

**LAND OFF GOODACRES,
BARNHAM, WEST SUSSEX**

Proposed Residential Development

Transport Assessment

**Prepared on behalf of
Seaward Properties Limited**

ARUN DISTRICT COUNCIL				
No.	BN	9	10	
RECEIVED				

PMR/SEAW/09/1102/TA01

March 2010



DOCUMENT CONTROL

Project: Land off Goodacres, Barnham, West Sussex
Proposed Residential Development

Document: Transport Assessment

Client: Seaward Properties Limited

Reference: PMR/SEAW/09/1102/TA01

Document Checking:

Author:

Date: 26/03/2010

Checked by:

Date: 26/03/2010

Approved by:

Date: 26/03/2010

Status:

<u>Issue</u>	<u>Date</u>	<u>Status</u>	<u>Issued by</u>
1.	26/03/2010	Final	PMR
2.			
3.			
4.			
5.			
6.			
7.			

© Copyright Russell Giles Partnership Limited 2010

No part of this publication may be reproduced by any means without the prior permission of Russell Giles Partnership Limited.



CONTENTS

1	INTRODUCTION.....	4
1.1	Background.....	4
1.2	Report Scope and Structure.....	5
1.3	Transport Development Control Policy.....	6
2	DEVELOPMENT SITE, LOCAL SURROUNDINGS AND ACCESSIBILITY	8
2.1	Site Location and Description.....	8
2.2	Local Highway Network.....	9
2.3	Eastergate Junction.....	10
2.4	Accessibility Credentials.....	10
	<i>Local Facilities</i>	<i>10</i>
	<i>Walk/Cycle Provision.....</i>	<i>12</i>
	<i>Bus Facilities.....</i>	<i>13</i>
	<i>Rail Facilities.....</i>	<i>13</i>
	<i>Summary</i>	<i>13</i>
3	REVIEW OF ACCIDENT RECORDS.....	15
3.1	Background.....	15
3.2	Goodacres Junction	15
3.3	Yapton Road/Barnham Road/Barnham Lane junction.....	16
3.4	Eastergate Junction.....	16
4	TRAFFIC GENERATION AND TRAFFIC IMPACT.....	17
4.1	Traffic Generation	17
4.2	Traffic Impact	18
4.3	Assessment of Growth	19
4.4	Traffic Distribution	20
4.5	Highway Capacity Impact.....	20
	<i>Junction 1 - Barnham Lane/Goodacres.....</i>	<i>21</i>
	<i>Junction 2 – Barnham Lane/Barnham Road/Yapton Road.....</i>	<i>22</i>
	<i>Junction 3 – Eastergate Junction</i>	<i>22</i>
5	ACCESS ARRANGEMENT OFF-SITE WORKS AND INTERNAL LAYOUT.....	24
5.1	Proposed Access Design and Off-site Works.....	24
5.2	Internal Layout.....	24
5.3	Parking Provision.....	25
6	SUMMARY AND CONCLUSIONS.....	27
6.1	Summary	27
6.2	Conclusions	27



PLANS

Plan 01 Site Location and Accessibility Plan

DRAWINGS

2009/1067/001 Proposed Off-site Works

FIGURES

Figure 1 Base 2010 Traffic Flows
Figure 2 Base 2013 Traffic Flows
Figure 3 Base 2018 Traffic Flows
Figure 4 Traffic Distribution
Figure 5 WSCC Development - Yapton Road Flows
Figure 6 Development Traffic
Figure 7 Opening Year 2013
Figure 8 Assessment Year 2018
Figure 9 Base 2013 Traffic Flows - Eastergate
Figure 10 Base 2018 Traffic Flows - Eastergate
Figure 11 Traffic Distribution - Eastergate
Figure 12 Development Traffic - Eastergate
Figure 13 Opening Year 2013 - Eastergate
Figure 14 Assessment Year 2018 - Eastergate

APPENDICES

Appendix A Traffic Survey Results
Appendix B Extracts from Arun District Council's 'Settlement Sustainability Study 2007'
Appendix C Accident Records
Appendix D TRICS Assessment
Appendix E Growth Calculations
Appendix F Junction 1 PICADY Results
Appendix G Junction 2 PICADY Results
Appendix H Junction 3 ARCADY Results

LIST OF TABLES

Table 2.1 Existing Traffic Generation - Goodacres
Table 2.2 Summary of Accessibility Credentials – ADC's 'Settlement Sustainability Study 2007'
Table 2.3 Summary of Local Bus Services
Table 4.1 Summary of Development Related Traffic Flows – 88 Dwellings
Table 4.2 Summary of Post Development Traffic Flows - Goodacres
Table 4.3 Summary of Traffic Growth Factors
Table 4.5 Junction 1 Capacity Summary
Table 4.6 Junction 2 Capacity Summary
Table 4.7 Junction 2 Capacity Summary



1 INTRODUCTION

1.1 Background

- 1.1.1 Russell Giles Partnership (RGP) is instructed by Seward Properties Limited to advise on highway and transport planning matters in relation to the proposed development of the land at Barnham, identified on the attached **Plan 01**, for a scheme of 88 residential properties.
- 1.1.2 The proposed development site extends to 28,854m² (2.88 hectares) in total area as indicated edged red on **Plan 01**.
- 1.1.3 The proposed development would be served via an extension of Goodacres, a small residential cul-de-sac located to the west of the site, and would provide a safe and convenient all-movement access for the whole 88 units. A secondary access is proposed via Halliford Drive to the north, for the purposes of emergency vehicle access only. Pedestrian and cycle links would be provided at all access points, with the addition of a pedestrian/cycleway link at its north-east end.
- 1.1.4 The proposals include improvements to Goodacres, involving measures to remove parking on the carriageway, and to the junctions of Goodacres/Barnham Lane, and Barnham Lane/Barnham Road/Yapton Road to improve capacity and safety for all users of the highway, notably for pedestrians.
- 1.1.5 West Sussex County Council (WSCC) as Highway Authority has not been consulted on the scope of this Transport Assessment (TA) given RGP's extensive knowledge of the site and its locality; in this light it was considered unnecessary to put Seward Properties to the expense of pre-planning consultation and to delay the Planning Application.
- 1.1.6 It has not been necessary to consult with the Highways Agency (HA) on other similar development proposals in the Barnham area and so the HA has not been consulted as background to this TA.
- 1.1.7 The impact of traffic associated with the proposal at the A27 would be very slight and of no material consequence to either capacity or safety.
- 1.1.8 **Plan 01** of this report identifies the sections of the highway network assessed in capacity and safety terms as sensitive to this development proposal and thus worthy of development funded works.



- 1.1.9 In designing off-site works, the level of daily and peak period trips has been identified and those trips assigned on the network. Land ownership, Public Highway limits, traffic survey data and accident statistics for the infrastructure have been studied in designing the nature and extent of development-related works.
- 1.1.10 It is considered that there is a natural desire-line for pedestrians and cyclists through the site, generally northeast/southwest, and this is reflected in the internal and external design aspects.
- 1.1.11 RGP previously consulted with Highway Officers at WSCC in respect to its Valuation and Estate's department's proposal for the local development on Yapton Road on the land identified on **Plan 01** (Planning Application ref. BN/27/09). RGP's consultation involved scoping the extent of input required in preparing the TA in support of that Planning Application for a residential development of 95 dwellings. Given that the TA in demonstration of that proposal showed that the development would not materially affect junctions in respect to capacity or safety, and generally by a considerable margin, it was decided that the junctions in question should not need reassessment in respect to this proposal.
- 1.1.12 Planning Application BN/27/09 has not yet been determined, but since RGP's work in respect to demonstrating the highway and transport aspects of the proposal have been accepted by WSCC, RGP considers that there is no conflict in RGP acting for Seward Properties Limited. Indeed, it is considered that by acting in respect to both planning proposals, greater efficiencies are achievable for the benefit of the area in general and the local community.
- 1.2 Report Scope and Structure**
- 1.2.1 Whilst the traffic associated with the proposed development has been indicated on Table 4.1 in Section 4 of this report to show the potential impact of the proposal in absolute terms assuming the WSCC Planning Application is consented, for the reasons outlined only the junctions shown on **Plan 01** have been assessed technically within this TA.
- 1.2.2 Each of the junctions technically assessed within this TA were surveyed by The Safety Forum, which undertook full classified turning counts at the junctions, monitored queues, speeds and pedestrian movements.
- 1.2.3 Assessment work was undertaken by RGP to determine the base capacity of each of the junctions (assuming the WSCC site is developed as proposed). Reference has been made to the effects of the forthcoming Bognor Regis Relief Road (BRRR) but only as a point of robustness.



- 1.2.4 Evidently the BRRR would enhance conditions on Yapton Road/Barnham Road (B2233) by diverting traffic from Yapton Road/Barnham Road on to the BRRR. Thus, it is considered that the traffic conditions post BRRR would be less than that recorded and therefore this assessment is robust.
- 1.2.5 By way of work conducted for the WSCC site, it was concluded that the location of the proposed development and the travel habits of the local community is such that the proposed development would significantly impact upon the junction of Barnham Road/Nyton Road/Fontwell Ave in Eastergate, known as the 'Eastergate Junction', where there is sensitivity. This junction is therefore technically assessed within this report in addition to the junctions of Goodacres/ Barnham Lane, and Barnham Lane/Barnham Road/Yapton Road
- 1.2.6 The other principal areas to be considered within this report include the accessibility credentials (i.e. the sustainable alternative modes of travel available to prospective residents of the site), review of accident history for the local highway network, traffic generation and impact, and the proposed access arrangements.
- 1.2.7 Consideration is also given to off-site works designed to mitigate traffic impact where the network is considered sensitive to the development traffic and includes the proposed improvements to the access arrangement for the site.
- 1.2.8 The remainder of this report comprises the following sections:
- (i) Section 2: Site Location and Accessibility Credentials;
 - (ii) Section 3: Review of Accident Records;
 - (iii) Section 4: Traffic Generation and Traffic Impact;
 - (iv) Section 5: Access Arrangements, off-site works and Internal Design;
 - (v) Section 6: Summary and Conclusions.

1.3 Transport Development Control Policy

- 1.3.1 This TA has been produced in accordance with the Department for Transport's (DfT) "Guidance on Transport Assessment" document. The DfT guidelines provide guidance on the content of TA's in relation to trip rates and traffic growth, for example.
- 1.3.2 This report has also been compiled with consideration of government Planning Policy Guidance in PPG13 'Transport', which highlights the Government's policies and targets for transportation. PPG13 sets out the framework for achieving sustainable development in relation to transport issues.



1.3.3 PPG13 states within Paragraphs 1-10 that when considering Planning Applications, local authorities should:

..."Actively manage the pattern of growth to make the fullest use of public transport, and focus major generators of travel demand in city, town and district centres and near to major public transport interchanges"...

..."Ensure that development comprising jobs, shopping, leisure and services offers a realistic choice of access by public transport, walking and cycling, recognising that this may be less achievable in some rural areas"...

..."Use parking policies, alongside other planning and transport measures, to promote sustainable transport choices and reduce reliance on the car for work and other journeys"...

Give priority to people over ease of traffic movement and plan to provide more road space to pedestrians, cyclists and public transport in town centres, local neighbourhoods and other areas with a mixture of land uses;

1.3.4 To implement this, PPG 13 also advises that developers should submit a Transport Assessment alongside Planning Applications. Transport Assessments are technical documents designed to assess the transport impacts of the development. Paragraph 23 states that:

..."Where developments will have significant transport implications, Transport Assessments should be prepared and submitted alongside the relevant planning applications for development. Transport Assessments replace Traffic Impact Assessments, and the Department will issue good practice advice on their content and preparation. The coverage and detail of the Transport Assessment should reflect the scale of development and the extent of the transport implications of the proposal. For small schemes, the Transport Assessment should simply outline the transport aspects of the application. For major proposals, the assessment should illustrate accessibility to the site by all modes and the likely modal split of journeys to and from the site. It should also give details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts. Where appropriate, a travel plan should be included"....

1.3.5 This TA has been compiled with consideration of these two documents against the background of RGP's considerable experience of the Barnham area.



2 DEVELOPMENT SITE, LOCAL SURROUNDINGS AND ACCESSIBILITY

2.1 Site Location and Description

- 2.1.1 **Plan 01** appended hereto illustrates the location of the site in relation to the local highway network and nearby facilities.
- 2.1.2 The development site is located at the eastern end of Goodacres, a residential cul-de-sac serving approximately 50 dwellings along its length, in a mixture of semi-detached dwellings and apartments. Goodacres is served by Barnham Lane at its eastern end by way of a priority arrangement with Goodacres the minor road.
- 2.1.3 Goodacres provides a single lane carriageway road width of approximately 4.8 metres. Two-way movements are restricted along much of the length of the cul-de-sac due to much of the southern side being occupied by on-street parking (see photographs below).



- 2.1.4 The majority of traffic generation along the length of Goodacres is from the residential dwellings it serves. The development site does not currently generate any traffic along its length.
- 2.1.5 A traffic survey was undertaken at the junction of Goodacres and Barnham Lane to determine the current level of traffic that the existing properties generate throughout the usual highway peak hours. The traffic survey was undertaken by The Safety Forum Limited on Tuesday 23rd March 2010 and observed multi-modal turning counts at Goodacres in morning (07:00 – 10:00) and evening (16:30 – 19:00) periods. The survey also monitored queuing and pedestrian movements. Results of the traffic survey are attached hereto at **Appendix A**.
- 2.1.6 Table 2.1 illustrates the current level of traffic at Goodacres during the traditional morning and evening peak periods respectively.



Time Period	Arrivals	Departures	Total Two-way
AM Peak Hour (08:00 – 09:00)	4	7	11
PM Peak Hour (17:00 – 18:00)	2	5	7

Table 2.1 - Existing Traffic Generation, Goodacres.

- 2.1.7 The survey results demonstrate that Goodacres is currently very lightly trafficked during the peak hours. During the morning peak period (08:00 – 09:00) a total of 11 two-way vehicle movements occur within a cul-de-sac at a frequency of 1 every 5 minutes or so. In the evening peak hour traffic flows are lower with 7 two-way movements, equivalent to 1 vehicle movement every 8.5 minutes.

2.2 Local Highway Network

- 2.2.1 Goodacres forms a priority junction with Barnham Lane, a 30 mph Local Distributor Road linking the B2233 with Walberton and the A27. Northwards, Barnham Lane splits at its priority junction with Lake Lane, which in turn provides links with the A27 and the B2233.
- 2.2.2 At its southern-most end, approximately 90 metres south of Goodacres, Barnham Lane forms a priority junction with B2233 Yapton Road/Barnham Road. Barnham Road is a District Distributor road, generally providing road links between the A259 to the south and the A27 to the north and passes through Barnham village centre to the west.
- 2.2.3 Further afield, the A259 District Distributor provides links west with Bognor Regis and east with Littlehampton and beyond. Due to the nature of the strategic role of this coastal route, at peak times the A259 has areas of congestion and delay, particularly the local westbound stretch connecting with Bognor Regis. The proposed BRRR associated with the development of Site 6 would therefore help alleviate current congestion problems on parts of the A259.
- 2.2.4 The A27 Trunk Road to the north of Bognor Regis also has an important role in catering for longer distance travel along the south coast between Portsmouth in the west to Eastbourne in the east. The A27 is accessible to the site either via the A259 through Bognor Regis and linking with Chichester, or via the A29 for example, north via Fontwell. Another north route to the A27 (Crockerhill) is the B2233.
- 2.2.5 Yapton Road/Barnham Road is generally subject to a 30 mph speed limit with many accesses for commercial and residential purposes local to the site; it could be described as semi-urban in character, with continuity of footways in the locality. The highway is generally lit, and serves a number of local bus routes.



- 2.2.6 Barnham Road provides direct access to Barnham village centre, located approximately 400 metres west of the site, which provides a number of facilities and amenities within a short distance, including Barnham train station. Barnham has a variety of shops which meet the daily needs of the local community and these are generally in the vicinity of the train station.

2.3 Eastergate Junction

- 2.3.1 The 'Eastergate' junction is located approximately 2.0 kilometres to the north-west of the site at the point where Barnham Road forms a roundabout junction with the A29. The connecting arms of the A29 subsequently provide a direct link to the A27 in both directions.

- 2.3.2 The junction is subject to heavy traffic flows during each of the peak periods with vehicles travelling through the junction between the A27 and Bognor Regis.

2.4 Accessibility Credentials

Local Facilities

- 2.4.1 The location of the site is such that the development is well placed to take advantage of a good mix of services and facilities within a 2.0 kilometre walking distance, whilst public transport services are also within a short distance. The site is located approximately 400 metres (5 minutes walk) from Barnham village centre. The location of the site relative to its local facilities is illustrated on **Plan 01** attached hereto.

- 2.4.2 Arun District Council's '*Settlement Sustainability Study*' produced in July 2007, provides guidance on the level of sustainability of the development site and the surrounding area. The study was produced for the Arun Local Development Framework. The guidance assesses the sustainability of the district's settlements to help inform decisions on the location of future residential and other development. Extracts from the Study are attached at **Appendix B**.

- 2.4.3 The Sustainability Study considers the location of settlements relative to facilities including, Educational, Local Health Services and a range of private and commercial services. The guidance provides a breakdown of the accessibility levels of site, and an accessibility score given, dependent upon the distance threshold to such services from the site.

- 2.4.4 The settlements are scored between 0.00–2.00+ ranging from Very Poor to Very Good accessibility. It is evident from the results of the assessment that the Barnham Settlement, within which the site lies, has a score of 1.63 and therefore is considered to have an overall 'good accessibility' level.



- 2.4.5 Table 7.4 of ADC's study provides a breakdown of the accessibility characteristics of the Barnham ward, within which the site lies, to a variety of important local facilities. Table 7.4 is summarised below:

Facility	Barnham Score	Barnham Accessibility Category	Eastergate Score	Eastergate Accessibility Category
Bank	2.33	Very Good Accessibility	1.00	Fair Accessibility
Bus	0.00	Very Poor Accessibility	3.00	Excellent Accessibility
Community Hall	0.78	Poor Accessibility	3.00	Excellent Accessibility
Food Store	2.56	Excellent Accessibility	2.50	Excellent Accessibility
Further Education	0.22	Poor Accessibility	2.00	Very Good Accessibility
G.P Surgery	0.78	Poor Accessibility	3.00	Excellent Accessibility
Petrol Station	0.22	Very Poor Accessibility	2.00	Very Good Accessibility
Pharmacy	2.56	Excellent Accessibility	1.00	Fair Accessibility
Place of Worship	1.00	Fair Accessibility	3.00	Excellent Accessibility
Post Office	2.56	Excellent Accessibility	2.50	Excellent Accessibility
Primary School	2.56	Excellent Accessibility	3.00	Excellent Accessibility
Secondary School	2.33	Very Good Accessibility	2.00	Very Good Accessibility
Train Station	2.22	Very Good Accessibility	0.50	Poor Accessibility

Table 2.2 – Summary of Accessibility Credentials – ‘Settlement Sustainability Study 2007’

- 2.4.6 The above Table 2.2 illustrates that Barnham provides a good level of essential facilities within the local vicinity of the site, with ‘Excellent’ accessibility to food stores, pharmacy, Post Office, and Primary School, and ‘very good’ accessibility to banks, Secondary Schools and stations. It is considered that the local facilities with an excellent and very good rating are the more frequent services that would be used by residents of the site to cater for their general day-to-day convenience and retail needs. The remaining facilities such as a Further Education Institutions, Community Hall, Petrol Station, Place of Worship and G.P Surgery would generally be used less frequently.



- 2.4.7 Eastergate village centre which provides further facilities is located approximately 2.5 kilometres northwest of Barnham village centre, approximately 5 mins walk from the site, or a short cycle. Eastergate provides 'Excellent Accessibility' to the facilities that would be less frequently used by the development site, as well as further retail and educational needs. The Eastergate settlement would therefore provide an attractive trip for residents of the proposed development, who would find this slightly longer walk through Barnham to Eastergate a desirable alternative to the private car for the occasional visit to their, Place of Worship and Community Hall etc.
- 2.4.8 Both of the settlement areas define the accessibility level for buses as 'very poor' within the sustainability statement. Yapton Road/Barnham Road serves as a bus route with services passing close by the site in both directions between Bognor Regis and Yapton. The limited bus services are counteracted by the very good accessibility to rail facilities, with Barnham rail station located approximately 400 metres from the site. Based on Table 5.3 of the study, the site therefore benefits from a score of 1.11 and a fair level of accessibility to local public transport.
- 2.4.9 For needs further afield, whether for shopping, employment, education or leisure, residents of the new development, likely destinations include Brighton (east), Portsmouth/Southampton (west) or the Horsham area in the north. Local to the site, the principal settlements for such trips include Littlehampton and Worthing (east), Chichester (west) and Arundel in the north.

Walk/Cycle Provision

- 2.4.10 Walking links to and from the site are provided along Goodacres, Barn Rise/Halliford Drive, Lake Lane, Barnham Lane, and Barnham Road/Yapton Road, with good footway provision connecting with Barnham village centre. A footpath/cycle path is proposed through the site. **Plan 01** illustrates the public pedestrian/cycle routes through Barnham and Eastergate village centres.
- 2.4.11 Several educational facilities are located close to the site, including Barnham Primary School and St Philip Howard Catholic High School. As reflected in the study, the existing education score is 2.56 (Excellent Accessibility). These facilities provide infant, junior, primary and secondary school education within a short walking distance. The locations of the local schools are illustrated on **Plan 01**.
- 2.4.12 Bognor Regis town centre is located approximately 9.5km to the south-west of Barnham. Bognor Regis is located within comfortable cycling distance from Barnham via a choice of designated cycle routes; these are shown on **Plan 01**.
- 2.4.13 Bognor Regis provides more significant employment opportunities within Bognor, including the industrial estates and retail parks close to the A29, for example the town centre itself provides a high concentration of employment needs with a wide range of shops and offices.



Bus Facilities

- 2.4.14 A section of Barnham Lane forms part of a bus route, with bus stops located on its both sides approximately 1 minute walk time of the site. The local bus service 66/66A operates in both directions offering a regular circuit to Bognor Regis town centre. All local services in the area are operated by Stagecoach. The routes of the local services are shown on **Plan 01**, with services summarised in Table 2.3 below.

Service	Route	Frequency (Weekday)	
		Peak	Off-Peak
66/66A	Bognor Regis – Westergate – Barnham – Walberton – Yapton	Hourly	Hourly

Table 2.3 – Summary of Local Bus Services

- 2.4.15 Route 66/66A operates between Yapton and Bognor Regis High Street, with an hourly frequency between 07:00 and 19:00 hours during Monday to Saturday.
- 2.4.16 The services commence in Bognor Regis High Street and travel north into Barnham following a circular route, via Yapton and Walberton before returning to the town centre via Barnham. The journey time from the site to Bognor Regis town centre is approximately 25 minutes (including walk time).

Rail Facilities

- 2.4.17 Barnham railway station is located approximately 400 metres from the site. Direct services are provided north to London (Victoria) and east and west including Chichester, Brighton and Portsmouth.
- 2.4.18 These services operate regularly and provide access to further employment and retail services in alternative destinations. It is considered that the good transport facilities in the area along with the extensive retail and employment facilities provide potential for residents of the proposed development to travel by non-car means, particularly for regular commuting trips.

Summary

- 2.4.19 It is evident that a wide range of shopping and educational facilities are available by alternative modes to the private car. The site lies close to a village which provides a very good range of facilities and a main town centre (Bognor Regis) can be accessed realistically by cycle, or via regular and reliable public transport links nearby.



- 2.4.20 It is recognised through local studies by ADC that the site has good accessibility to local facilities and very good links to public transport, thus reducing the reliance of the private vehicle.



3 REVIEW OF ACCIDENT RECORDS

3.1 Background

- 3.1.1 Accident records have been obtained from WSCC, for the period from June 2004 to May 2009 (5 years), for the adjacent stretch of Barnham Lane adjacent to the site, the junction of Barnham Road/Yapton Road/Barnham Lane and the junction of Barnham Lane and Lake Lane to the north.
- 3.1.2 Accident data was also obtained for the Eastergate junction to the west of the site. A full copy of the accident information is attached hereto at **Appendix C**, including detailed description of all of the accidents obtained from Sussex Police. The accident data relates to Personal Injury Accidents (PIAs) of all categories during this period.
- 3.1.3 From the review of the accident records provided, the proposed development would seek to improve safety by way of the off-site works illustrated by Drawing **2010/1102/001**.
- 3.1.4 Details of the improvements that would be implemented are discussed further in Section 5.

3.2 Goodacres Junction

- 3.2.1 It is apparent from the summary plans for the 5 year period that the general area surrounding the site does not have a pattern of accidents that indicate clear highway inadequacies; however, those accidents recorded suggest worthwhile improvements in the context of the proposed development.
- 3.2.2 Since pedestrian-related accidents have occurred on Barnham Road in the vicinity of the station, and also at Barnham Road in the vicinity of Goodacres it is considered important to provide improved safety for road crossing pedestrians. There is a clear desire-line for pedestrians between the site area and the station, and so with additional development as proposed, that desire-line has been a focus in the design of development-related off-site works. It is proposed to attract pedestrians to a controlled crossing as shown on Drawing **2010/1102/001**.
- 3.2.3 One isolated accident (*ref: 0510075*) occurred involving a vehicle turning right into Goodacres and was shunted by a vehicle travelling behind. It is considered that this frequency of accidents during the 5 year period does not warrant concern for safety.



3.3 Yapton Road/Barnham Road/Barnham Lane junction

- 3.3.1 The accident records show that 2 slight PIA's have occurred at this junction during the last five years. It is likely that pedestrian-related accidents that have been recorded nearby would have occurred at the junction were it not for the barriers.
- 3.3.2 One accident occurred involving a vehicle failing to stop at the give-way line of Barnham Lane and entering the junction into the path of oncoming traffic. The second accident involved a taxi parked illegally on the junction, whose passenger was struck on the arm as she stepped out of the vehicle onto the carriageway.
- 3.3.3 Evidently the junction does not currently exhibit any particular accident trends. However, in the light of the existing pedestrian desire-line, which would heighten post-development, and the recorded pedestrian-related accidents in the locality, without a controlled crossing design solution for Barnham Road, more pedestrian-related accidents are likely.

3.4 Eastergate Junction

- 3.4.1 Accidents records identified that a total of 5 accidents occurred at the roundabout junction during the last 5 years, all of which resulted in slight injuries.
- 3.4.2 Two of the accidents involved pedestrians stepping out at inappropriate locations (i.e. not crossing at crossing points provided) and being struck by vehicles, whilst one accident involved a cyclist being struck by a vehicle on the roundabout.
- 3.4.3 The remaining two accidents were shunt type accidents of vehicles waiting at the give way prior to entering the roundabout.
- 3.4.4 It is considered that the existing junction does not suffer from any significant safety issues and research shows that the rate of accidents recorded is within the average PIA's for this type of junction. Based on 'Road Casualties Great Britain, the average rate of PIA's for 3-arm roundabouts is 0.75 – 1.2 per year.



4 TRAFFIC GENERATION AND TRAFFIC IMPACT

4.1 Traffic Generation

- 4.1.1 To determine the proposed traffic generation of the site, the TRICS database has been interrogated. Although a survey of the existing Goodacres cul-de-sac has been undertaken, it is not considered appropriate to use this data for a trip rate comparison, since the existing dwellings along Goodacres comprise mainly retirement flats and sheltered accommodation.
- 4.1.2 The TRICS database has therefore been assessed for similar private housing sites within West Sussex. The TRICS database identified one comparable site based on location, size, dwelling type and accessibility level. The full output results of the TRICS database and the resultant trip rates derived are attached hereto at **Appendix D**.
- 4.1.3 Based on the determined residential trip rates from the survey results the predicted level of vehicle movements for the proposed development of 88 dwellings is summarised in Table 4.1 below.

	Arrivals		Departures		Total	
	Trip Rate	Traffic	Trip Rate	Traffic	Trip Rate	Traffic
AM Peak Hour	0.111	10	0.500	44	0.611	54
PM Peak Hour	0.422	37	0.122	11	0.544	48
12hr (07:00 – 19:00)	2.644	233	2.632	232	5.276	465
24hr (00:00 – 24:00)	3.287	289	3.253	286	6.540	575

Table 4.1 – Summary of Development Related Traffic Flows – 88 Dwellings

- 4.1.4 As summarised by Table 4.1 the proposed residential development would generate in the order of 54 and 48 two-way vehicle movements during the AM and PM peak hours respectively. When considering the worst case AM peak, the 54 two-way movements equates to 1 additional vehicle every 1 minute or so (either arriving or departing the site), which is not considered significant. Over the course of a day the development proposals would generate 575 two-way vehicle movements.
- 4.1.5 This assessment of traffic generation is considered robust since the TRICS sites provide trip rates purely for semi-detached and terraced style dwellings. The proposed development would include a number of flats, which traditionally generate less traffic than houses.



- 4.1.6 Table 4.2 below summarises the post development traffic generation of Goodacres, combining the proposed 88 dwellings with the existing mix of 49 residential units.

	Arrivals		Departures		Total	
	Existing	Post-dev	Existing	Post-dev	Existing	Post-dev
AM Peak Hour	4	14	7	51	11	65
PM Peak Hour	2	39	5	16	7	55

Table 4.2 – Summary of Post Development Traffic Flows – Goodacres

4.2 Traffic Impact

- 4.2.1 RGP has considerable history of Transport Planning work in the Barnham area and based on experience it was established that the following junctions, as illustrated on **Plan 01** attached hereto, should be considered in detail as part of the assessment work within this TA:

- (i) Priority junction of Goodacres with Barnham Lane (i.e. Site Access) – Junction 1;
- (ii) Junction of Barnham Lane, with Barnham Road/Yapton Road – Proposed Controlled Pedestrian Crossing – Junction 2;
- (iii) Roundabout junction of Barnham Road/Nyton Road/Fontwell Avenue (Eastergate Junction) - Junction 3;

- 4.2.2 In order to assessed the above identified junctions detailed traffic surveys were undertaken during typical neutral days on the local highway network. Junctions 1 and 2 were surveyed on Tuesday 23rd March 2010 between 07:00 and 10:00 during the morning period and 14:30 and 19:00 during the evening period.

- 4.2.3 Junction 3 was surveyed on Wednesday 15th July 2009 between the hours of 07:00 and 10:00 during the morning period and 16:00 and 19:00 during the evening period.

- 4.2.4 Neither of the above surveys was conducted during times when snow was present, or had been forecast, and hence the surveys are considered to be representative of normal conditions locally. The results of the surveys conducted are attached at **Appendix A**.



- 4.2.5 Since Junction 1 is the site access, it is assumed that the side road traffic (Goodacres) is equivalent to the existing traffic counts at Goodacres plus the traffic generated by the number of dwellings proposed to be served from Goodacres based upon the trip rates determined from the TRICS database. The through traffic on Barnham Lane at Junction 1 is assumed to be equivalent to that traffic recorded from the turning count survey at the junction of Barnham Lane with Yapton Road/Barnham Road to immediately to the south, i.e. Junction 2.
- 4.2.6 The flow diagrams illustrating the existing traffic flows on the local highway network are shown in Figure 1 for the morning and evening peak hours respectively.
- 4.2.7 Consideration of the impact of the BRRR has been given to identify the redistribution of base traffic flows and development related traffic flows. It is considered that the impact of Junctions 1 and 2 would not be materially affected by the completion of the BRRR and based on previous assessment undertaken by RGP would generally lead to a reduction in traffic in this location. Therefore for a robust assessment the BRRR has not been considered for these junctions.
- 4.2.8 RGP previously undertook assessment of the Eastergate junction (Junction 3) as part of the WSCC Estates department Planning Application (Ref: BN/27/09), the location of which is illustrated on **Plan 01**. RGP's assessment of the junction determined post development traffic flows with the alterations to traffic patterns associated with the completion of the BRRR, as agreed with WSCC. The assessment of Junction 3 for this project therefore the post development flows for the previous scheme as a base so that the BRRR is appropriately assessed.
- 4.3 Assessment of Growth**
- 4.3.1 It was agreed with WSCC on previous schemes that the 'with development' scenarios should be assessed based upon an opening year of 2013 and a future assessment year of 2018.
- 4.3.2 Background traffic growth on the local highway network has been assumed to be 'medium' growth defined by use of TEMPRO for the local area of Barnham and NRTF figures for the UK. The data sheets attached at **Appendix E** illustrate the calculations of background growth, which are summarised in Table 4.3 below

	AM Peak	PM Peak
2010 to 2013 Growth Factor	1.037	1.060
2010 to 2018 Growth Factor	1.109	1.134

Table 4.3 Summary of Traffic Growth Factors



4.3.3 The background traffic on the local highway network has been factored to reflect the anticipated growth to determine the traffic flows for the 2013 opening year and 2018 assessment year base scenarios.

4.3.4 In addition to background growth, which includes allowance for traffic associated with proposed development in the wider area, consideration has been given to the traffic associated with the WSCC application in Yapton Road referred to earlier in the report.

4.3.5 Figure 2 attached hereto illustrates the 2013 opening year base scenario flow diagrams for the morning and evening peak hour respectively, whilst Figure 3 illustrates the 2018 assessment year base scenario flow diagrams.

4.4 Traffic Distribution

4.4.1 The distribution of traffic generated by the proposed development has been determined based upon existing proportion of residential traffic using Goodacres and the Yapton Road/Barnham Road junction to the south, based on the observed traffic counts undertaken at the two sites.

4.4.2 The full distribution figures are illustrated on Figure 4 for the morning and evening peak hours. Figure 5 also shows the traffic flows at the Yapton Road/Barnham Road junction associated with the adjacent WSCC scheme that is to be included within the post development assessment. These flows have been distributed across the junction based on the proportions identified in Figure 4.

4.4.3 The anticipated traffic generation for the proposed development is illustrated on the local highway network, based on the anticipated distribution, on Figure 6 for the AM and PM peak hours.

4.4.4 Traffic distribution at the Eastergate junction is assumed to be as per the previous assessment. It is assumed for a robust assessment that traffic turning right out of Barnham Lane would pass through the junction, when in reality due to the large distance between the two junctions only a small proportion would do so.

4.5 Highway Capacity Impact

4.5.1 The impact of the proposed development on the local highway network has been assessed at the three junctions identified above, during the morning and evening peak periods, based upon a comparison of the scenarios A to D outlined below.

(i) Scenario A: 2013 Opening Year 'do-nothing' Traffic (See Figure 2);



- (ii) Scenario B: 2018 Assessment Year 'do-nothing' Traffic (See Figure 3);
- (iii) Scenario C: 2013 Opening Year post-development traffic (See Figure 7);
- (iv) Scenario D: 2018 Assessment Year post-development traffic (See Figure 8).

4.5.2 The same scenarios A to D have also been assessed for the Eastergate junction. These traffic flows are as illustrated with Figures 9 to 14.

4.5.3 The following tables illustrate the capacity at each junction throughout each scenario, with the arm with the highest queue length and RFC (Ratio of Flow to Capacity) detailed.

Junction 1 - Barnham Lane/Goodacres

4.5.4 Table 4.4 below illustrates the results of the capacity assessment for Junction 1 for each of the scenarios identified above. The junction has been assessed using design software PICADY (Priority Intersection Capacity And Delay). Full results of the PICADY assessment are attached at **Appendix F**.

Junction 1	AM Peak Hour		PM Peak Hour	
	Max Q	Max RFC	Max Q	Max RFC
Scenario A – 2013 'Do Nothing'	0.1	0.015	0.1	0.009
Scenario B – 2018 'Do Nothing'	0.3	0.017	0.2	0.011
Scenario C – 2013 'Post Dev'	0.1	0.118	0.1	0.039
Scenario D – 2018 'Post Dev'	0.3	0.121	0.2	0.039

Table 4.4 – Junction 1 Summary

4.5.6 From table 4.4 above it is evident that the junction of Goodacres is impacted minimally by the proposed development, with RFC reaching a maximum of 0.121 in Scenario D, which is still well within acceptable limits, with no significant increase in queues at the junction. The maximum queues anticipated for the Barnham Lane junction are 0.3. It is considered that the junction will continue to operate without issue after development.



Junction 2 – Barnham Lane/Barnham Road/Yapton Road

- 4.5.7 The table below illustrates the existing and proposed scenarios at the junction. The junction has been assessed to determine the capacity of the existing and proposed arrangement using PICADY. Full results of the PICADY are attached at **Appendix G**.

Junction 2	AM Peak Hour		PM Peak Hour	
	Max Q	Max RFC	Max Q	Max RFC
Scenario A – 2013 'Do Nothing'	0.5	0.184	0.6	0.364
Scenario B – 2018 'Do Nothing'	0.6	0.364	0.7	0.415
Scenario C – 2013 'Post Dev'	0.7	0.411	0.7	0.405
Scenario D – 2018 'Post Dev'	0.8	0.456	0.8	0.464

Table 4.5 – Junction 2 Summary

- 4.5.9 Table 4.5 above shows the impact of the proposed development scenarios on Junction 2. During the AM Peak period there is a queue length variation from 0.6 in Scenario A to 0.9 in Scenario D and an RFC increase from 0.184 to 0.470, occurring on Barnham Lane. During the PM peak period there are no significant impacts from Scenario A with a queue of 0.6 and RFC of 0.364, through to Scenario D with a queue of 0.8 and RFC of 0.464.
- 4.5.10 From these results it is evident that there will be little impact on this junction, with queues remaining below 1.0 vehicle on all arms. The maximum RFC for the junction would be 0.490, identified in the PM peak hour and therefore the junction would remain operation with little impact on capacity and delay.

Junction 3 – Eastergate Junction

- 4.5.11 The existing roundabout junction has been tested to determine the current and future capacity characteristics of its operation. The junction has been assessed using ARCADY (Assessment of Roundabout Capacity And Delay) software, which models capacity queues and delays at roundabouts. The assessment is considered robust since it assumes that all vehicles travelling west from the site would visit this junction, when a large proportion of traffic may not reach it.
- 4.5.12 A full copy of the ARCADY outputs for the junction is contained within **Appendix H**. The results of the analysis is summarised in the tables below.



Junction 3	AM Peak Hour		PM Peak Hour	
	Max Q	Max RFC	Max Q	Max RFC
Scenario A – 2013 'Do Nothing'	6.5	0.886	1.1	0.529
Scenario B – 2018 'Do Nothing'	10.9	0.948	1.3	0.570
Scenario C – 2013 'Post Dev'	6.7	0.889	1.1	0.536
Scenario D – 2018 'Post Dev'	11.3	0.952	1.3	0.576

Table 4.6 – Junction 3 Summary

- 4.5.14 The capacity assessment indicates that all approaches of the roundabout junction would operate within capacity during the opening year and future assessment scenarios. Although the junction is close to capacity, the proposed development flows would have no significant impact on the junctions operation.
- 4.5.15 The results indicate that there would be negligible difference in the post-development performance operation of the junction during the assessed peak hours.



5 ACCESS ARRANGEMENT OFF-SITE WORKS AND INTERNAL LAYOUT

5.1 Proposed Access Design and Off-site Works

- 5.1.1 As illustrated on drawing number **2010/1102/001** (*revision A*), attached hereto, the all-movement access is proposed by way of an extension to Goodacres, a Public Highway. Since on-street parking regularly occurs on Goodacres, reducing the effective width of its carriageway to one lane, a lay-by is proposed for unassigned casual car parking. Initially it was considered that the on-street car parking is largely attributable to rail commuters, but a recent survey indicates that the car parking is generally associated with residents of Goodacres.
- 5.1.2 Current footways either side of Goodacres would be extended to connect to the Public Footpath to the south, cross it, and extend in to the proposed residential estate.
- 5.1.3 The existing turning head for Goodacres would be removed as service vehicles would enter the new estate road and turn within it.
- 5.1.4 Drawing **2010/1102/001** shows modifications to the section of Barnham Lane between its junction with Goodacres and Barnham Road/Yapton Road and to that junction also. The proposal to provide a controlled pedestrian crossing is motivated by the need to formalise the crossing of pedestrians in order to best protect their safety and raise the development's accessibility credentials in respect to non-car access from and to the rail station for example.
- 5.1.5 On commencement of detailed design of off-site works, RGP would investigate Statutory Equipment with a view to accommodating that equipment most efficiently. Any appropriate or necessary amendments to the proposed works as outlined would be referred to the Highway Authority under condition.

5.2 Internal Layout

- 5.2.1 The internal layout design is illustrated on the Illustrative Site Plan (Martin Critchell Architects Drawing Number 05).
- 5.2.2 It is proposed that the estate road design is adopted as Public Highway by WSCC, and as such it is considered that the design is acceptable in respect to servicing, car parking and accommodating pedestrians and cyclists with motorised traffic, safely and conveniently.
- 5.2.3 The proposed development also accommodates the current Public Footpath and provides for alternative pedestrian and cyclist passage through the site, generally in a northeast/southwest direction.



- 5.2.4 Emergency access is proposed via Halliford Drive, which would also allow access for pedestrians.

5.3 Parking Provision

- 5.3.1 The proposed development of up to 100 residential units would provide parking at a ratio of 1 space per dwelling for all 1 bedroom dwellings and 2 spaces per dwelling for the remaining. The proposed parking facilities would comprise a mixture of private car parks, private garages and driveways throughout the site.
- 5.3.2 RGP have considered the maximum parking standards to be applied to the proposed development, as set out within guidance by both Arun District Council (ADC) and West Sussex County Council (WSCC).
- 5.3.3 The WSCC guidance sets out a Zonal approach (i.e. Zone 1 to Zone 4) to parking based on the accessibility credentials of the site. Zone 1 relates to sites within town centre locations whereby accessibility credentials to sustainable modes of travel are relatively attractive, whilst Zone 4 is for rural areas whereby accessibility to sustainable modes is limited. WSCC's guidance stipulates that it is the responsibility of the District and Borough Councils to define their own zones.
- 5.3.4 When interpreting the standards set out by WSCC and ADC, it is considered that the site lies within Zone 3, whereby the maximum standard should be 85% of the full maximum standard (i.e. that for Zone 4). The ADC document defines the maximum provision for developments in Zone 4 as follows:
- (i) 1 bed units: 1 space per unit;
 - (ii) 2 & 3 bed units: 2 spaces per unit;
 - (iii) 4 bed units: 3 spaces per unit.
- 5.3.5 Based on the above maximum standards the site could demand 163 parking spaces if located in Zone 4, however since the site is located close to good train services, and its location on the edge of the urban area, i.e. within Zone 3, the standards dictate that the maximum parking provision of 85% of the maximum standard. Since the standards suggest a maximum of 75% of the Zone 4 standards for Zone 2, it is anticipated that an appropriate provision would be between 75% and 85% of the maximum standard.



- 5.3.6 The proposed development would therefore provide a sufficient level of parking on site in accordance with Council parking standards. It is considered that the level of parking is appropriate and is not set at a level which would result in excessive use of the private car since smaller households would be restricted from owning two cars, and neither would it result in parking on the local highway network.
- 5.3.7 Cycle parking would be provided on site for each dwelling, mainly in the form of private garages and cycle stores.



6 SUMMARY AND CONCLUSIONS

6.1 Summary

- 6.1.1 The proposal is considered to be well sited in respect to non-car accessibility and thus rates well in a transport sustainability sense. It also includes for off-site works that would provide planning gain in that regard but also generally in respect to traffic capacity, convenience and safety locally.
- 6.1.2 The proposal is to provide 88 dwellings on the site with a principal all-movement access via Goodacres, an emergency access via Barn Rise, and a pedestrian and cycle route through the development. The Public Footpath generally to the northwest of the site would be maintained.
- 6.1.3 It is proposed that on-street unassigned car parking that takes place on the carriageway of Goodacres be accommodated within a new lay-by and that the carriageway and footways be extended into the site.
- 6.1.4 RGP is well placed to demonstrate the Transport Planning aspects of this proposal given its considerable experience of the Barnham area, much of which relates to close communication with WSCC as Highway Authority. As such, RGP has been able to focus on the main issues to be addressed in order to at least mitigate transport impact.
- 6.1.5 Traffic data has been collected in order to assist in testing the capacity performance of the local highway network and design off-site works.
- 6.1.6 Land title, including Public Highway boundaries have been thoroughly investigated such that all works shown in the Planning Application are deliverable without agreement with an outside party.
- 6.1.7 All off-site works and internal design works would be the subject of further investigation post Planning Consent under Planning Condition relating to Highway Works Agreements.
- 6.1.8 The current off-site works proposals will be the subject of a Stage 1 Road Safety Audit and a Designer's Response submitted to address its findings.

6.2 Conclusions

- 6.2.1 This report provides details pertaining to the policy and technical aspects of providing access for, and accommodating safely and conveniently on the highway network, 88 dwellings. The principal conclusions of this report are as follows:



- (i) That the site accords well with Transport Policy (Central and Local Government), most importantly in the context of accessibility by non-car means;
- (ii) By way of off-site works the existing development neighbouring the site would have safer, more convenient pedestrian access from and to the train station for example, which would of cause benefit the residents of the new dwellings too;
- (iii) Existing residents of Goodacres would benefit from a lay-by for casual parking;
- (iv) Pedestrians and cyclists generally travelling northwest/southeast would benefit from the safe, convenient and attractive route through the development as an alternative to travelling on Lake Lane and Barnham Lane;
- (v) The proposed estate road design meets with road adoption standards;
- (vi) Adequate parking and servicing area is provided;
- (vii) The development traffic would not cause material capacity issues on the local highway network deemed potentially sensitive to the proposal for the purposes of this TA;
- (viii) The proposed Site 6 development, which includes the implementation of the BRRR would provide relief to the local traffic routes and further reduce the already minimal impact of the proposed development.

6.2.2 In light of the findings of this report, WSCC, as Highway Authority are respectfully urged to confirm that the proposed development is acceptable on highway grounds.