



Richard Jackson
Engineering Consultants

TRANSPORT AND HIGHWAYS ACCESS APPRAISAL

Greater Norwich Local Plan: Call for Sites Ref GNLP0132

Land North of Salhouse Road, White House Farm,
Sprowston, Norwich (Phase 3)

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Document prepared by: - David Bates
on behalf of Richard Jackson Ltd

Date: - 17 August 2017

Document checked by: - Raymond Long BSc (Hons) IEng MCIHT MICE
on behalf of Richard Jackson Ltd

Date: - 22 August 2017

Document Approved by: - Martin Doughty BEng(Hons) CEng FICE FCIHT MAPM
on behalf of Richard Jackson Ltd

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1. INTRODUCTION

Background Context

- 1.1. Richard Jackson Ltd (RJL) has been appointed by Persimmon Homes (Anglia), Taylor Wimpey and Hopkins Homes (the Consortium), to undertake a transport and highways access appraisal in relation to the promotion of land located north of Salhouse Road, Sprowston, Norwich.
- 1.2. The Site has been identified in the recent Greater Norwich Local Plan (GNLP) Call for Sites submission; Site Reference GNLP0132 as Land off Blue Boar Lane/Salhouse Road, White House Farm (known herein as the Site).
- 1.3. The Site has a total area of approximately 55 hectares and is currently in agricultural use. The Site lies immediately east of land identified as Strategic Policy GT20 (known herein as Phase 2) in the Growth Triangle Area Action Plan (AAP) produced by Broadland District Council and adopted in July 2016 to support Local Plan proposals in the area of Old Catton, Sprowston, Rackheath and Thorpe St Andrew.
- 1.4. This review considers that satisfactory access to the Site can be achieved to enable the comprehensive master planning process and provides an initial review of the off-site highway issues that need to be considered to enable development of the Site.
- 1.5. For the purposes of this review, and in accordance with the Call for Sites submission, it is assumed that around 1,500 dwellings, including public open space, school (2 form entry) and landscaping could be accommodated on the Site.
- 1.6. A future planning application will be accompanied by a Transport Assessment (TA) and a Framework Residential Travel Plan. The TA will evaluate the impacts of the proposals on the local transport network over time and in consideration with other development proposals and transport infrastructure interventions. A TA scoping report will be prepared and agreed with Norfolk County Council, Highways. The TA will assess development across the whole of the GT20 and GT7 allocated sites within the Growth Triangle Area, as well as the effects that the Norwich Northern Distributor Road (NNDR) will have after opening.

1.7. The key issues addressed in this report are summarised as follows:

- The existing conditions associated with the Site and consideration of the opportunities that exist to reduce the dependence on travel by private vehicles;
- Sustainability in considering the accessibility of the Site by all modes of transport;
- Consideration of the physical means of direct access to the Site;
- Development potential and trip generation of the number of vehicle movements likely to be generated;
- Summary and Conclusion.

2. THE SITE & EXISTING CONDITIONS

Site Location

- 2.1. Figure 1 shows the location of the Site which comprises of approximately 55 hectares.
- 2.2. The approximate postcode is NR7 8SB and the grid reference midpoint is approximately 626998, 312257. The Site is bound by Sprowston Golf Club to the north, Mallard Way to the west and land known as Phase 2, woodland to the east and Salhouse Road to the south. Further North West is Sprowston Park & Ride and to the Tesco superstore. The city centre of Norwich is approximately 6.6km distance to the southwest.

Highway Network

- 2.3. Figure 1 shows the key roads on the local highway network within the vicinity of the Site.
- 2.4. The B1140 Salhouse Road serves as a link road to Norwich for a number of villages located along the corridor to the north east of the City. Salhouse Road connects the Heartsease area of Norwich to New Rackheath, Salhouse, Panxworth and South Walsham.
- 2.5. Salhouse Road at the location of the Site frontage is approximately 6m in width, straight horizontal alignment and minimal vertical alignment that would be no cause for concern, with no existing footways. Hedgerows and trees line both sides of the road. In the vicinity of the Site boundary, Salhouse Road has 40mph and 60mph speed limits, with street lighting only within the 40mph area.
- 2.6. Mallard Way, located west of the Site, is the main spine road for the Phase 1 development of White House Farm. It is of approximately 7.3m width. The southern half of the road and development is currently under construction. To the north of the road is a roundabout junction with the A1151, Wroxham Road. To the south, Mallard Way junctions with Salhouse Road as a ghost island priority junction.

Pedestrian & Cycle Network

- 2.7. To enable an assessment of the viability of walking and cycling as a realistic mode for trips to and from the Site it is appropriate to establish the maximum distance that people are generally prepared to walk and the destinations that exist within these distances.
- 2.8. Manual for Streets (Paragraph 4.4.1) states the following:

"Walkable neighbourhoods are typically characterised by having a range of facilities within 10 minutes (up to about 800m) walking distance of residential areas which residents may access comfortably on foot."

- 2.9. Furthermore, Local Transport Note 1/04a (Department for Transport 2004), considers acceptable walking and cycling distances at Paragraph 3.10.3, stating:

"There are limits to the distances generally considered acceptable for utility walking and cycling. The mean average length for walking journeys is approximately 1 km (0.6 miles), and for cycling, it is 4 km (2.4 miles), although journeys of up to three times these distances are not uncommon for regular commuters. The distances people are prepared to walk or cycle depend on their fitness and physical ability, journey purpose, settlement size, and walking/cycling conditions. Useful guidance on desirable, acceptable and preferred maximum walking distances for different purposes is included in Tables 3.2 and 3.3 of Providing for Journeys on Foot, IHT 2000".

- 2.10. The Institution of Highways and Transportation (IHT) 'Guidelines for Providing Journeys on Foot' (2000) suggests acceptable, desirable and maximum walking distances. Table 2.1 contains the suggested walking distances for pedestrians without mobility impairment for some common trip purposes, which are discussed further later in this section.

Table 2.1: Acceptable Walking Distances (metres)

Definition	Distance		Walk Time	
	Commuting, Walking to School and Recreational	Other Non-Commuter Journeys	Commuting, Walking to School and Recreational	Other Non-Commuter Journeys
Desirable	500m	400m	6.25 mins	5 mins
Acceptable	1,000m	800m	12.5 mins	10 mins
Considered	2,000m	1,200m	25 mins	15 mins

Source: IHT Providing for Journeys on Foot (2000)

- 2.11. The link road built for the first two phases of development associated GT allocation sites GT4 and GT5 accesses from Wroxham Road to the north of the proposed development Site and off Salhouse Road to the south. The link road currently has a footway/cycleway on the western side which runs the length of the link road. There is a bus access onto Blue Boar Lane which will also allow pedestrian access. There is an access for all transport modes at the existing Tesco Superstore to provide further pedestrian routes.
- 2.12. At Wroxham Road, there is a good network of footways that lead to local amenities and schools by continuing on Wroxham Road or using Blue Boar Lane. Currently, on Salhouse Road the nearest footway is at the junction with Harrisons Drive. However, a link to this is proposed as part of the Phase 1 development on the north side of Salhouse Road.

- 2.13. The nearest footway/cycleway on Salhouse Road, starts approximately 500m west of the Mallard Way access. This link provides access into Norwich city centre, numerous employment areas, schools and amenities.
- 2.14. There is a 30mph speed limit in operation west of the Site towards Norwich city centre and it could therefore be considered as an appropriate cycle network. However, it is known that as part of the development site south of Salhouse Road it is recommended to reduce the 40/60mph speed limits along the Salhouse Road development frontage (to incorporate all the priority junction accesses) and beyond the main access proposed to the Site to 30mph.
- 2.15. On Wroxham Road there is a footway/cycleway on the southern side which links to Blue Boar Lane and the local superstore. Along Wroxham Road there are footways only around the roundabout junction with Blue Boar Lane. There is a short section of cycleway on the north side of Wroxham Road between Church Lane and the toucan crossing which links to other parts of Blue Boar Lane, to the south. The current immediate routes into Norwich are limited for cyclists but are improved into Norwich at the junction of Wroxham Road/Rosemary Road where a bus/cycle/taxi lane begins and continues to the Wroxham Road roundabout/Ring Road A1042 junction.
- 2.16. Norwich City Council have published a Norwich Cycle Map that shows appropriate cycling networks to/from Norwich city centre and the surrounding areas. This map also includes employment areas, schools, sports facilities, libraries and attractions/facilities. The map has been included in Appendix A.
- 2.17. Further to LTN 1/04, Local Transport Note 2/08 'Cycle Infrastructure Design' (Department of Transport 2008) states:
- "Many utility cycle journeys are under 3 miles although, for commuter journeys, a trip distance of over 5 miles is not uncommon."*
- 2.18. Norwich Area Action Plan (AAP) commits to cycleways along Salhouse Road from Norwich to Rackheath and any access works associated with the Site will need to take that into account, providing appropriate infrastructure.
- Public Transport
- 2.19. Available public transport information is included within Appendix B. The nearest bus stops to the Site have been taken into consideration when reviewing current service levels. There will be bus stops located along Mallard Way approximately 500m from the centre of the Site. In addition, there are services from Sprowston Park & Ride and on Wroxham Road. The services are summarised below in Table 2.1.

Table 2.1 – Bus Routes and Service Frequency

Operator	Service	Journey Times	Frequency
Konectbus	502 Sprowston Park & Ride – Norwich – Harford Park & Ride	Anglia Square, Norwich: 12mins	Monday – Friday 47 Services between 0635- 1835
		City Centre: 20mins	Saturday 44 Services between 0655- 1805
		City College: 23mins	Sunday No service
First Buses in Norfolk & Suffolk	11/12 Pink Line Wroxham – Norfolk/Norwich Hospital	Harford: 35mins	Monday – Friday 28 Services to N&N Hospital 0725 - 1824
		Sprowston: 3-8mins	Saturday 20 services to N&N Hospital 0756 - 1745
		City Centre: 22-33mins	Sunday No service
		Hospital: 48mins	

- 2.20. Table 2.1, shows that the Site is well placed for access to public transport with services to the Norwich City Centre, south of the city via the Park & Ride bus, Norfolk & Norwich Hospital, Stalham and Wroxham.
- 2.21. The development link road would provide a possible through route for bus services from Wroxham Road to Salhouse Road. Additionally, the existing dwellings off Blue Boar Lane have a bus only entrance/exit onto Blue Boar Lane which could be utilised by any additional services.
- 2.22. There are currently no bus services operating along Salhouse Road. Salhouse Road has been identified by NCC as a potential BRT (Bus Rapid Transit) road within the Norfolk Area Transportation Strategy (NATS). The implementation of this strategy incorporates up to six BRT routes linking major facilities and employment destinations across Norwich and its surrounding areas.
- 2.23. Implementation of BRT is part dependent on the identified growth areas within GT20 and GT7 allocated sites with the Growth Triangle allocation. The proposed Site will also benefit from BRT being implemented along the Salhouse corridor, therefore proposed access works would need to consider BRT routing.

Rail Accessibility

- 2.24. The nearest train station is Salhouse which is located approximately 3.6km to the east of the Site. Services operate at an hourly frequency at this station which connects Norwich to Sheringham.

- 2.25. Norwich train station is located 4.6km to the south-west of the Site providing frequent access to various destinations nationwide; including London, Manchester, Liverpool, Nottingham, Sheffield and Peterborough. Utilising the current and potential expanded NCC recommended pedalways, there is likely to be a cycle route from the Site to the train station via Salhouse Road.

Local Facilities & Amenities

- 2.26. Research has been undertaken to identify facilities and services local to the proposed development Site, and the results are shown in the Table 2.2.

Table 2.2 – Facilities/Services Table

Amenity	Location	Km Distance
Large Food Retail	Tesco	1.2
Large Food Retail	Morrisons	3.3
Large Food Retail	Aldi	3.2
Post Office	Thorpe End	1.5
Local Shop	Tesco Express	1.9
School – Nursery	Phase 1	0.8
School – Primary	Falcon Road West	3.2
School – Primary	Salhouse Road Site	0.9
School – Secondary (Public)	Sprowston Community High	2.1
School – Secondary (Public)	Open Academy	2.4
Bus Stop	Park & Ride	1.4
Bus Stop	Spine Road	0.5
Railway Station	Salhouse	3.6
Railway Station	Norwich	4.6
Doctors Surgery	William Wood Surgery	1.7
Pharmacy	Tesco	1.2
Sports Facilities	Sports & Social Club	1.0
Golf Course	Sprowston Manor	0.5
Library	Sprowston Library	2.6
Closest Pub	The Blue Boar	1.5
Local Large Employment	Sprowston Retail Park	2.7
Local Large Employment	Rackheath Industrial Estate	2.0
Hospital	Norfolk & Norwich	10.0

*distances measured from approximately Site centre (as the crow flies)

- 2.27. The conclusions that can be drawn from the table above are that the majority of facilities and services are available in the local area, and as a consequence, the following Table 2.3, indicates the acceptability of the Site in terms of distance, frequency of use and acceptability of need to travel.

Table 2.3 – Acceptability of Travel/Use Table

Amenity	Location	Km	Likely Frequency of Use					
			Daily Km		More than Weekly Km		Less than Weekly Km	
			<2.0	<8.0	<2.0	<8.0	<2.0	<8.0
Large Food Retail	Tesco	1.2			✓			
Large Food Retail	Morrisons	3.3				✓		
Large Food Retail	Aldi	3.2				✓		
Post Office	Thorpe End	1.5			✓			
Local Shop	Tesco Express	1.9			✓			
School – Nursery	Phase 1	0.8	✓					
School – Primary	Falcon Road	3.2		✓				
School – Primary	Salhouse Road Site	0.9	✓					
School – Secondary (Public)	Sprowston Community High	2.1		✓				
School – Secondary (Public)	Open Academy	2.4		✓				
Bus Stop	Park & Ride	1.4	✓					
Bus Stop	Spine Road	0.5	✓					
Railway Station	Salhouse	3.6		✓				
Railway Station	Norwich	4.6		✓				
Doctors Surgery	William Wood Surgery	1.7					✓	
Pharmacy	Tesco	1.2					✓	
Sports Facilities	Sports & Social Club	1.0			✓			
Golf Course	Sprowston Manor	0.5					✓	
Library	Sprowston Library	2.6						✓
Closest Pub	The Blue Boar	1.5			✓			
Local Large Employment	Sprowston Retail Park	2.7		✓				
Local Large Employment	Rackheath Industrial Estate	2.0	✓					
Hospital	Norfolk & Norwich	10.0						Bus

Note. 2km is considered as set out in paragraph 2.10; 8km is equivalent to 5.0 miles as set out in Table 2.1.

- 2.28. In summary, the Site has good accessibility by non-car modes of transport to Norwich. The Site could be developed to provide easier access by foot, cycle, bus and rail services providing links to local shops and facilities in Norwich.

Existing Traffic Conditions

- 2.29. Automatic Traffic Counts (ATCs) were installed at key links across the local highway network during June 2017. The following ATC locations are summarised below:

1. Mallard Way south of A1151 Wroxham Road
2. Salhouse Road east of Mallard Way

3. Salhouse Road west of Mallard Way
4. Salhouse Road west of Blue Boar Lane
5. Blue Boar Lane
6. A1151 Wroxham Road east of Mallard Way
7. A1151 Wroxham Road west of Blue Boar Lane

2.30. The ATCs were undertaken between Monday 11th June and Sunday 20th June 2017. Table 2.4 shows the Average Weekday Traffic (AWT) flow for links identified.

Table 2.4: Summary of 2017 Baseline AWT Flows

Link No.	ATC Location	Average Weekday Flow (two-way)
1	Mallard Way south of A1151 Wroxham Road	2,571
2	Salhouse Road east of Mallard Way	6,949
3	Salhouse Road west of Mallard Way	7,418
4	Salhouse Road west of Blue Boar Lane	13,503
5	Blue Boar Lane	13,912
6	A1151 Wroxham Road east of Mallard Way	14,114
7	A1151 Wroxham Road west Blue Boar Lane	17,814

2.31. The above traffic surveys identify that the two-way flow on Salhouse Road are in line with that estimated by NCC in their TA forecasting of traffic flows for the year of 2017 (without the NNDR in operation) taken **from the data within the NCC, 'Norwich Northern Distributor Road Application for Development Consent Order, Document Ref 5.6 Appendix I, Figure I.2 AADT Traffic Flows - Eastern section'**. The survey undertaken in April 2015 for the development site south of Salhouse Road has shown that the daily flow has only increased 1.2%.

2.32. The above recorded flows for Wroxham Road (east of Mallard Way) identify that the traffic flows estimated in the NCC TA forecasting report are underestimated by nearly 2000 vehicles, at the time of writing the report, but may be due to routing of vehicles during traffic management routes for the construction of the NNDR.

Impact of the NNDR

2.33. The anticipated opening of the NNDR in early 2018 will significantly change traffic flows upon the local highway network in the surrounding area and assignment of future development traffic flows. The predicted changes in traffic flow resulting from the NNDR will therefore be considered further in the preparation of baseline traffic flows in a future Transport Assessment.

- 2.34. The calculation of future increases in traffic in the area by NCC does include an element of background traffic growth and allocated development in the Norwich Growth Triangle from the original traffic survey undertaken for the NNDR TA. The increases along Salhouse Road therefore are partly existing commuters travelling out of the city to use the NNDR and partly new residents from local development sites utilising the NNDR in the future. This will need to be considered when undertaking any TA for the Site to avoid significant double counting.
- 2.35. The predicted forecast changes in traffic flows along Wroxham Road are forecast to experience an 23% reduction in traffic for the opening year and a 9% increase by 2032. As mentioned above this includes for background growth and allocated development in the area.
- 2.36. The predicted changes in traffic flows along Salhouse Road towards Norwich are forecast to experience an 8% reduction in traffic in the opening year and a 9.8% reduction by 2032. Salhouse Road towards the north-east approaching the NDR is forecast to experience an increase in traffic of 74% in the opening year and 102% increase by 2032. As mentioned above this includes for background growth and allocated development in the area.
- 2.37. It is known that the development south of Salhouse Road will be required to upgrade the Mallard Way / Salhouse Road junction to become signalised as the development will have an access point directly from it. Traffic modelling data undertaken in March 2016 identified that this junction format would be within capacity in 2025 with committed, allocated and NNDR sites in operation. The TA work undertaken for this development identified that the junctions assessed along the Salhouse Road route from Rackheath to the ring road that they would all be operating just within capacity with the NNDR in operation in the future horizon year. As it is deemed by the TA for the development south of Salhouse Road, that the use of the NNDR is key to keeping existing junctions within capacity in the future, it will need to be understood how the NNDR will affect flows along Salhouse Road and other routes. As the NNDR is likely to be open in early 2018, then new traffic surveys are recommending to be completed 6 weeks after opening to allow traffic flows to settle to support any future planning application for this Site.

3. SITE ACCESS

- 3.1.** The principal point of access to the Site will be taken from Salhouse Road in the form of a new signalised junction towards the centre of the Site. This junction type has been selected based upon the previous requests of Norfolk County Council to accommodate their future plans for a Bus Rapid Transit (BRT) and improvements to walking and cycling provision along the Salhouse Road corridor. The junction layout also takes in to account of the committed development and its accesses for the land south of Salhouse Road. It will be required that one of those access points would be converted from a priority junction to signalised. It is not anticipated this will affect the layout of the committed development and all work could be contained within highway land (current or future). The general form of the junction is similar to that proposed for the Mallard Way junction with Salhouse Road, that would be completed by the Developer for the site south of Salhouse Road.
- 3.2.** The third party TA modelling undertaken in March 2016 identified that the form of junction would be within capacity in the assessed horizon year and as this Site access would have similar traffic numbers and distribution, it is assumed that this junction would adequately accommodate the anticipated traffic volumes. It will be key to understand what impacts the NNDR has on traffic volumes and distribution on Salhouse Road prior to preparing a finalised design of the access for consideration by NCC.
- 3.3.** The route connecting Salhouse Road and Mallard Way would be provided in the form of a Type 1 style link road, with a 6.5m minimum carriageway, a 3.5m shared foot/cycleway including a verge strip on one side and 2.0m footway on the other. The link road would be able to accommodate a bus route if required. It would be recommended that this link be formed first for the Site from Phase 2, with the Salhouse Road access being finalised at later stages of the Site development. This will enable the access to the Salhouse development to be formed and approved.
- 3.4.** The conceptual vehicular access arrangements are shown on Drawing 48130/PP/SK02.
- 3.5.** Comprehensive masterplanning will ensure pedestrian and cycle access are provided along the Salhouse Road Site boundary and the internal link road between Salhouse Road and the northern areas of Mallard Way. Further internal pedestrian and cycle links can also be formed from the link road into Phase 2 and to Mallard Way. This would then enable connections to existing links within Phase 1 land and in the local area. Other than along the Site boundary on Salhouse Road, it is not anticipated that offsite upgrades to pedestrian/cycle infrastructure are required.
- 3.6.** Subject to scoping discussions with the Local Highway Authority the impact on link and junction capacities with the proposed access arrangements will be assessed in a Transport Assessment.

- 3.7. As the Site is more than 400m from the existing bus services operating in the area, it would be recommended that bus services could be diverted (or a new service created), as a minimum, along Mallard Way to enable residents on the Site to be closer to bus services into the city. However, should bus services become available along Salhouse Road as a result of other development located in Rackheath and/or part of the Norwich BRT work then this would enable residents of the Site to be closer to an existing bus service.

4. DEVELOPMENT POTENTIAL AND TRIP GENERATION

Trip Generation

4.1. The trip rates used in this review have been obtained from secondary sources in order to be consistent with other proposed and permitted development in the Growth Triangle Area of north-east Norwich. Specifically, the vehicle trip rates have been extracted from Table 5.1 of the Transport Assessment prepared by Peter Brett Associates in relation to the permitted planning application submitted by LanPro for the allocated land south of Salhouse Road (Planning Application Reference Number 2016/0499).

4.2. These trip rates are shown in Table 4.1.

Table 4.1: Peak Hour Vehicle Trip Rates

	AM Peak 0800-0900			PM Peak 1700-1800		
	Arr	Dep	Total 2-way	Arr	Dep	Total 2-way
Vehicle Trip Rate	0.128	0.314	0.442	0.224	0.142	0.366

4.3. As highlighted in Section 1, the quantum of residential development being considered is approximately 1,500 dwellings. Applying the above trip rates to this scale of development generates a level of vehicle movements during the AM and PM peak hours. Table 4.2 summarises the vehicle trips.

Table 4.2: Peak Hour Vehicle Trips

	AM Peak 0800-0900			PM Peak 1700-1800		
	Arr	Dep	Total 2-way	Arr	Dep	Total 2-way
Vehicle Trips	192	471	663	336	213	549

4.4. As demonstrated in Table 4.2 the likely level of traffic generated by a development of some 1,500 residential properties on the Site would be around 663 and 549 two-way trips in the AM and PM peak hours respectively. Subject to scoping discussions with the Local Highway Authority, Norfolk County Council. The development impacts upon links, junctions and the access arrangements will be assessed in a Transport Assessment to accompany a future planning application.

4.5. It is considered that the junction proposals for the Site access would be able to provide sufficient capacity for the predicated growth but the analysis will be completed at a planning application stage.

- 4.6. From the TA work undertaken by Peter Brett Associates for the committed development site south of Salhouse Road, it has shown that daily traffic flows along this road have increased from 2015 to 2017 by only 1.2%. The traffic modelling of junctions along the Salhouse Road corridor identified that with the opening of the NNDR the junctions will remain operating just within capacity in 2025 with allocated sites and background traffic growth. The addition of this Site to the local highway network is likely to have an impact on the operation of the junctions along the Salhouse Road corridor from the NNDR to the city centre.
- 4.7. Given the opening of the NNDR and estimations made by NCC on the traffic redistribution in Norwich, are key to the conclusions of the Peter Brett Associates TA and key to the assessment of the level of impact the Site will have on the local network. New traffic surveys would be recommended a minimum of 6 weeks after opening of the NNDR.
- 4.8. Although it is expected that there will be an impact on the road network heading towards Norwich, it is likely this will not be significant or severe as public transport use and cycling are well utilised in the city (40% increase in cycling since 2013) and ease of access to the NNDR to access employment areas on the fringes of the city. Given the close proximity of the Site to the city (<5 miles) it is expected that the low trip rates set out in Table 4.1 would be reasonable to utilise.
- 4.9. From an initial assessment of the 2011 Census data for those using the car to travel to work from the Sprowston area, we have assumed that all people travelling to areas within Norwich city would head west / southwest and not use the NNDR as this would not likely result in journey time savings. It would therefore be reasonable to assume that for commuter journeys to all other destinations would utilise the NNDR as this could result in journey time savings. This would estimate the vehicular trip split for the Site as follows:
- To / from Norwich using Salhouse Road or Wroxham Road – 45%
 - To / from the NNDR – 55%
- 4.10. This would result in the following estimation of vehicular traffic:
- 298 AM peak 2-way flow to / from Norwich; 247 PM peak 2-way flow to / from Norwich.
 - 365 AM peak 2-way flow to / from NNDR; 302 PM peak 2-way flow to / from NNDR.
- 4.11. The choice for residents of the Site for those travelling to / from the NNDR are likely to be principally via Salhouse Road. Given the extensive works on the assessment of the NNDR link road and junction operations it is expected that they would be able to accommodate significant long-term growth in the local area.

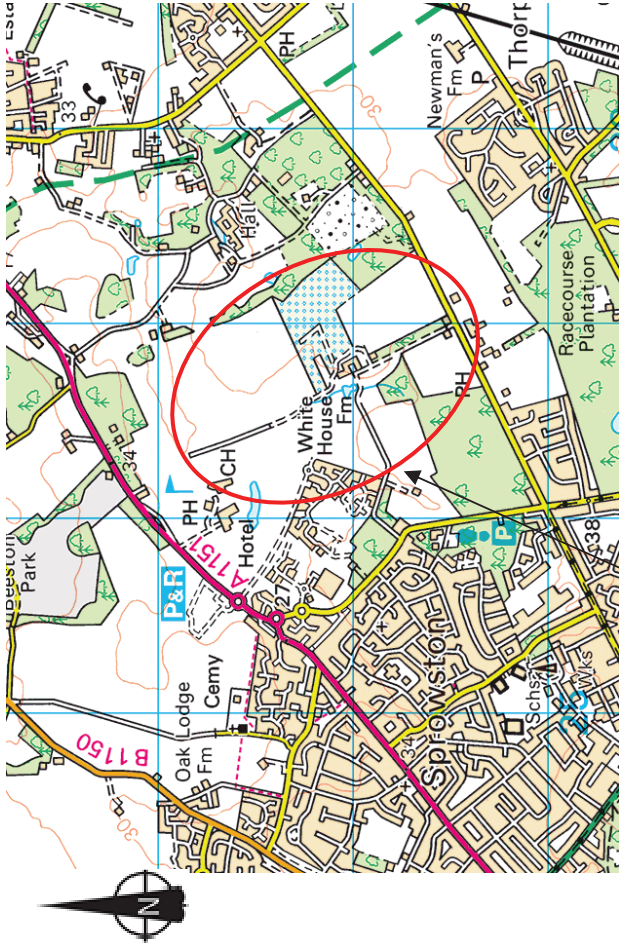
- 4.12. The choice for residents of the Site for those travelling to / from the NNDR is likely to be close to equal between Wroxham Road and Salhouse Road. Therefore, based on worst case peak hour (AM) this could result in approximately 149 2-way flow on Salhouse Road and Wroxham Road heading to / from Norwich west of the Site.

5. SUMMARY & CONCLUSION

- 5.1. Richard Jackson Ltd have been appointed by Persimmon Homes (Anglia), Taylor Wimpey and Hopkins Homes (the Consortium), to undertake a transport and highways access appraisal in relation to the promotion of land located north of Salhouse Road, Sprowston, Norwich.
- 5.2. The Site has been identified in the recent Greater Norwich Local Plan (GNLP) Call for Sites submission; Site Reference GNLP0132 as Land off Blue Boar Lane/Salhouse Road, White House Farm. The Site is located approximately 6.6km northeast of Norwich city centre and on the edge of the urban area of Sprowston. The Site is Phase 3 of the development of White House Farm land, with Phase 1 under construction and Phase 2 proceeding to a planning application in due course.
- 5.3. A number of local facilities, including education, lie within walking and/or cycling distance of the Site. The local facilities can be reached via a network of existing footways and cycleways associated with development allocated within the adjacent area of the Site. The committed development located south of Salhouse Road is proposing to reduce the speed limit along the road from 40/60mph to 30mph in the vicinity of the Site boundary. Footway / cycleway links are recommended to be provided along the Salhouse Road frontage of the Site to connect with Mallard Way (via Phase 2) and also via the internal link road that connects with existing infrastructure on Mallard Way to travel through Phase 1 to Blue Boar Lane or to Wroxham Road.
- 5.4. There are existing bus services located at the Tesco superstore off Wroxham Road and also via the local Park & Ride service to the northwest of the Site. These existing services provide a minimum of a half hourly bus service to the city centre and other locales such as Norwich hospital. As the Site will be located some distance from these bus stops it would be recommended that an existing bus service is diverted into the Site or a new service provided along Salhouse Road to tie in with the NCC BRT aspirations.
- 5.5. Norwich train station is located 4.6km to the south-west of the Site providing frequent access to various destinations nationwide; including London, Manchester, Liverpool, Nottingham, Sheffield and Peterborough. Utilising the current and potential expanded NCC recommended Pedalways, there will be a cycle route from the Site to the train station via Salhouse Road. No further off-site upgrades are considered necessary to the footway / cycleway routes.
- 5.6. Traffic modelling undertaken by the Consultants for the committed development south of Salhouse Road identified that the junctions along the Salhouse Road corridor would operate just within capacity in the assessments horizon year with the development and adjacent development in operation. This is dependent on the opening of the NNDR and the assumptions in the assessment in redistribution of traffic being correct. Recent traffic surveys of Salhouse Road show that daily traffic has only increased by 1.2% in the last two years and is in line with that predicted by NCC in their traffic forecasting for the NNDR assessments.

- 5.7. As the NNDR is likely to be open in early 2018, then new traffic surveys are recommending to be completed 6 weeks after opening to allow traffic flows to settle to support any future planning application for this Site.
- 5.8. There is potential to serve the identified Site from Salhouse Road and Mallard Way that would provide safe, effective vehicular access and egress in accordance with current highway design standards and practices. The principle access off Salhouse Road is suggested to be built after the access via Phase 2 from Mallard Way. This is due to the access to Salhouse Road being located opposite an access to the committed development south of Salhouse Road. The form of junction will be similar to that of the required traffic signal junction that will be created at the Mallard Way junction with Salhouse Road, constructed by the Developer of the land south of Salhouse Road. The use of traffic signal junction will enable better incorporation of BRT and cycle access.
- 5.9. The Site being considered is expected to accommodate some 1,500 residential units. This level of development would be expected to generate around 600 vehicle movements during the AM and PM peaks. It is expected in the biggest peak hour the two-way flow along Salhouse Road and Wroxham Road towards the city would be approximately 140 vehicles on both roads.
- 5.10. From an initial appraisal of the traffic modelling undertaken by Peter Brett Associates for the development located south of Salhouse Road and an appraisal of expected vehicle distribution towards the city it is not anticipated that the development will have a severe impact on junctions located to the south west of the Site and can be accommodated on the local network with the NNDR operational.
- 5.11. Given the opening of the NNDR and estimations made by NCC on the traffic redistribution in Norwich are key to the conclusions of the Peter Brett Associates TA and key to the assessment of the level of impact the Site will have on the local network new traffic surveys would be recommended a minimum of 6 weeks after opening of the NNDR.
- 5.12. The specific highway impacts and mitigation measures associated with the development will be identified in a full Transport Assessment to accompany a future planning application.

FIGURES

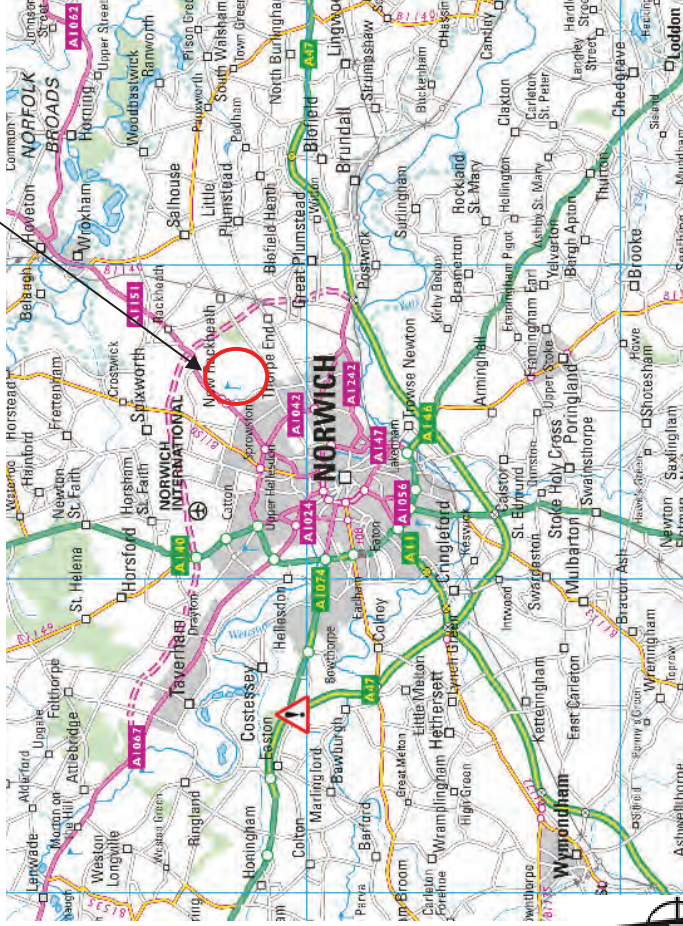


REPRODUCED FROM ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. © CROWN COPYRIGHT RICHARD JACKSON LTD - ACC No. 100002572

SITE LOCATION

White House Farm, Site Location
Grid Reference 626607, 312102 and Postcode NR13 6LB

SITE LOCATION

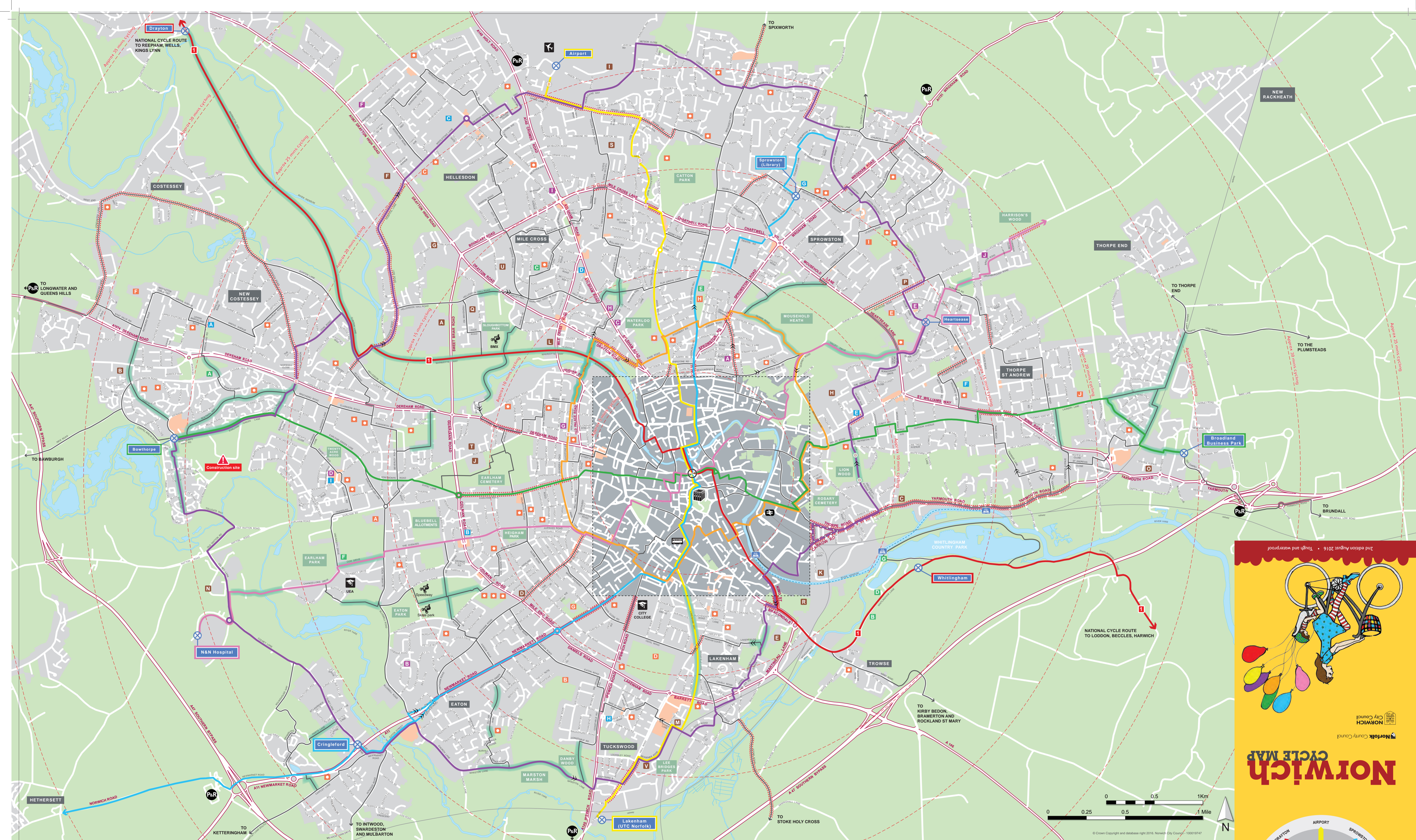


Client:		Drawing Title:	
Taylor Wimpey, Hopkins Homes & Persimmon Homes	Site Location Plan		
Job Title:	Phases 2 & 3, White House Farm, Sprowston	Date:	27/06/17
		Job No:	48130
		Dwg No:	Figure 1



6 The Old Church, St Matthews Road, Norwich, NR1 1SP
Tel. 01603 230240
www.richardjackson.uk.com

Appendix A



2nd edition August 2016 • Tough and waterproof

NORWICH
CYCLE MAP

Norfolk County Council

Norwich great to explore by bike

The pace is right to spot a bargain in a quirky shop or pause for a chat with a friend in the park. The city is compact, making it manageable to ride from the edge to the centre in under 20 minutes. But you need to know where to go.

Welcome to the cycle network!

It features seven pedalways, each represented by a colour. Five cross the city from one side to the other and meet in the middle at St Andrews Plain. Two others encircle the city – orange near the centre and purple on the edge. They are complemented by neighbourhood routes that help you get around from your home to school and shops, or they can be connected to the pedalways for longer journeys. Norwich is yours to discover.

Happy pedalling!

How to use this map

Planning your route

Use this side of the map for planning your route. It shows where the pedalways go and how they relate to facilities. The main routes are coloured and can be found on signs and stickers along the way.

Turn over to look at a detailed map of the city centre which features some of Norwich's finest buildings.

Route conditions

The quality of the network varies from place to place and we are implementing a long-term plan to improve it. The maps show the busy traffic areas and the traffic-free sections so you can match your route to your level of cycling confidence and skill. The traffic-free parts are usually shared with pedestrians so please be considerate and use a bell. Some parts of the network are privately owned and not maintained by the city or county council.

Pedalways

- Bowthorpe ↔ Broadland Business Park
- Cringleford ↔ Sprowston
- Drayton ↔ Whittingham (National Cycle Route 1)
- Lakenham ↔ Airport
- N&N Hospital ↔ Heartsease
- Inner circuit
- Outer circuit
- Neighbourhood routes

Cycle network route conditions

- ▶▶▶ One way
- Route along busy road (without off carriage way option – take particular care)
- Traffic free path
- Cyclists dismount
- ▶▶ Steep hill (arrows point uphill)

Attractions and facilities

- Airport
- Bus station (including cycle hire)
- Cycle and pedestrian ferry (seasonal only)
- Cycle sport venue
- Higher and further education
- Local shopping centres
- Park & Ride (cycle parking available)
- St Andrews Plain (centre of the network)
- Train station (including cycle hire)

Libraries

- A** Costessey
- B** Earlham
- C** Hellesdon
- D** Mile Cross
- E** Plumstead Road
- F** St Williams Way
- G** Sprowston
- H** Tuckswood
- I** West Earlham

Sports facilities

- A** Football Development Centre
- B** Norfolk Snowsports Club
- C** Norman Centre
- D** Norwich Rowing Club
- E** Sewell Park College Sports Centre
- F** UEA Sports Park
- G** Whittingham Outdoor Education Centre

Schools

- A** First, infant or primary
- B** City Academy Norwich
- C** City of Norwich School
- D** Hellesdon High
- E** Hewett Academy
- F** Open Academy
- G** Ormiston Victory Academy
- H** Norwich High School for Girls
- I** Sewell Park College
- J** Sprowston High
- K** Thorpe St Andrew High

Bicycle shops

- A** John Borwell
- B** Leisure Cycles
- C** Mandarin (Aylsham Road)
- D** Mandarin (West Earlham)
- E** Molly's Cycles
- F** Sorens
- G** Streetlife
- H** Wilco 'Bike' (Aylsham Road)
- I** Wilco 'Bike' (Reepham Road)
- J** Wilco 'Bike' (Salhouse Road)

Employment areas

- A** Briar Chemicals
- B** Bowthorpe Industrial Estate
- C** Broadland District Council
- D** Colman Hospital
- E** Country Hall
- F** Hellesdon Hospital
- G** Hellesdon Park Industrial Estate
- H** HM Prison Knox Road
- I** Hurricane Way Industrial Estate
- J** Julian Hospital
- K** Lawrence Scott Electromotors
- L** Mile Cross Business Centre
- M** Norwich Business Park Whiting Road
- N** St Andrews Research Park
- O** St Andrews Business Park
- P** Sweet Briar Industrial Estate
- Q** Unilever
- R** Vulcan Road Industrial Estate
- S** West Norwich Hospital
- T** Whiffler Road Industrial Estate
- V** White Lodge Business Park



Supported by:

Norwich City Centre

Pedalways

- Bowthorpe ↔ Broadland Business Park
- Cringleford ↔ Sprowston
- Drayton ↔ Whitingham (National Cycle Route 1)
- Lakenham ↔ Airport
- N&N Hospital ↔ Heartsease
- Inner circuit
- Outer circuit
- Neighbourhood routes

Cycle network route conditions

- One way
- Busy road (Without off carriage way option – take particular care)
- Traffic free path
- Cyclists dismount
- Steep hill (arrows point uphill)
- Long stay secure cycle parking
- Cycle stand parking

Attractions and facilities

- Banks
- Bus station
- Children's playground
- Cinemas
- City wall
- Cycle and pedestrian ferry (seasonal only)
- Football stadium
- Higher and further education
- Local shopping centres
- Museums
- NHS walk in centre
- Norwich Market
- Riverside walk/pathway
- St Andrew's Plain centre of the network
- Theatres/cultural venue
- Toilets, public and customer
- Tourist Information Centre
- Train station (including cycle hire)
- Yacht Station

Libraries

- Millennium Library

Sports facilities

- Carrow Park
- Riverside Leisure Centre

Schools

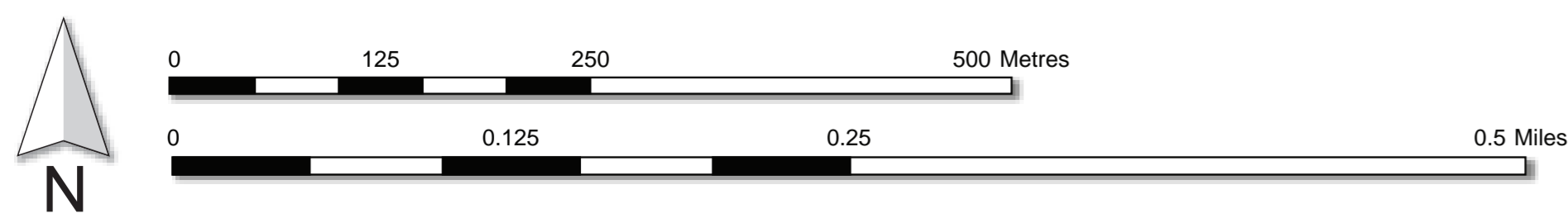
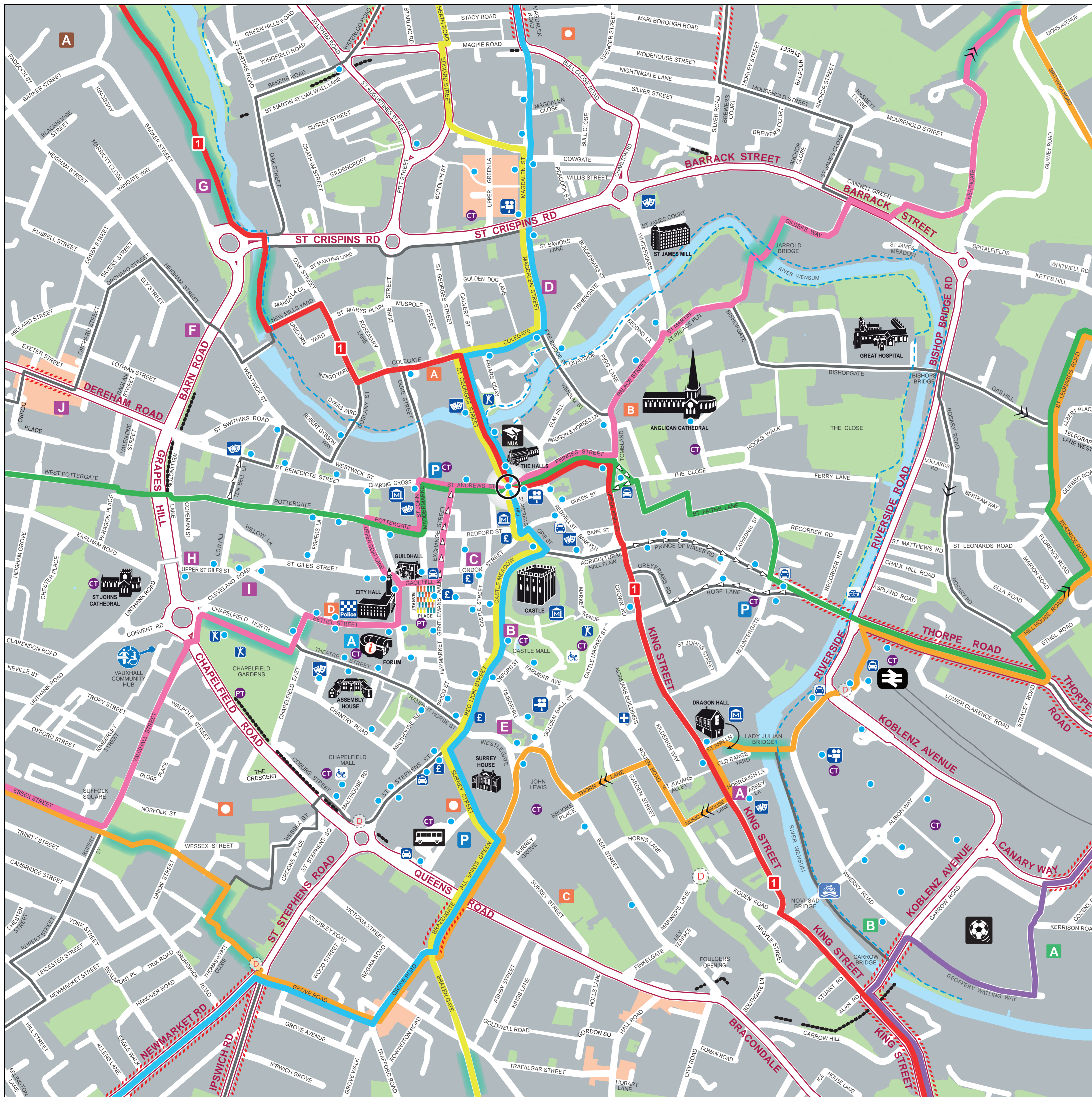
- First, infant or primary
- Jane Austin Free School
- Norwich School
- Notre Dame
- Sir Isaac Newton Free School

Bicycle shops

- Bicycle Links
- Cycle Republic
- Cycles UK
- Dandy Horse
- Evans Cycles
- Freemans
- Halfords
- Motion BMX
- Pedal Revolution
- Wilko 'Bike' (Dereham Road)

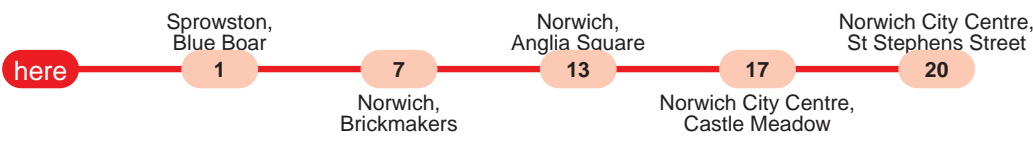
Employment areas

- Barker Street



Appendix B

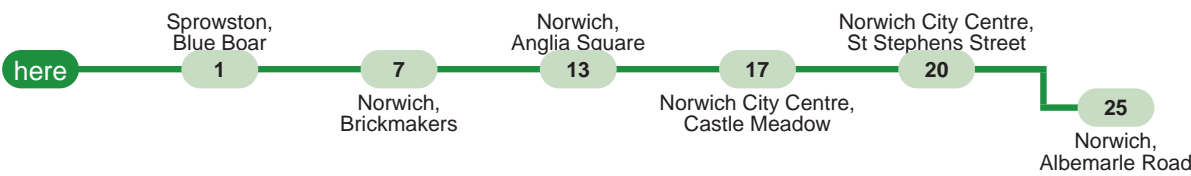
10 Stalham - Norwich City Centre Sanders Coaches



12 Wroxham - N & N University Hospital First in Norfolk & Suffolk



X11 Stalham - Wroxham - Sprowston - Norwich Sanders Coaches



The numbers circled indicate approximate timings in minutes from Sprowston, Sprowston Manor

Mondays to Fridays Bus times as at 14th June 2017

Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note			
0725	12	1	0859	10		1032	12		1152	10		1302	X11		1432	12		1620	12	
0747	X11	Sch	0911	12	1	1052	12		1152	12		1312	12		1452	12		1641	X11	
0747	X11	3,NSch	0931	12	1	1100	X11		1212	12		1332	12		1512	12	NSch	1657	12	2,NSch
0755	12	1	0952	12		1112	12	NSch	1232	12		1352	10		1532	12		1657	12	2,Sch
0851	12	1,NSch	1000	X11		1112	12	Sch	1252	12	NSch	1352	12		1534	X11		1711	X11	
0851	12	1,Sch	1012	12		1132	12		1252	12	Sch	1412	12		1557	12		1824	12	2

Saturdays Bus times as at 17th June 2017

Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note			
0756	12	1	0927	12		1057	12		1227	12		1342	X11		1457	12		1657	12	
0757	X11		0952	X11		1057	X11		1249	10		1357	12		1527	12		1719	10	
0826	12	1	0957	12		1127	12		1257	12		1427	12		1557	12		1745	12	1,2
0856	12	1	1027	12		1157	12		1327	12		1449	10		1627	12				

Sundays

No Service

Notes: NSch - Not Schooldays Sch - Schooldays only 1 - does not serve Sprowston, Tesco 2 - serves Cringleford, The Pines 3 - terminates at Norwich, Albemarle Road
 Times shown in italics are approximate times



Next bus times on your phone

the code for this stop is **NFODPGJD**

Mobile internet: Use the QR code (left) if you can, or enter the stop code at www.nextbuses.mobi

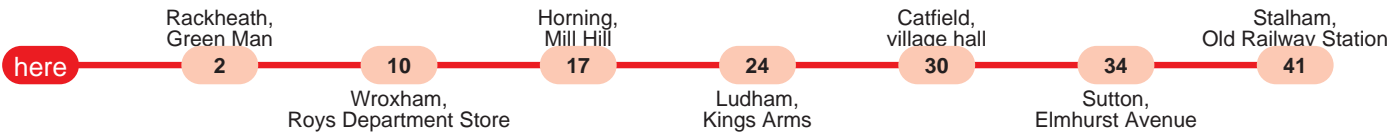
By SMS: text the stop code to 84268. Add a space and service number for just that service.

Internet enquiries incur normal mobile internet charges. SMS messages cost 25p plus your normal text message charge.

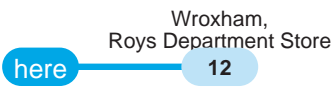
Live Departure information will be given if available (eg 3 mins) - otherwise scheduled times will be shown as clock times (eg 1007).

Bus departures from this stop Sprowston opp Sprowston Manor

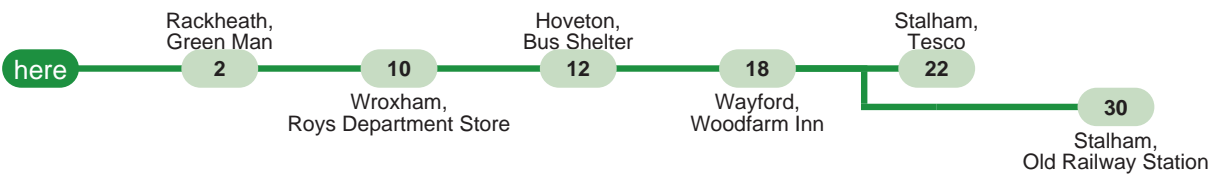
10 Norwich City Centre - Stalham Sanders Coaches



12 N & N University Hospital - Wroxham First in Norfolk & Suffolk



X11 Norwich - Sprowston - Wroxham - Stalham Sanders Coaches



The numbers circled indicate approximate timings in minutes from Sprowston, Sprowston Manor

Mondays to Fridays Bus times as at 14th June 2017

Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note
0842	12		1024	12		1144	12		1245	X11		1415	X11	
0902	12		1044	12	NSch	1145	10		1304	12		1424	12	
0918	12		1044	12	Sch	1204	12		1324	12		1444	12	NSch
0944	12		1045	X11		1224	12	NSch	1344	12		1444	12	Sch
0949	10		1104	12		1224	12	Sch	1345	10		1504	12	
1004	12		1124	12		1244	12		1404	12		1524	12	
												1635	X11	Sch
												1635	X11	NSch
												1652	12	
												1660	12	
												1627	12	NSch
												1627	12	Sch
												1730	X11	
												1734	12	
												1754	12	
												1758	10	
												1811	12	
												1856	12	NSch
												1856	12	Sch

Saturdays Bus times as at 17th June 2017

Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note	Time	Service	Note
0726	12		1049	12		1219	12		1335	X11	1	1455	10	
0949	10		1119	12		1235	10		1349	12		1519	12	
0949	12		1135	X11	1	1249	12		1419	12		1549	12	
1019	12		1149	12		1319	12		1449	12		1605	X11	1
												1619	12	
												1649	12	
												1719	12	
												1851	12	

Sundays

No Service

Notes: NSch - Not Schooldays Sch - Schooldays only 1 - terminates at Stalham, Old Railway Station
 Times shown in italics are approximate times



Next bus times on your phone

the code for this stop is **NFODPGJM**

Mobile internet: Use the QR code (left) if you can, or enter the stop code at www.nextbuses.mobi

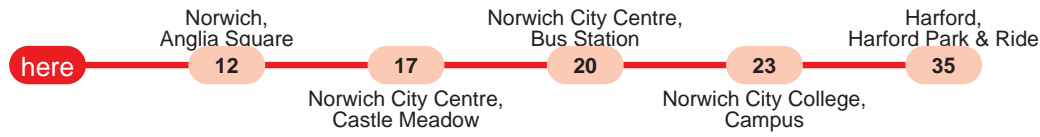
By SMS: text the stop code to 84268. Add a space and service number for just that service.

Internet enquiries incur normal mobile internet charges. SMS messages cost 25p plus your normal text message charge.

Live Departure information will be given if available (eg 3 mins) - otherwise scheduled times will be shown as clock times (eg 1007).

502 Sprowston, Park And Ride - Norwich - Harford, Park & Ride

Konectbus



The numbers circled indicate approximate timings in minutes from Sprowston, Park and Ride

Mondays to Fridays Bus times as at 14th June 2017

Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note		
0635	502	0810	502	0945	502	1115	502	1245	502	1415	502	1545	502	1715	502
0655	502	0825	502	1000	502	1130	502	1300	502	1430	502	1600	502	1730	502
0710	502	0840	502	1015	502	1145	502	1315	502	1445	502	1615	502	1750	502
0725	502	0855	502	1030	502	1200	502	1330	502	1500	502	1630	502	1805	502
0740	502	0915	502	1045	502	1215	502	1345	502	1515	502	1645	502	1835	502
0755	502	0930	502	1100	502	1230	502	1400	502	1530	502	1700	502		

Saturdays Bus times as at 17th June 2017

Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note	Time	Service Note		
0655	502	0840	502	1015	502	1145	502	1315	502	1445	502	1615	502	1750	502
0715	502	0855	502	1030	502	1200	502	1330	502	1500	502	1630	502	1805	502
0735	502	0915	502	1045	502	1215	502	1345	502	1515	502	1645	502		
0755	502	0930	502	1100	502	1230	502	1400	502	1530	502	1700	502		
0810	502	0945	502	1115	502	1245	502	1415	502	1545	502	1715	502		
0825	502	1000	502	1130	502	1300	502	1430	502	1600	502	1730	502		

Sundays

No Service



Next bus times on your phone

the code for this stop is **NFOGMJPD**

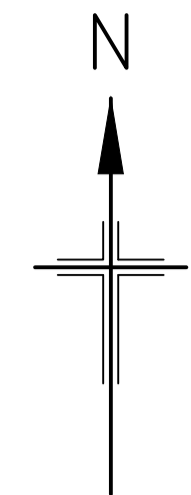
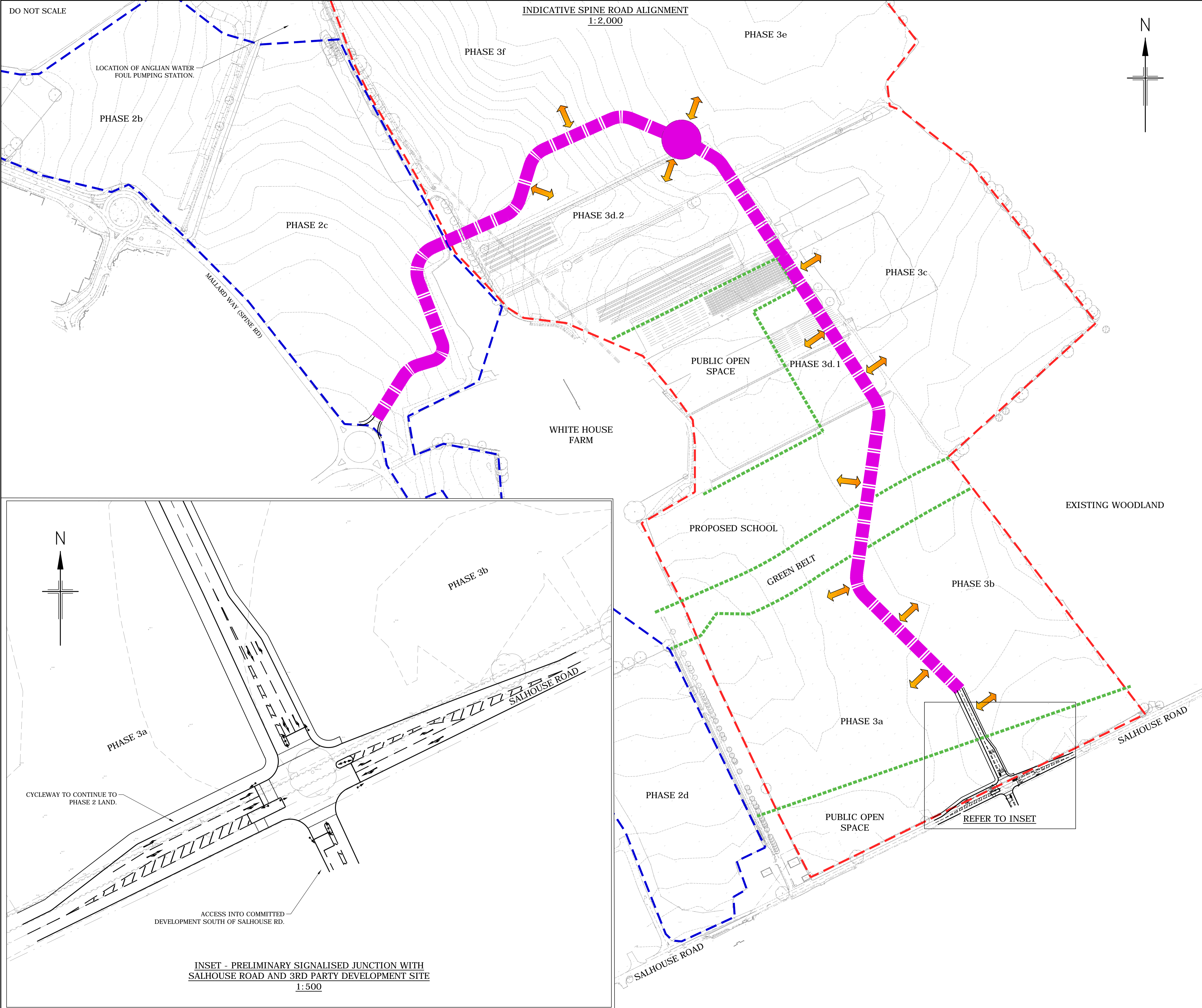
Mobile internet: Use the QR code (left) if you can, or enter the stop code at www.nextbuses.mobi

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Internet enquiries incur normal mobile internet charges. SMS messages cost 25p plus your normal text message charge.

Live Departure information will be given if available (eg 3 mins) - otherwise scheduled times will be shown as clock times (eg 1007).

DRAWINGS



- KEY:**
- PHASE 2 INDICATIVE BOUNDARY
 - PHASE 3 INDICATIVE BOUNDARY
 - ⇄ ESTATE / ACCESS ROAD INDICATIVE OPTIONS
 - LINK ROAD

- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED. PLAN IS BASED ON TOPOGRAPHICAL SURVEY INFORMATION.
 2. PROPOSED ROAD ALIGNMENT IS INDICATIVE AND WILL BE REQUIRED TO BE DESIGNED IN ACCORDANCE WITH THE HIGHWAY AUTHORITY REQUIREMENTS FOR HORIZONTAL AND VERTICAL ALIGNMENT AS WELL AS INTERNAL JUNCTION DESIGN AND SPACING.
 3. MAIN ESTATE ROADS TO HAVE SWALE TO DRAIN SURFACE WATER RUNOFF FROM HIGHWAY.
 4. MAIN SPINE ROAD (TYPE 1) TO CONSIST OF MINIMUM 6.5m WIDE CARRIAGEWAY; ONE 2.0m FOOTWAY AND ONE 3.5m WIDE SHARED USE FOOTWAY / CYCLEWAY.
 5. RESIDENTIAL ESTATE ROADS TO BE DESIGNED TO SUIT THE SIZE OF DEVELOPMENT SERVED.

REV	DATE	DESCRIPTION	DRAWN	CHKD
B	16.08.17	AMENDED ROAD ALIGNMENT AND NOTES.	RNL	DDP
A	19.07.17	AMENDED KEY AND NOTES.	RNL	MDD

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Project
**'WHITE LAND' - PHASE 3
SPROWSTON
LOCAL PLAN REPRESENTATION**

Title
**INDICATIVE ACCESS STRATEGY
ACCESS AND SPINE ROAD
ALIGNMENT**

Client
**CONSORTIUM OF TAYLOR WIMPEY,
PERSIMMON HOMES &
HOPKINS HOMES**

Scale AS SHOWN @ A1	Drawn L.A. WYND	Date 13/07/2017
Job Manager R. LONG	Checked D. BATES	Approved M. DOUGHTY

Richard Jackson
Engineering Consultants

847 The Crescent, Colchester, Essex CO4 9YQ Tel: 01206 228800
 Suite 409, 1 All Saints, London E1 8DE Tel: 020 7448 9910
 York House, 3 Station Court, Great Shelford, Cambs CB22 5NE Tel: 01223 314794
 6 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP Tel: 01603 230240
 The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3BF Tel: 01172 020070
 Email Address: mail@rj.co.uk Website: http://www.rj.co.uk

Drawing No. 48130/PP/SK02	Revision B
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
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<input type="checkbox"/> TENDER	<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> AS CONSTRUCTED



 **Colchester**
847 The Crescent
Colchester
Essex
CO4 9YQ
t/ **01206 228800**

 **London**
Suite 409
1 Alie Street
London
E1 8DE
t/ **020 7448 9910**

 **Norwich**
6 The Old Church
St Matthews Road
Norwich
NR1 1SP
t/ **01603 230240**

 **Cambridge**
York House
3 Station Court
Great Shelford
Cambridge
CB22 5NE
t/ **01223 314794**

 **Bristol**
The Wheelhouse
Bonds Mill
Stonehouse
Gloucestershire
GL10 3RF
t/ **01172 020070**