be liable for the information contained in this report if used for any purpose other than that for which it was provided in connection with their appointment as road safety auditors.
- 1.13 The Auditors would be pleased to discuss the acceptability of alternative solutions to problems identified during the Audit, and would encourage the Designer to consult them on this matter.

STAGE 1 ROAD SAFETY AUDIT

2.1 Problem

Location: Burndell Road at the access

Summary: proposed uncontrolled pedestrian crossing may be hazardous

Drawing No. TSP/BRO/P2551/02 shows an uncontrolled pedestrian crossing with tactile paving across Burndell Road immediately adjacent to a resited bus stop. A blind or partially sighted pedestrian crossing Burndell Road south to north will have their route across the road blocked by a bus standing at the bus stop which could lead to vehicle/pedestrian collisions.

Recommendation

It is recommended that the proposed location for the bus stop is reconsidered.

2.2 Problem

Location: Burndell Road at the access

Summary: proposed new footway may be hazardous

It is proposed that there will be new 2.0m wide footways on both sides of the access road where it meets Burndell Road with tactile paving to assist blind and partially sighted pedestrians to cross the new access road. The audit team are concerned that the section of new footway on the east side of the access road is very short and does not lead to a continuous footway on the south side of Burndell Road. Blind and partially sighted pedestrians may become confused by the lack of footway and may lead to such pedestrians attempting to cross Burndell Road which could result in vehicle/pedestrian collisions.

Recommendation

It is recommended that the short section of footway is deleted from the proposals.

Audit Team Statement

ROAD SAFETY AUDIT STAGE 1

I certify that this audit has been carried out in accordance with HD 19/03.

Audit Team Leader

L. E. Shaw MCIHT
Senior Associate
Laurence Shaw Associates
1 Dyke Close
Poynings
West Sussex
BN45 7BB

Signed



Date 24th March 2014

APPENDIX A

Schedule of documents examined

Drawing No.	Title	Description	Scale
TSP/BRO/P2551/02 B	Land off Burndell Road Yapton, West Sussex	Proposed Access and Highway Improvements Plan	1:200 @ A1

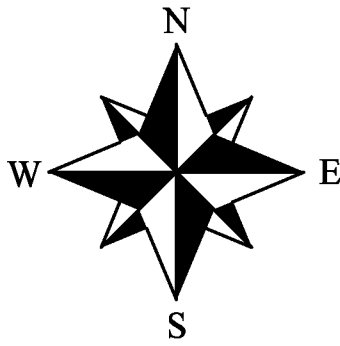
Relevant emails received from Chris Vaughan

APPENDIX B

SCHEME DRAWINGS

Notes

1. All Highway works (including highway Drainage) subject to adoption shall be in accordance with the DEPARTMENT OF TRANSPORT MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS 2002, SPECIFICATION FOR HIGHWAY WORKS with additions and amendments where appropriate by West Sussex County Council.
2. Existing highway drainage to be modified to suit new layout.
3. Street lighting to be modified to suit new layout to West Sussex County Council standard.



B	Sightline Modified	16/01/14
A	Information added	02/01/14
REV	DESCRIPTION	DATE



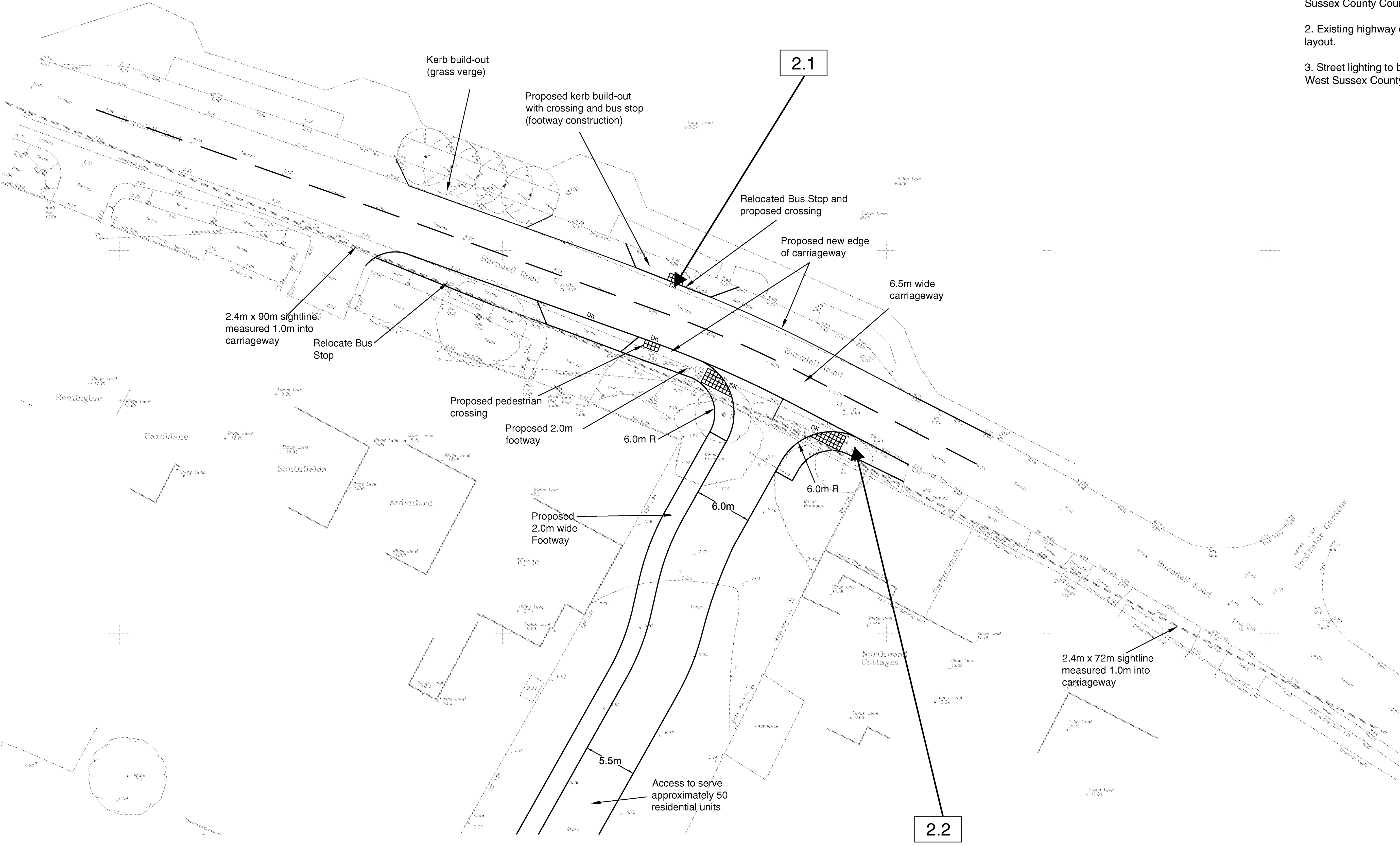
Stilwell

PARTNERSHIP

SAFETY, TRAFFIC & HIGHWAY
ENGINEERING CONSULTANTS
SATELLIET HOUSE, 2 NEXUS PARK
ASH VALE, SURREY, GU12 5QE

PROJECT:	Land off Burndell Road Yapton, West Sussex		
TITLE:	Proposed Access and Highway Improvements Plan		
SCALE:	1:200 @ A1	DRAWN:	JH
DATE:	December 2013	CHECKED:	
DWG No:	TSP/BRO/P2551/02 B		

DRAFT
THIS IS A CONTROLLED
DOCUMENT



APPENDIX G

Designers Response

DESIGNERS RESPONSE TO STAGE 1 ROAD SAFETY AUDIT

Item	Problem	Recommendation	Designers Response
2.1	Drawing No. TSP/BRO/P2551/02B shows an uncontrolled pedestrian crossing with tactile paving across Burndell Road immediately adjacent to a resited bus stop. A blind or partially sighted pedestrian crossing Burndell Road south to north will have their route across the road blocked by a bus standing at the bus stop which could lead to vehicle/pedestrian collisions.	It is recommended that the proposed location for the bus stop is reconsidered.	In order to remove the possible vehicle/pedestrian conflict, Drawing TSP/BRO/P2551/02B has been amended. Drawing TSP/BRO/P2251/02C now shows a relocated uncontrolled crossing approximately 24m to the west. This would allow pedestrians to cross away from the bus stops and waiting buses.
2.2	It is proposed that there will be new 2.0m wide footways on both sides of the access road where it meets Burndell Road with tactile paving to assist blind and partially sighted pedestrians to cross the new access road. The audit team are concerned that the section of new footway on the east side of the access road is very short and does not lead to a continuous footway on the south side of Burndell Road. Blind and partially sighted pedestrians may become confused by the lack of footway and may lead to such pedestrians attempting to cross Burndell Road which could result in vehicle/pedestrian collisions.	It is recommended that the short section of footway is deleted from the proposals.	Footway now removed from proposals as shown on Drawing TSP/BRO/P2251/02C.

APPENDIX H

TRICs Data

RGP Fry's Yard Godalming

Licence No: 728001

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	EX ESSEX	1 days
05	EAST MIDLANDS	
	LE LEICESTERSHIRE	1 days

Filtering Stage 2 selection:

Parameter: Number of dwellings
 Range: 11 to 237 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/99 to 05/09/10

Selected survey days:

Tuesday 2 days

Selected survey types:

Manual count 2 days
 Directional ATC Count 0 days

Selected Locations:

Edge of Town 2

Selected Location Sub Categories:

Residential Zone 2

LIST OF SITES relevant to selection parameters

1	EX-03-A-01	SEMI-DET., STANFORD-LE-HOPE	ESSEX
	MILTON ROAD		
	CORRINGHAM		
	STANFORD-LE-HOPE		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	237	
	Survey date: TUESDAY	13/05/08	Survey Type: MANUAL
2	LE-03-A-01	DETACHED, MELTON MOWBRAY	LEICESTERSHIRE
	REDWOOD AVENUE		
	MELTON MOWBRAY		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	11	
	Survey date: TUESDAY	03/05/05	Survey Type: MANUAL

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 08:00	2	124	0.125	2	124	0.335	2	124	0.460
08:00 - 09:00	2	124	0.173	2	124	0.516	2	124	0.689
09:00 - 10:00	2	124	0.157	2	124	0.206	2	124	0.363
10:00 - 11:00	2	124	0.125	2	124	0.190	2	124	0.315
11:00 - 12:00	2	124	0.173	2	124	0.125	2	124	0.298
12:00 - 13:00	2	124	0.206	2	124	0.181	2	124	0.387
13:00 - 14:00	2	124	0.202	2	124	0.194	2	124	0.396
14:00 - 15:00	2	124	0.222	2	124	0.198	2	124	0.420
15:00 - 16:00	2	124	0.468	2	124	0.302	2	124	0.770
16:00 - 17:00	2	124	0.427	2	124	0.246	2	124	0.673
17:00 - 18:00	2	124	0.431	2	124	0.270	2	124	0.701
18:00 - 19:00	2	124	0.286	2	124	0.194	2	124	0.480
19:00 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			2.995			2.957			5.952

Parameter summary

Trip rate parameter range selected: 11 - 237 (units:)
Survey date date range: 01/01/99 - 05/09/10
Number of weekdays (Monday-Friday): 2
Number of Saturdays: 0
Number of Sundays: 0
Surveys manually removed from selection: 48

APPENDIX J

Tempro Growth Forecast Data

AM PEAK (2009 - 2014)

Database Version:	62
Result Type:	Trip ends by time period
Base Year:	2009
Future Year:	2014
Trip purpose groups:	All Purposes
Time Period:	Weekday AM peak period (0700 – 0959)

Area Description		All purposes		
Level	Name	Production	Attraction	Average
GB	GB	1.0378	1.0378	1.0378
45UC4	Yapton	1.0446	1.0617	1.0532

TEMPRO Results			NRTF 2009 - 2014
Area	2009 - 2014	Prop of UK	Medium
Yapton	1.0532	1.015	1.093
GB	1.0378		1.077

PM PEAK (2009 – 2014)

Database Version:	62
Result Type:	Trip ends by time period
Base Year:	2009
Future Year:	2014
Trip purpose groups:	All Purposes
Time Period:	Weekday PM peak period (1600 – 1859)

Area Description		All purposes		
Level	Name	Production	Attraction	Average
GB	GB	1.0440	1.0440	1.044
45UC4	Yapton	1.0491	1.0689	1.059

TEMPRO Results			NRTF 2009 - 2014
Area	2009 - 2014	Prop of UK	Medium
Yapton	1.059	1.014	1.092
GB	1.044		1.077

AM PEAK (2009 - 2019)

Database Version:	62
Result Type:	Trip ends by time period
Base Year:	2009
Future Year:	2019
Trip purpose groups:	All Purposes
Time Period:	Weekday AM peak period (0700 – 0959)

Area Description		All purposes		
Level	Name	Production	Attraction	Average
GB	GB	1.0788	1.0788	1.0788
45UC4	Yapton	1.0830	1.1026	1.0928

TEMPRO Results			NRTF 2009 - 2019
Area	2009 - 2019	Prop of UK	Medium
Yapton	1.0928	1.013	1.164
GB	1.0788		1.149

PM PEAK (2009 – 2019)

Database Version:	62
Result Type:	Trip ends by time period
Base Year:	2009
Future Year:	2019
Trip purpose groups:	All Purposes
Time Period:	Weekday PM peak period (1600 – 1859)

Area Description		All purposes		
Level	Name	Production	Attraction	Average
GB	GB	1.0736	1.0736	1.0736
45UC4	Yapton	1.0707	1.0985	1.0846

TEMPRO Results			NRTF 2009 - 2019
Area	2009 - 2019	Prop of UK	Medium
Yapton	1.0846	1.010	1.160
GB	1.0736		1.149

APPENDIX K

PICADY Results

TRL LIMITED

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 3.0 (MAR 2001)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"s:\Clients\BrookworthHomesLtd\Burndell Road, Yapton - P2551\General\Proposed Access Am Peak 0800-0900.vpi"
at 10:29:10 on Thursday, 3 April 2014

RUN TITLE

Proposed Access AM Peak 0800 - 0900 plus Com Dev plus Application

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

MAJOR ROAD (ARM C) ----- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS Burndell Road East
ARM B IS Proposed Access
ARM C IS Burndell Road West

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I (W)	6.50 M.	I
I	CENTRAL RESERVE WIDTH	I (WCR)	0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I (WC-B)	2.20 M.	I
I	- VISIBILITY	I (VC-B)	75.0 M.	I
I	- BLOCKS TRAFFIC	I	YES	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I (VB-C)	18.0 M.	I
I	- VISIBILITY TO RIGHT	I (VB-A)	18.0 M.	I
I	- LANE 1 WIDTH	I (WB-C)	3.00 M.	I
I	- LANE 2 WIDTH	I (WB-A)	0.00 M.	I

TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I I I I	I I I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		FLOW STARTS	TOP OF PEAK	FLOW STOPS	BEFORE	AT TOP	AFTER
I I I	I I I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	15.00	45.00	75.00	3.72	5.59	3.72
I	ARM B	15.00	45.00	75.00	0.29	0.43	0.29
I	ARM C	15.00	45.00	75.00	4.05	6.08	4.05

	TIME	TURNING PROPORTIONS					
		TURNING COUNTS (VEH/HR)					
		(PERCENTAGE OF H.V.S)					
		FROM/TO	ARM A	ARM B	ARM C		
07.45 - 09.15	ARM A	0.000	0.013	0.987			
		0.0	4.0	294.0			
		(0.0)	(10.0)	(10.0)			
	ARM B	0.478	0.000	0.522			
		11.0	0.0	12.0			
		(10.0)	(0.0)	(10.0)			
	ARM C	0.988	0.012	0.000			
		320.0	4.0	0.0			
		(10.0)	(10.0)	(0.0)			

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I
I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I
I		07.45-08.00							
I		B-AC	0.29	7.22	0.040	0.0	0.0	0.6	
I		C-AB	0.08	11.19	0.007	0.0	0.0	0.1	
I		C-A	3.97						
I		A-B	0.05						
I		A-C	3.67						

I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I
I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I	I I I I I I I I
I		08.00-08.15							
I		B-AC	0.34	6.97	0.049	0.0	0.1	0.8	
I		C-AB	0.10	11.55	0.008	0.0	0.0	0.1	
I		C-A	4.74						
I		A-B	0.06						
I		A-C	4.39						

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	08.15-08.30									I
I	B-AC	0.42	6.63	0.063		0.1	0.1	1.0		I
I	C-AB	0.13	12.05	0.011		0.0	0.0	0.2		I
I	C-A	5.79								I
I	A-B	0.07								I
I	A-C	5.37								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	08.30-08.45									I
I	B-AC	0.42	6.63	0.063		0.1	0.1	1.0		I
I	C-AB	0.13	12.05	0.011		0.0	0.0	0.2		I
I	C-A	5.79								I
I	A-B	0.07								I
I	A-C	5.37								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	08.45-09.00									I
I	B-AC	0.34	6.97	0.049		0.1	0.1	0.8		I
I	C-AB	0.10	11.55	0.008		0.0	0.0	0.1		I
I	C-A	4.74								I
I	A-B	0.06								I
I	A-C	4.39								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	09.00-09.15									I
I	B-AC	0.29	7.22	0.040		0.1	0.0	0.6		I
I	C-AB	0.08	11.19	0.007		0.0	0.0	0.1		I
I	C-A	3.97								I
I	A-B	0.05								I
I	A-C	3.67								I
I										I

WARNING THE JUNCTION MODELLED CAN CARRY HIGH-SPEED MAJOR ROAD TRAFFIC. (AG23 REF. 8.4.2(v)).

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.0

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I		I		I		I		I		I	
I	STREAM	I	TOTAL DEMAND		I	* QUEUEING *		I	* INCLUSIVE QUEUEING *		I
I		I			I	* DELAY *		I	* DELAY *		I
I		I			I			I			I
I		I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	(MIN/VEH)	I
I	B-AC	I	31.5	I 21.0	I	4.8	I 0.15	I	4.8	I 0.15	I
I	C-AB	I	9.2	I 6.1	I	0.9	I 0.09	I	0.9	I 0.09	I
I	C-A	I	435.1	I 290.1	I		I	I		I	I
I	A-B	I	5.5	I 3.7	I		I	I		I	I
I	A-C	I	403.1	I 268.8	I		I	I		I	I
I	ALL	I	884.4	I 589.6	I	5.6	I 0.01	I	5.6	I 0.01	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

***** PICADY 4 run completed.
===== end of file =====

[Printed at 10:29:55 on 03/04/2014]

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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RELEASE 3.0 (MAR 2001)

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Run with file:-
"s:\Clients\BrookworthHomesLtd\Burndell Road, Yapton - P2551\General\Proposed Access PM Peak 1700-1800.vpi"
at 10:30:35 on Thursday, 3 April 2014

RUN TITLE

Proposed Access PM Peak 1700 - 1800 plus Com Dev plus Application

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

MAJOR ROAD (ARM C) ----- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS Burndell Road East
ARM B IS Proposed Access
ARM C IS Burndell Road West

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I (W)	6.50 M.	I
I	CENTRAL RESERVE WIDTH	I (WCR)	0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I (WC-B)	2.20 M.	I
I	- VISIBILITY	I (VC-B)	75.0 M.	I
I	- BLOCKS TRAFFIC	I	YES	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I (VB-C)	18.0 M.	I
I	- VISIBILITY TO RIGHT	I (VB-A)	18.0 M.	I
I	- LANE 1 WIDTH	I (WB-C)	3.00 M.	I
I	- LANE 2 WIDTH	I (WB-A)	0.00 M.	I

TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			I	RATE OF FLOW (VEH/MIN)			I
		I	I	I		I	I	I	
I	ARM	I	FLOW STARTS	I	TOP OF PEAK	I	FLOW STOPS	I	BEFORE
I	I	I	TO RISE	I	IS REACHED	I	FALLING	I	AT TOP
I	I	I	I	I	I	I	I	I	AFTER
I	I	I	I	I	I	I	I	I	I
I	ARM A	I	15.00	I	45.00	I	75.00	I	4.19
I	ARM B	I	15.00	I	45.00	I	75.00	I	0.15
I	ARM C	I	15.00	I	45.00	I	75.00	I	4.80

	TIME	TURNING PROPORTIONS					
		TURNING COUNTS (VEH/HR)					
		(PERCENTAGE OF H.V.S)					
		FROM/TO	ARM A	ARM B	ARM C		
16.45 - 18.15	ARM A	0.000	0.027	0.973			
		0.0	9.0	326.0			
		(0.0)	(10.0)	(10.0)			
	ARM B	0.500	0.000	0.500			
		6.0	0.0	6.0			
		(10.0)	(0.0)	(10.0)			
	ARM C	0.974	0.026	0.000			
		374.0	10.0	0.0			
		(10.0)	(10.0)	(0.0)			

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

I	TIME	I	DEMAND	I	CAPACITY	I	DEMAND/	I	PEDESTRIAN	I	START	I	END	I	DELAY	I	GEOMETRIC DELAY	I
I	I	I	(VEH/MIN)	I	(VEH/MIN)	I	CAPACITY	I	FLOW	I	QUEUE	I	QUEUE	I	(VEH.MIN/	I	(VEH.MIN/	I
I	I	I	I	I	I	I	(RFC)	I	(PEDS/MIN)	I	(VEHS)	I	(VEHS)	I	TIME SEGMENT)	I	TIME SEGMENT)	I
I	16.45-17.00	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	B-AC	I	0.15	I	6.98	I	0.021	I	I	I	0.0	I	0.0	I	0.3	I	I	I
I	C-AB	I	0.20	I	11.53	I	0.017	I	I	I	0.0	I	0.0	I	0.3	I	I	I
I	C-A	I	4.60	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	A-B	I	0.11	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	A-C	I	4.07	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

I	TIME	I	DEMAND	I	CAPACITY	I	DEMAND/	I	PEDESTRIAN	I	START	I	END	I	DELAY	I	GEOMETRIC DELAY	I
I	I	I	(VEH/MIN)	I	(VEH/MIN)	I	CAPACITY	I	FLOW	I	QUEUE	I	QUEUE	I	(VEH.MIN/	I	(VEH.MIN/	I
I	I	I	I	I	I	I	(RFC)	I	(PEDS/MIN)	I	(VEHS)	I	(VEHS)	I	TIME SEGMENT)	I	TIME SEGMENT)	I
I	17.00-17.15	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	B-AC	I	0.18	I	6.69	I	0.027	I	I	I	0.0	I	0.0	I	0.4	I	I	I
I	C-AB	I	0.26	I	11.96	I	0.022	I	I	I	0.0	I	0.0	I	0.4	I	I	I
I	C-A	I	5.47	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	A-B	I	0.13	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	A-C	I	4.87	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	17.15-17.30									I
I	B-AC	0.22	6.29	0.035		0.0	0.0	0.5		I
I	C-AB	0.36	12.54	0.029		0.0	0.0	0.6		I
I	C-A	6.66								I
I	A-B	0.16								I
I	A-C	5.96								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	17.30-17.45									I
I	B-AC	0.22	6.29	0.035		0.0	0.0	0.5		I
I	C-AB	0.36	12.54	0.029		0.0	0.0	0.6		I
I	C-A	6.66								I
I	A-B	0.16								I
I	A-C	5.96								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	17.45-18.00									I
I	B-AC	0.18	6.69	0.027		0.0	0.0	0.4		I
I	C-AB	0.26	11.96	0.022		0.0	0.0	0.4		I
I	C-A	5.47								I
I	A-B	0.13								I
I	A-C	4.87								I
I										I

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	I
I	18.00-18.15									I
I	B-AC	0.15	6.98	0.021		0.0	0.0	0.3		I
I	C-AB	0.20	11.54	0.018		0.0	0.0	0.3		I
I	C-A	4.60								I
I	A-B	0.11								I
I	A-C	4.07								I
I										I

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * * DELAY *		* INCLUSIVE QUEUEING * * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-AC	16.5	11.0	2.5	0.15	2.5	0.15
C-AB	24.9	16.6	2.6	0.10	2.6	0.10
C-A	501.7	334.5				
A-B	12.3	8.2				
A-C	447.0	298.0				
ALL	1002.4	668.2	5.1	0.01	5.1	0.01

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

***** PICADY 4 run completed.
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