Norwich Research Park Transport Assessment

Part 1 – Development Trips

July 2006

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1 Introduction

1.1 Background

The County Council seeks contributions from developers to secure transport improvements to mitigate the traffic impact of development and improve accessibility by public transport, walking and cycling. South Norfolk District Council proposes to take forward its local planning process with a development brief for the Norwich Research Park. An assessment was completed in December 2005 in order to inform these processes, and to help develop an appropriate access strategy and contribution methodology. This report updates assessments made back in December.

Prior to this assessment in December 2005, earlier proposals for improvement of the standard of the B1108 together with multi-modal improvements (developed as part of an access strategy for the research park from consultations in 2002) were set aside. This assessment examines a number of scenarios for consideration by stakeholders involved in the NRP that consist of combinations of plot ratios and access strategies.

This assessment considers two key areas relating to the NRP, new trips arising from completion of both planned and Vision development and the traffic impact of allocated development on the existing road network (with alternative strategies for sustainable transport) up to 2021. The effect of strategic options with possible highway infrastructure measures will be considered in regard to this traffic impact, once a decision is made on the preferred combination of plot ratio and access strategy.

1.2 Project Brief

Following a meeting of officers of Norfolk County Council and South Norfolk District Council on 7th June 2005 and subsequent discussions, a brief was agreed which outlined the work to be undertaken by Mott MacDonald with input from Land Use Consultants (LUC).

New trips will comprise a multi modal approach to strategic options whilst the traffic impact will identify necessary highway infrastructure elements, both areas will include the following areas of work:

- Review of allocated Local Plan development, use and transport assumptions (with LUC)
- Examination by LUC of extent and location of Vision development (review 80ha Vision Group figure) and timescale in relation to Local Plan period (subject to Economic Development officer input)
- Information on existing buildings/staff, student, visitor numbers/homes/travel/parking from NNUH, IFR, JIC and UEA (with LUC)
- Consideration of the opportunity for linkage to existing Park & Ride

- High level consideration of elements necessary for good accessibility by non-car modes.
- Examination of TRICS trip rates by accessibility and mode
- Investigation of alternative sources of accessibility criteria, parking standards and contribution mechanisms
- Identification of all possible infrastructure and service provision elements to maximise accessibility by non-car modes.
- Risk assessment for delivery of non-car strategy elements
- Identification of achievable accessibility measures taking account of risks to delivery
- Identify strategy elements, mode share targets and trip rates for 3 strategy options (challenging the conditions relating to trip rates for car-dependent developments)

2 Travel Patterns and Data

2.1 Norfolk and Norwich University Hospital (NNUH)

This information was collated from the NNUH Travel Plan published in March 2004.

2.1.1 Road Access

Access and egress to the Hospital are via the B1108 Watton Road and Colney Lane. A new link road from the A11 at Cringleford was opened in May 2005, providing a second direction of access to the Hospital using a single access roundabout.

There are also dedicated access/egress points for pedestrians and cyclists via the University Campus.

2.1.2 Car Parking

On site there are approximately 1,950 car parking spaces for staff, and a further 850 for visitors and patients.

2.1.3 Public Transport

The Hospital is served by nine bus services, including the new clockwise (550) and anticlockwise (551) Norwich Orbital services (552 Evening orbital service), supported by Norfolk County Council. Other services serving the hospital are: First Services 21/22 and 24/24a, Konectbus Service 4/X4, 3 and 604 Costessy Park and Ride (by request only), and Anglian Coaches Service 59.

Orbital services 550 and 551 run every 30 minutes from 0600 to 1900 Monday to Saturday. First's 24 service runs at a frequency of up to one every 15 minutes between the City Centre and the NNUH in both directions throughout the majority of the day. Current costs for journeys to/from the Hospital to/from the City Centre for the 24 and 21/22 services are summarised in **Table 2-1**.

Table 2-1 First ,Orbital and Costessey Park and Ride Service Costs to/from the NNUH (current)

First	Adult (£.pp)		Child (£.pp)		Concession (£.pp)	
To / From Hospital	Single	Return	Single	Return	Single	Return
City Centre	1.80	3.40	1.20	2.20	0.90	1.70

Norwich Orbital To / From Hospital	Adult (£.pp)		Child (£.pp)	
	Single	Return	Single	Return
City Centre	1.50	2.25	0.75	1.10

Costessey Park and Ride	Adult (£.pp)		Child (£.pp)	
	Single	Return	Single	Return
City Centre	2.00-	3.00	1.00	1.50

First also offer a first day ticket at a cost of £3.80 which gives unlimited travel on the First network. Other tickets available through First include monthly, 3-monthly, and annual 'Norwich Zone' bus-passes allowing unlimited use of all First buses in and around Norwich and its surrounding area. The costs of these tickets are shown in **Table 2-2**. The NNUH and First have set up a staff discount ticket scheme for use on First buses. Discounts are available on monthly and three-monthly passes as well as on annual tickets.

Table 2-2 First service season ticket costs (current)

	First Month (£)		First 3Months (£)		First Year (£)	
	Adult	Child	Adult	Child	Adult	Child
Norwich Zone	£43	£29	£120	£80	£430	£290

The UEA site is also serviced by the following but not so frequent services:

- Service 4 to/from Dereham and Service 59 to/from Wymondham both operate a frequency of one service per hour in each direction.
- Service 3 to/from Watton is a circular service which currently runs via the Hospital (3 per day inbound am only, 4 per day outbound). Reduced service on Saturday (3 inbound, 2 outbound).

2.1.4 Staff and Patient Numbers

There are approximately 5200 full or part-time staff on the Hospital payroll, with a further 1000 working for contractors and volunteers on site full time, part time or on a casual basis. At least 40% of the workforce needs to commute regularly to NNUH from outside the greater Norwich area. Access to the site is required 24 hours a day, every day of the year.

During the year 2005/06 over 642,000 patients passed through the hospital doors as out-patients, accident and emergency attendances, in-patients and day cases. The majority of these were out-patients.

2.1.5 Travel Plan

The 2004 Travel Plan includes initiatives that are already in place including the appointment of a transport co-ordinator to develop and implement the travel plan, a car park charging scheme for staff, patients and visitors, cycle parking and other cycle facilities, discounted bus tickets for staff, and "bike2 work" days. Section 106 agreements have made provision for funding for a bus link to the city centre should this not be provided commercially, for example at times of lower demand such as at evenings or on Sundays, currently the only 24 hour service in Norwich is operated by First and only services the UEA and rail station.

The Travel Plan includes a Three Year Action Plan, which provides site-specific strategies required to encourage modal shift.

As part of the 2004 travel Plan a car share scheme was proposed. A scheme has been set up and is part of the "Carshare" initiative created jointly by Norfolk County and Norwich City Council.

2.1.6 Modal Split

In order to inform the production of the travel plan surveys were carried out in 2002/03 in association with a planning application to increase the number of parking places for the hospital. Together with observation data on bus patronage supplied by the County Council; the estimated existing modal share is shown as **Figure 2.1**. The public transport figure includes arrivals from Costessey Park and Ride with estimates taken from peak and non peak times during the day. The figure for vehicle occupants includes car sharers.

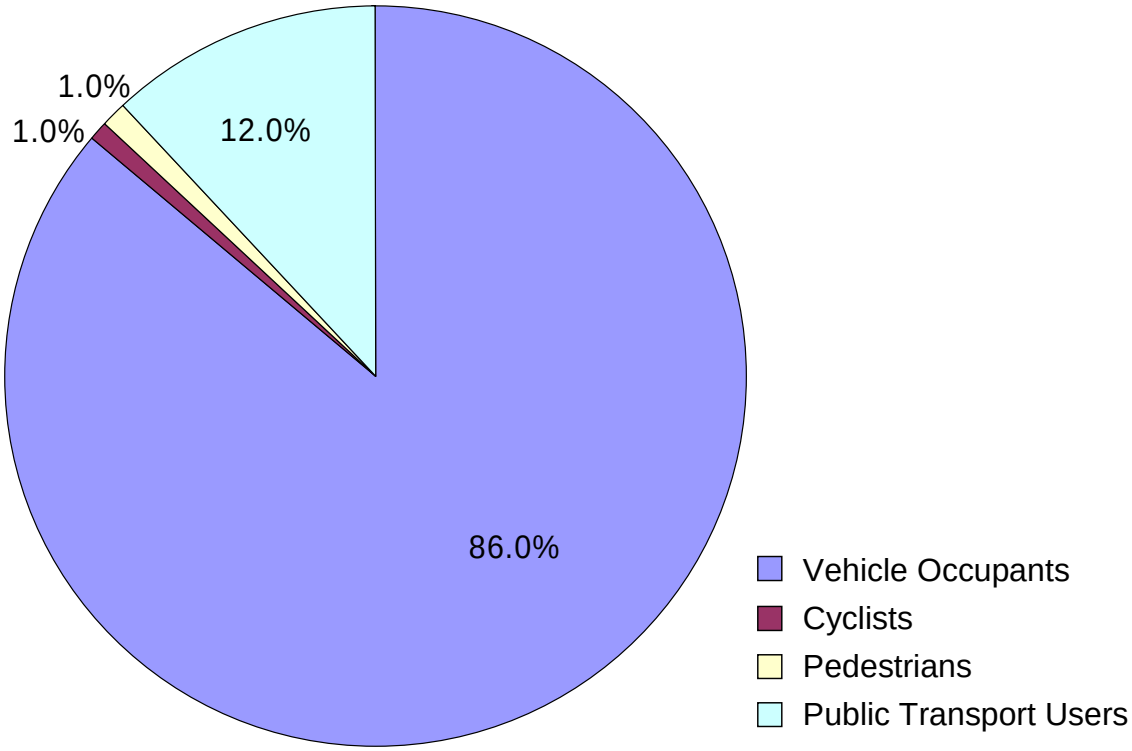


Figure 2.1 NNUH Existing Modal Share

Figure 2.2 shows the mean modal split observed for three UK hospitals: Edinburgh General Hospital, Redhill General Hospital in Surrey and Chichester Hospital in West Sussex. Comparison of this figure with **Figure 2.1** suggests that the current modal share for travel to the NNUH is less sustainable than that for other UK hospitals, with a significant deficit of pedestrian numbers. The out-of-town location of the hospital goes some way toward accounting for this deficit.

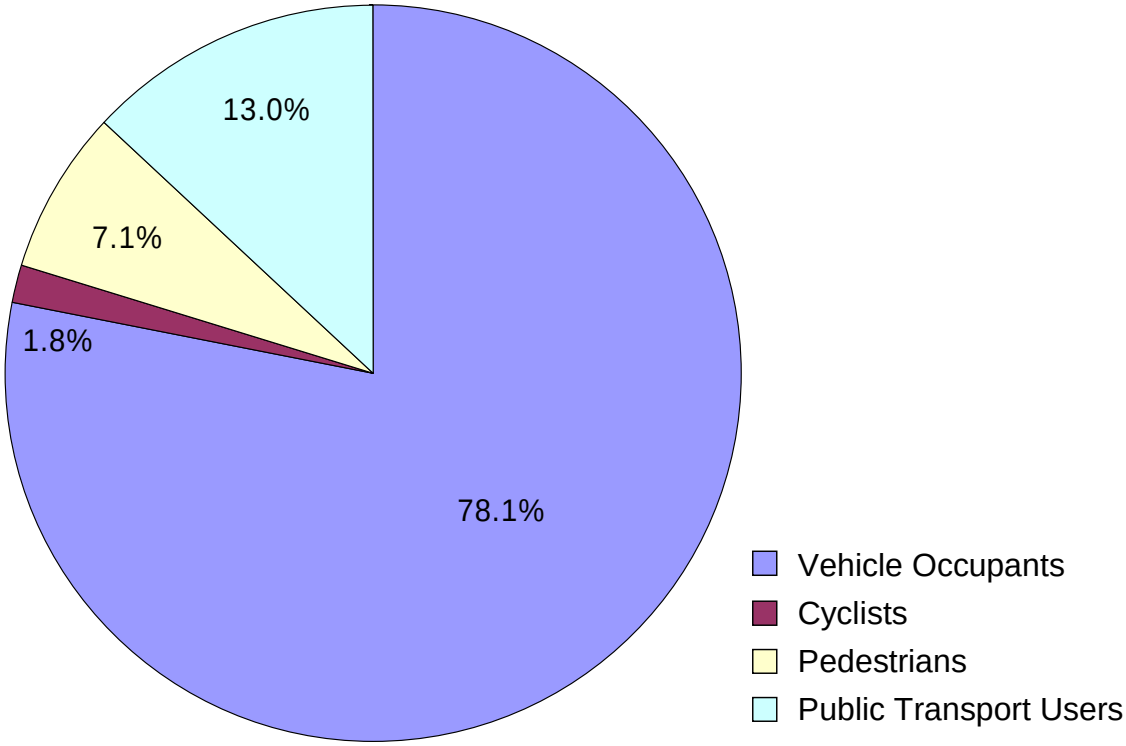


Figure 2.2 TRICS Derived Modal Share for Hospitals - Daily Average

Although walking/cycling trips are seen as low it should be noted that there are significant flows of pedestrian and cyclists between the UEA campus and NNUH. This is attributed to students accessing the recently constructed school of nursing and midwifery.

Figure 2.3 and **Figure 2.4** show modal split data during the AM and PM peak periods for the same three hospitals as used for **Figure 2.2**.

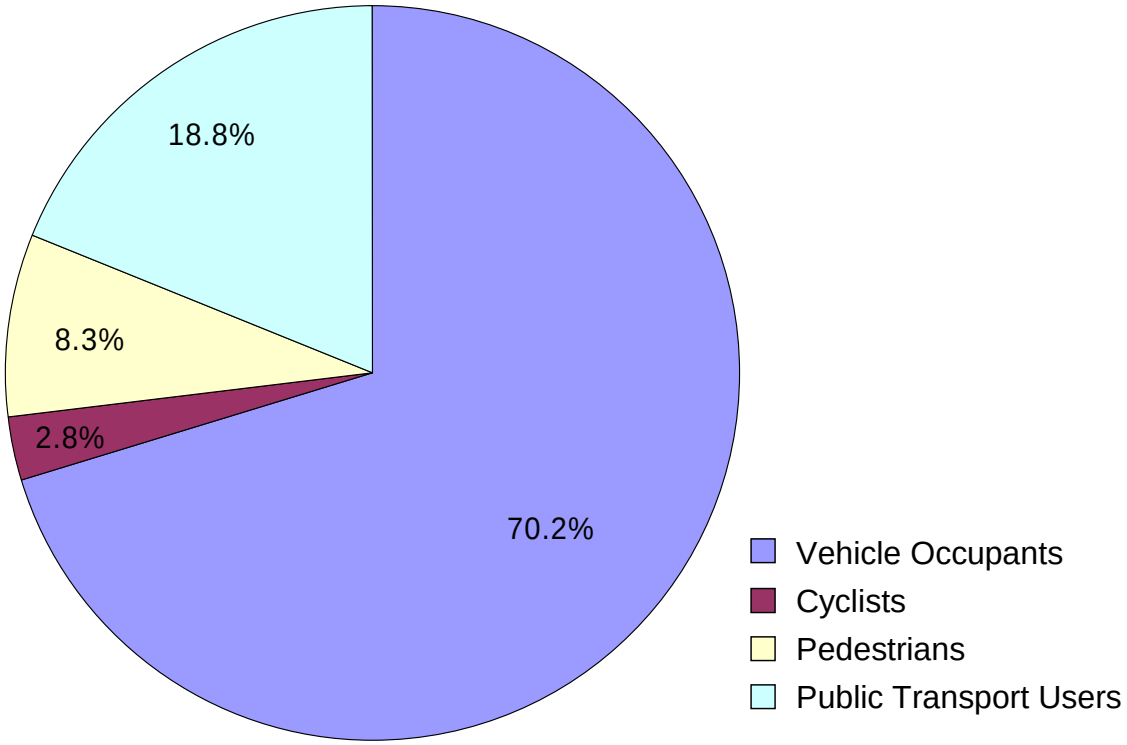


Figure 2.3 TRICS Derived Modal Share for Hospitals - AM Peak

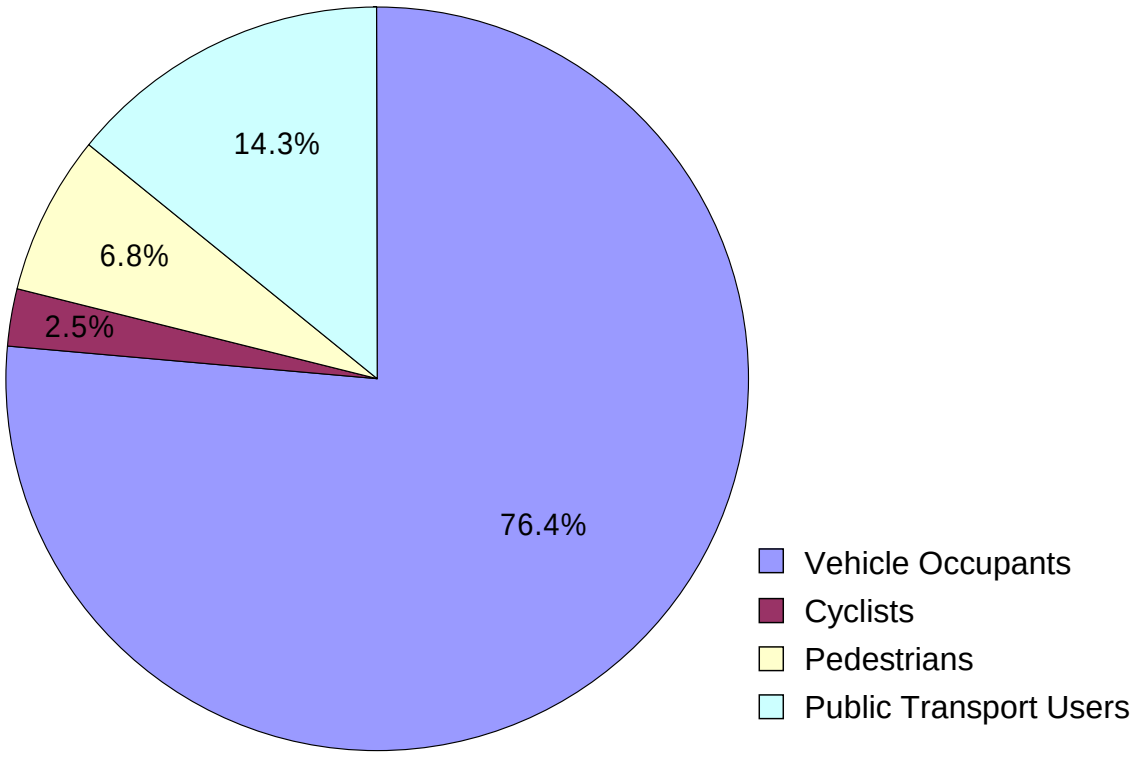


Figure 2.4 TRICS Derived Modal Share for Hospitals - PM Peak

2.2 University of East Anglia (UEA)

The information below is taken from the UEA Travel Plan 2004 and the UEA Commuter transport Survey 2005.

2.2.1 Road Access

The main entrance, 'University Drive', is located on the B1108 Watton Road, and a second entrance can be found on Bluebell Road. Both entrances provide access for pedestrians, cyclists, buses and motor vehicles. Egress from the University is via Bluebell Road. There are also dedicated access/egress points for pedestrians and cyclists at a variety of other points.

2.2.2 Car Parking

The total number of car parking spaces on the campus is approximately 1600. The growth in car parking spaces in the last ten years has been approximately 6.5%, although this growth is considerably lower than the growth and expansion of the UEAs main activities.

Each "working" day the University parks approximately 2000 cars and regularly uses grassed areas to accommodate these vehicles.

Under the University Car Parking Scheme, residents on campus, with 1 mile of the University and within the NR2 postcode area are not entitled to park. There is an annual charge of £60 for members of a car sharing scheme. Students are required to pay a parking charge of £1.00 per full day and staff are charged according on their salary. Parking charges for staff are as shown in **Table 2-3**:

Table 2-3 UEA Staff Parking Charges

Staff Salary Range	Cost per Day
< £10,000 pa	£0.50
£10,000 - £35,000	£1.00
> £35,000 pa	£1.50

There are visitor car park charges in place to encourage visitors to use non-car modes when they come to the UEA. There are approximately 250 visitor cars per day throughout the year.

The UEA has also formed a "Car Club" With support from the European Community funded CIVITAS/SMILE project and in partnership with City Car Clubs the University has brokered an arrangement for its staff, students and associates to benefit with access to pool cars. As part of the Car Club, SmartShare is also introduced which

encourages car, lift or ride sharing as an easier and more effective method to cut traffic and air pollution around the UEA. SmartShare is available to all staff and students and provides designated parking spaces.

2.2.3 Public Transport

The university campus is served by three key services:

- Service 25 (First) runs between the UEA and the City centre / Riverside. There are six per hour throughout the day, and it is the only 24-hour bus service in Norwich.

- Service 21/22 (First) also serves the UEA with one bus every 15 minutes on the following route: UEA - NNUH - Bowthorpe - City Centre – Sprowston.

- Services 26 and 27 (First) run every 15 minutes throughout the day on the route: Horsford/Hellesdon - City centre - UEA. The service also operates in the evenings and on Sundays at a lower frequency.

Current costs for journeys to/from the University to/from the hospital and the City Centre (services 22 and 25) are summarised in **Table 2-4**.

Table 2-4 Service 21/22 and 25/26/27 Costs to/from the UEA (as at 4 December)

To / From University	Adult (£.pp)		Child (£.pp)		Concession (£.pp)	
	Single	Return	Single	Return	Single	Return
NNUH	0.80	1.50	0.60	1.00	0.40	0.75
City Centre	1.80	3.40	1.20	2.20	0.90	1.70

2.2.4 Staff and Student Numbers

In the last ten years the staff and student numbers have risen from approximately 7,500 to just over 15,200. There are approximately 2,200 full time and part time staff, and a large number of other staff working on an occasional or casual basis. There are just over 13,000 full and part time students (about 3,000 of which live on or very near the campus).

Analysis of home location by postcode, carried out by the UEA, indicates that at least 1/3 of the student body may need to commute regularly to the UEA from outside of Norwich locations.

Figures recorded in 1998 as part of a study by Oscar Faber showed that 60% of staff and students lived within Norwich postcode zones. Analysis of data for the University year 2001/02 showed a continuation of the 40% rural and 60% urban split.

2.2.5 Commuter Transport Survey 2005

All students and staff were invited to complete the 2005 Transport Survey which was primarily web based. The surveys main purpose was to extract information on transport modes whilst eliciting views on parking and transport polices.

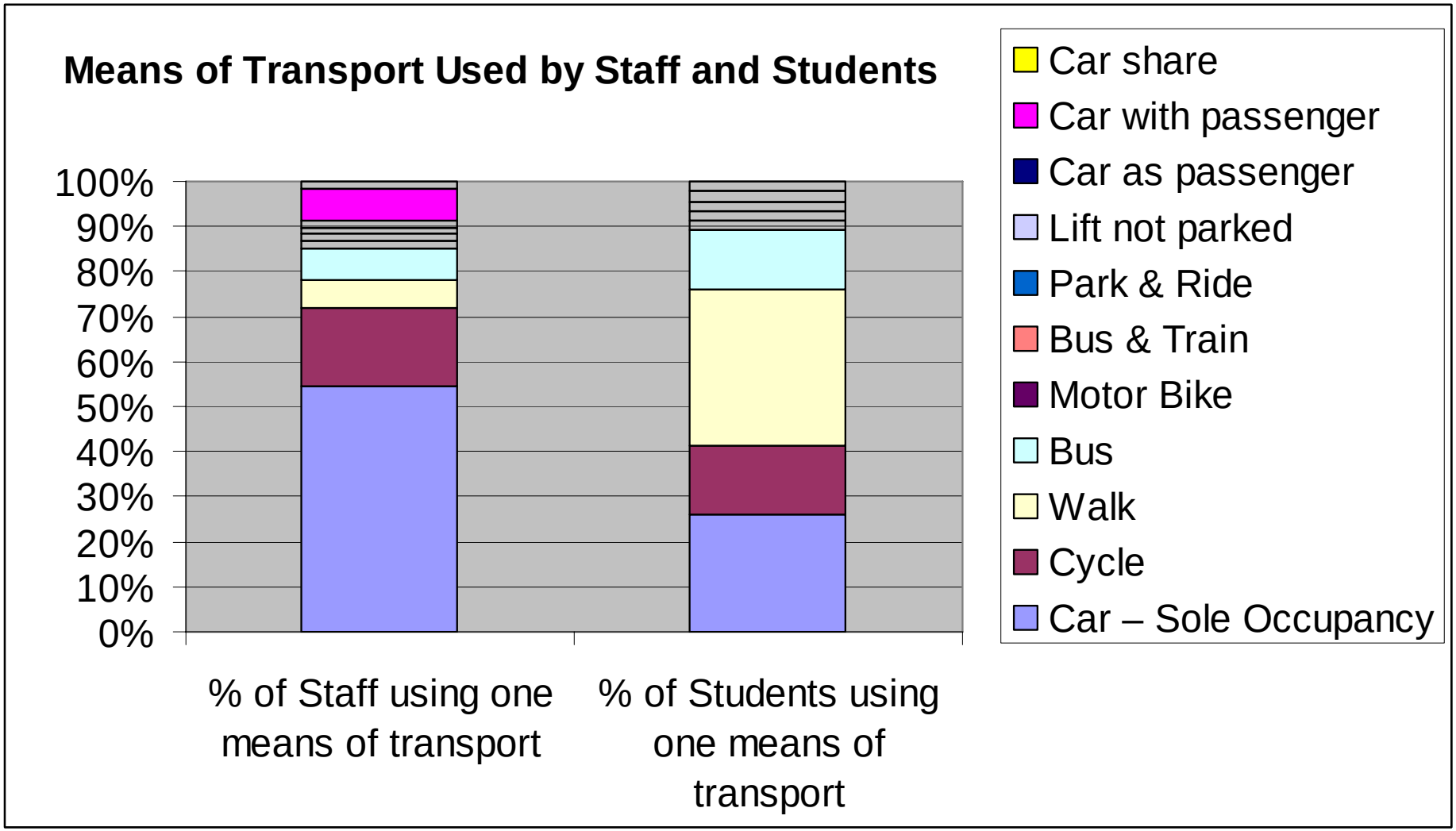
Approximately 48% of all students and staff completed the survey, 60% of these completed were by students. The following are the results of this survey undertaken in the September 2005; these results are likely to be affected by the seasonal timing of this survey particularly levels of cyclists and walkers being more open to fluctuations. Also different methods of transport will be affected by the distance in which staff and students will have to travel this is illustrated below:

Figure 2.5 Distance from Campus for UEA Staff and Students

Distance from UEA	Staff	Students
>5miles	45%	20%
Between 3 and 5 miles	19%	13%
<3miles	36%	67%

Figure 2.6 outlines the methods of transport used by both staff and students in reached the UEA.

Figure 2.6 Usual Method of Travel by UEA staff and Students



The chart above shows 68% of staff and 46% of students using one method of transport to reach the UEA Of the remaining respondents 26% of staff and 35% of students use 2 methods of transport and 6% of staff and 18% of students use three methods of transport.

Some of the headline results from this survey are below:

- 63% of staff and 28% of students sometimes drive to the UEA with 26% of staff and 6% of the students being sole occupiers of the car.
- 37% of staff and 72% of students never drive to the UEA.
- 31% of students use the bus all the time and 18% cycle at least 3 times a week. Bus usage amongst staff is considerably lower at 14%.
- 30% of staff living within 3miles of the UEA walk regularly in contrast to 60% of students living within 3miles.
- 42% of staff who live within 3miles of the UEA cycle to work regularly. This reduces to just 23% for students, many of whom prefer walking.
- Public transport is used to a grater extent by students, 25% of whom use buses regularly compared to just 10% of staff.

With the introduction of UEA travel polices having an emphasis on carbon reduction and encouragement to reduce the frequency of car journeys, the survey highlights changes in transportation methods for both staff and students within the past two years. Amongst staff 8% have switched to cycling 6% to walking and 4% to buses, for students 4% switched to walking, 3.5% to cycling and 3% to buses.

2.2.6 Travel Plan

The University is in a period of sustained growth and development, and it is recognised that the rate of increase in car journeys needs to be managed and retained at as low a level as possible. The Travel Plan aims to provide the framework for a reduction in non-essential car use, thus reducing the University's environmental impact. It includes a Five Year Action Plan which gives details of the site-specific strategies required to encourage modal shift. A potential cross valley link is identified which would connect the UEA to the school of Nursing and Midwifery at the NNUH. This link will expand the current cycle and pedestrian path and create a public transport only link. This proposal is currently in its infancy with the potential route marked on infrastructure proposals found at the end of this report.

The Travel Plan gives modal shares in 2002 and targets for modal share by 2017 with and without a cross-valley public transport link and additional bus services. These figures are shown in **Table 2-5**

Table 2-5 Modal Share and Targets for UEA

	2002	2017 No link	2017 With link
Car	38%	23%	17%
Other	3%	6%	9%
Bus	14%	18%	21%
Cycle	15%	19%	21%
Walk	30%	34%	32%

Numerous measures are already in place to fulfil the University's aim of reducing non-essential car use. These include increased cycle parking, the introduction of a web based car share scheme, a travelsmart website to provide travel information and to promote the Travel Plan and safety access improvements for non-car users.

The figures above are taken from the UEAs own model share targets but it is difficult to establish how cycling and walking will increase with the provision of a cross valley link with this already being possible due to a private bridge.

Figure 2.7 shows the existing modal share for travel to and from the UEA. **Figures 2.8**, **2.9** and **2.10** are based on data from the TRICS 2005b database and show the mean modal splits observed for a selection of Colleges and Universities around the UK at various times. The Colleges and Universities used are: Luton Sixth Form College, Cardiff Catering College, Eastbourne Art & Technology College, Colchester College, Glasgow Nautical Studies College, Glasgow Eng. College, Manchester University Campus, Hull College, Blackburn RC College, and Epsom Art & Design College.

Figure 2.8 shows the daily average modal split for the above institutions, while **Figures 2.9** and **2.10** show the modal split at peak AM and PM periods, respectively.

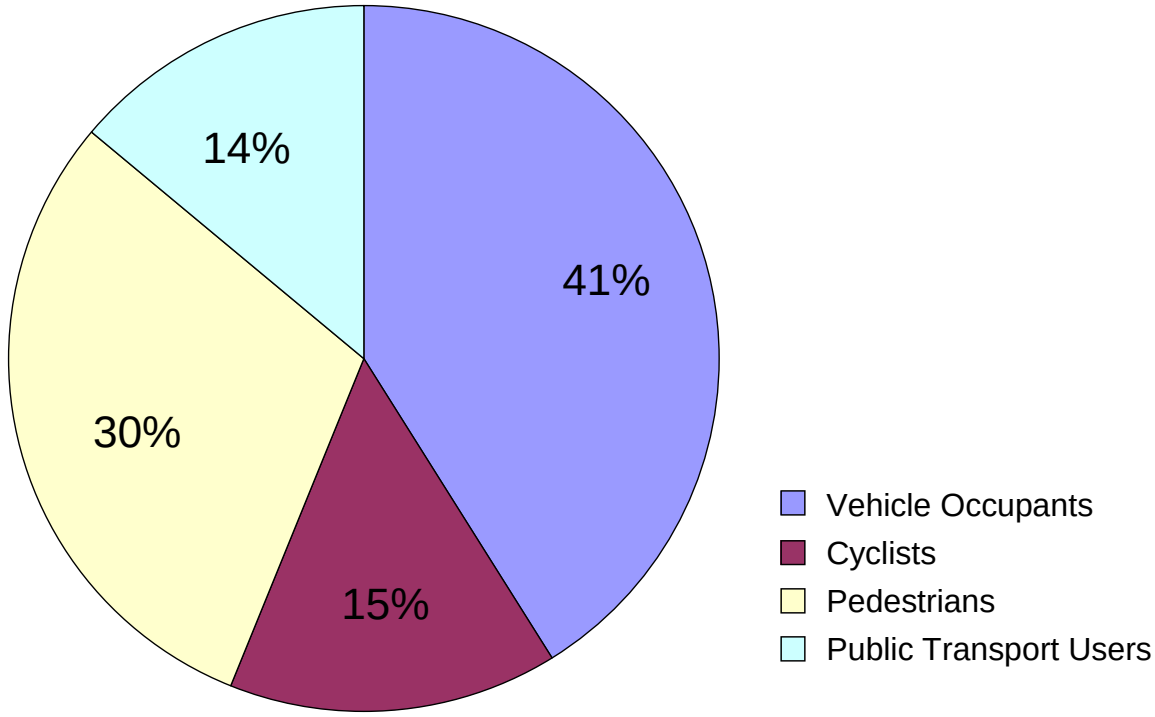


Figure 2.7 UEA Existing Modal Share

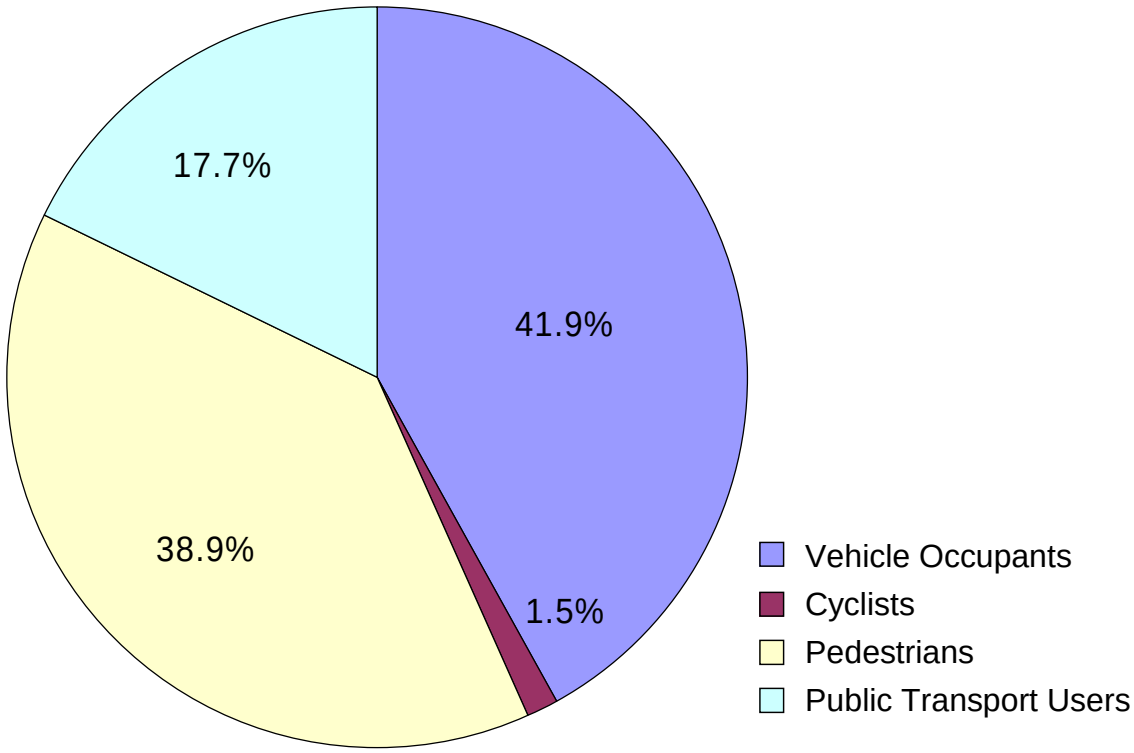


Figure 2.8 TRICS Derived Modal Share for Universities – Daily Average

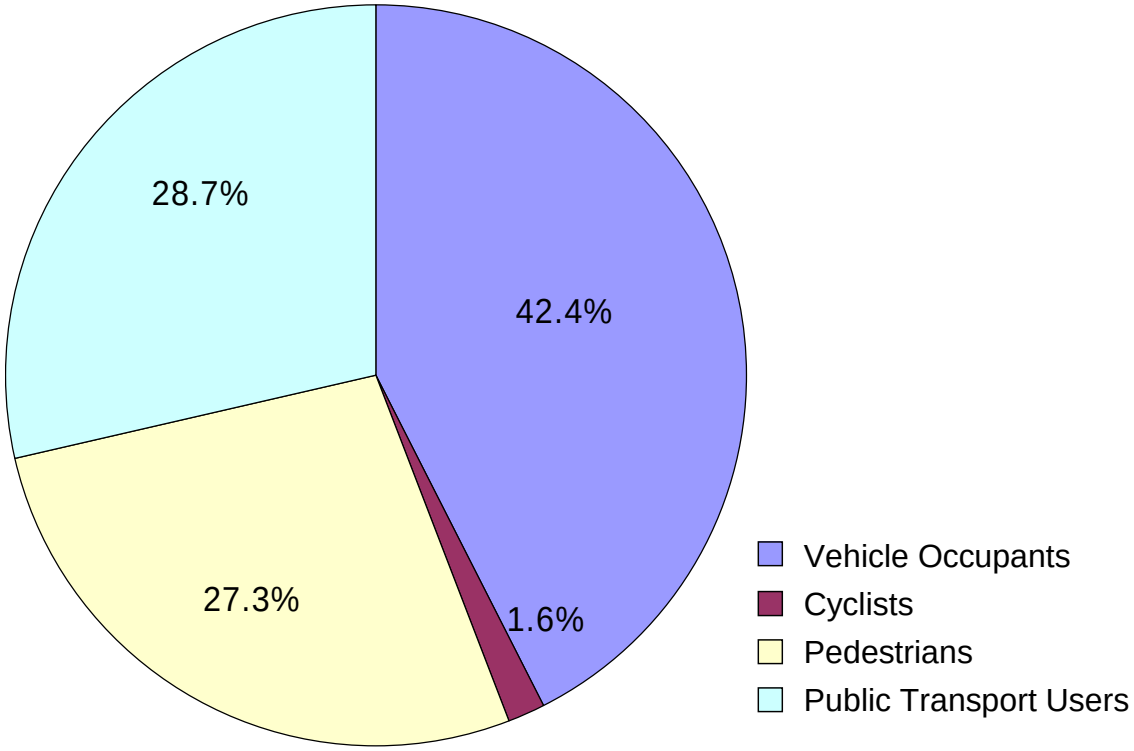


Figure 2.9 TRICS Derived Modal Share for Universities - AM Peak

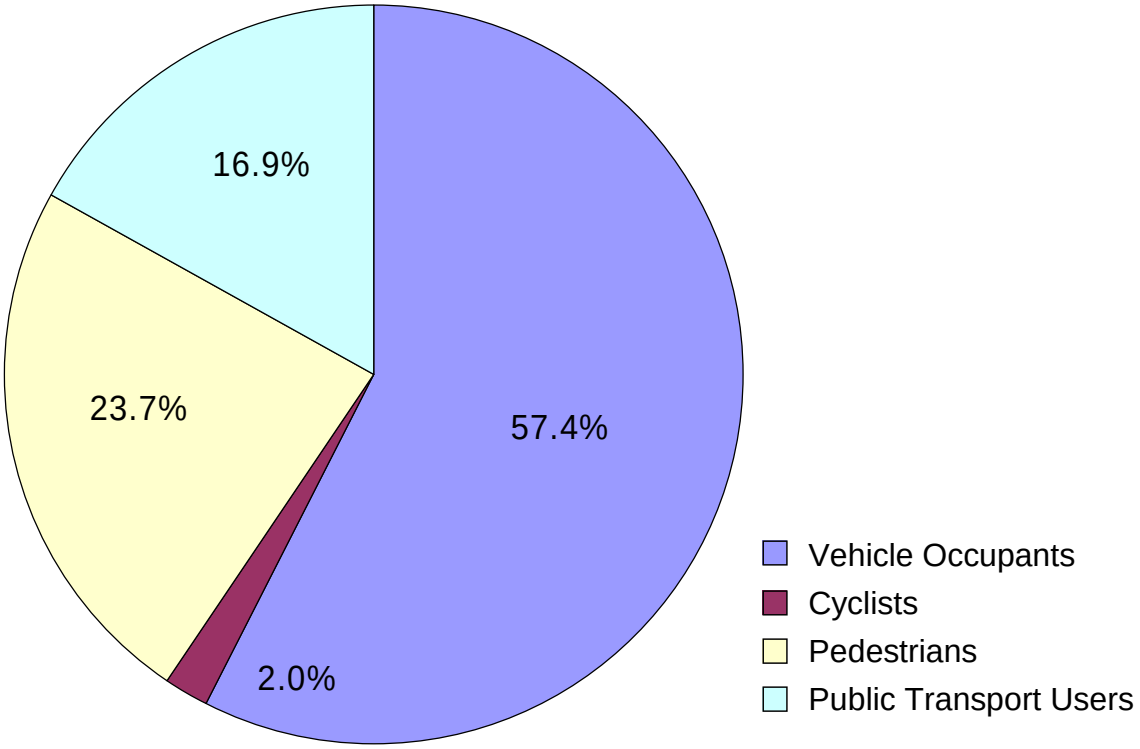


Figure 2.10 TRICS Derived Modal Share for Universities - PM Peak

Comparison of **Figure 2.7** to **2.8** shows that the UEA has a car occupancy proportion well in line with that seen at other universities and colleges around the UK. Significant differences include a below average proportion of pedestrians and an above average proportion of cyclists.

Additionally, **Figure 2.9** predicts an increase in the proportion of travel by public transport during the AM peak and **Figure 2.10** predicts an increase in car occupancy during the PM peak.

2.3 Institute for Food Research (IFR)

Although comparatively small, the IFR is more typical of NRP future development than either the UEA or the hospital. The IFR does not have a travel plan.

2.3.1 Staff Numbers

The IFR has advised that it typically employs PhD students alongside regular employees, currently amounting in all to 350 staff including part time. Staff work flexitime, with arrivals between 8-10am, departures between 4-6pm. In their publication ***Introducing IFR*** (2004), the IFR reported employee numbers summarised in **Table 2-6**.

Table 2-6 IFR Employees 2004

	Number	Proportion
Scientific Staff	215	70.3%
PhD Students	20	6.5%
Office / Management Staff	71	23.2%
Total	306	100%

2.3.2 Road Access

Access and egress is via Colney Lane. The private track across the river between IFR and UEA has a barrier operated by UEA and a gate operated by IFR. It is kept closed to vehicles between 4.30pm and 10.00am but is always open to cyclists/walkers.

2.3.3 Car Parking and Cycle Parking

There are 3 main staff car parks:

- 200 spaces in main car park (IFR1)
- 30 spaces (approx) in IFR2
- 35 spaces in West Site A

plus

- 50-60 temporary spaces available in mesh reinforced grass overspill area
- 10 visitor parking spaces
- 12 covered motor cycle spaces

In winter, all parking areas except the overspill area are full. Parking is not controlled.

IFR has 78 cycle parking spaces spread across 3 locations. Usage is about 10-15 in winter, but full or near full in summer. The lack of a safe and convenient cycle network on roads to the site is perceived as a deterrent.

2.3.4 Public Transport

The IFR is is served by First services 26 and 27 hwere a bus stop can be found on colney lane. Other key features of the public transport which serve the IFR are:

- Services 21/22 and 25 operate to the University, which is a 10 minute walk away. Passengers prefer to walk over the river to the terminus in UEA.
- Usage of the new Norwich Orbital bus service by IFR staff is unknown
- The observation about bus services tends to underline the value of a cross valley bus link for sustainable transport to NRP development.

2.3.5 Travel Data

According to the IFR publication, 67% of IFR staff live within 5 miles of the site. Modal split information for travel to and from the IFR is not available. However, it can be inferred from the information on parking that the modal spit is seasonally variable with a maximum proportion of vehicle occupants likely to be in excess of 80% during the winter. However, full usage of the cycle parking suggests that the proportion of arrivals by cycle in summer is 22% suggesting high levels of cycle trips to and from the UEA and the NRP facilities.

2.4 John Innes Centre (JIC)

2.4.1 Staff Numbers

JIC employee numbers and make-up as at June 2002 are shown in **Table 2-7**. Current estimates in 2006 suggest these figures are still accurate

Table 2-7 JIC Employees June 2002

	Number	Proportion
Permanent staff	291	36.7%
Short-term research contracts	227	28.7%
Casuals	12	1.5%
Visiting Workers / PhD Students	261	33.0%
Total	791	100%

2.4.2 Road Access

Access and egress is via Colney Lane.

2.4.3 Car Parking and Cycle Parking

The JIC has 434 car park spaces and 168 cycle racks on site. The level of use of the cycle racks provided is unknown.

2.4.4 Public Transport

The new Norwich Orbital bus service serves the JIC at a frequency of two buses per hour. The usage of the service is unknown.

The JIC is a short walk from the NNUH and UEA which are served by First services 21/22, 26 and 27. The 25 bus service now only serves the UEA main campus and not the NNUH. The level of public transport usage by staff is unknown.

2.4.5 Travel Plan

A JIC Workplace Transport Policy was agreed in 2003 and revised in June 2005. The policy outlines the centre's responsibilities and aims for transport on and to the site, with regard to vehicles and driving, and ways in which they aim to improve the local environment. The policy states the aim of JIC to encourage the use of public transport and car sharing where possible, together with the use of bicycles and lower

power vehicles (e.g. mopeds and scooters). It also encourages cooperation with NRP partners in developing a sustainable transport policy for South West Norwich.

The policy states the aim to provide sufficient car parking for JIC staff, which is of good standard and away from pedestrian routes, and to provide sufficient bike parking at points convenient to the main buildings.

2.5 Other Research Park development

The Vision Group see Cambridge Science Park (5,000 employees, 145,000 m^2 gross floor area) as an appropriate target towards which Norwich Research Park should aspire. This corresponds to an employment density of 29 m^2 per workspace, a typical figure for Research Parks according to guidance issued by English Partnerships, and lying closer to industry/small businesses at 32-34 m^2 per workspace than typical offices at 19 m^2 per workspace.

Figures 2.11, **2.12** and **2.13** show modal splits observed for a selection of Business and Research Parks around the UK, taken from the TRICS database version 2005(b). Cambridge Science Park together with business parks in High Wycombe, Kingston, Oxford and Stafford were included in the selection.

The high proportion of vehicle occupants (a daily average of over 86%) associated with Research Park developments is evident. The figure is similarly high for the critical AM peak period of 0800 to 0900. It is a reasonable model for the expected modal split associated with a traditional (non multi-modal) approach to development infrastructure for Norwich Research Park.

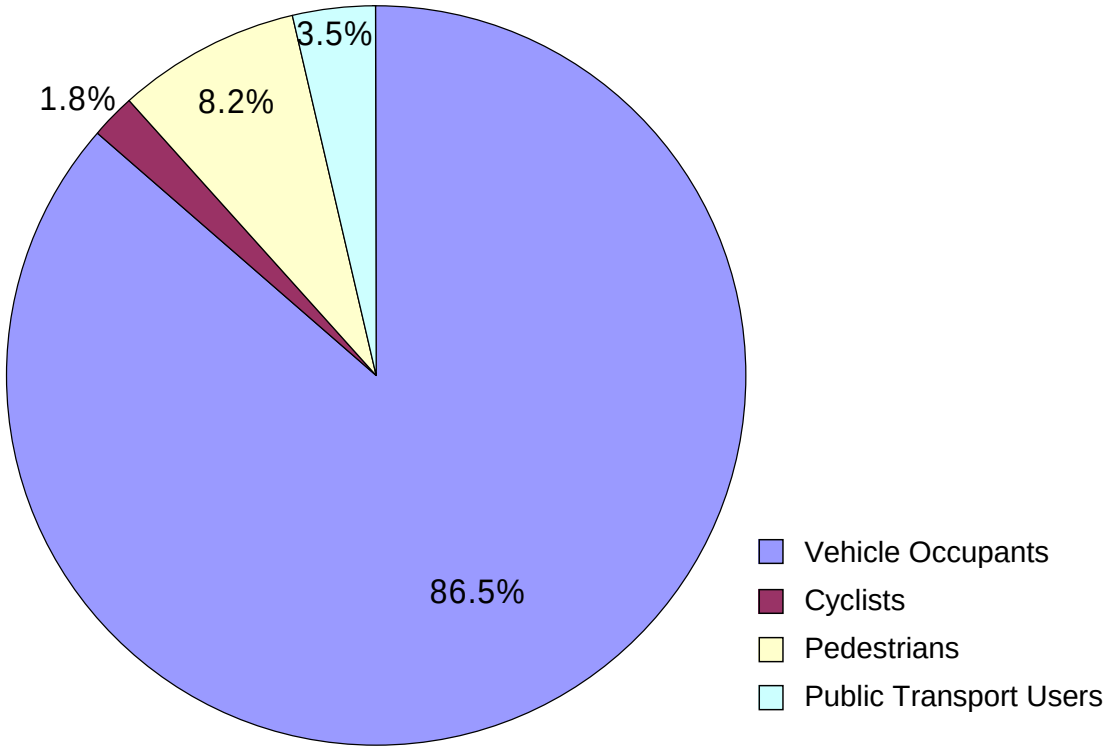


Figure 2.11 Modal Share for Business and Research Parks - Daily Average

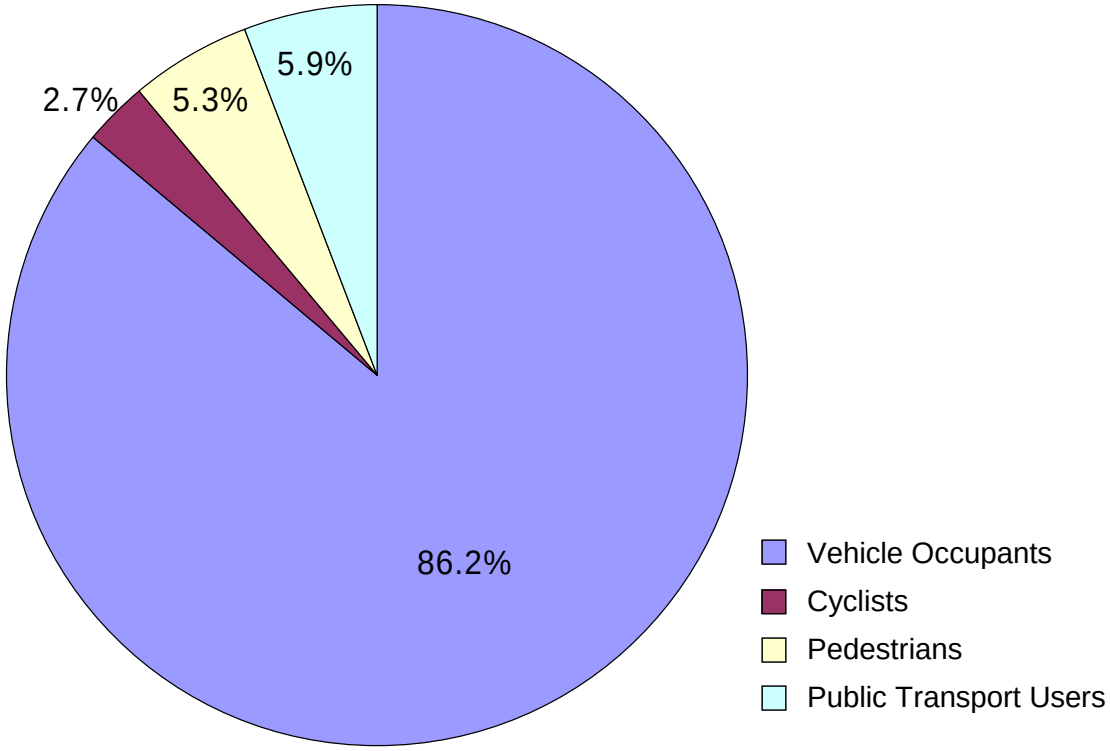


Figure 2.12 Modal Share for Business and Research Parks - AM Peak

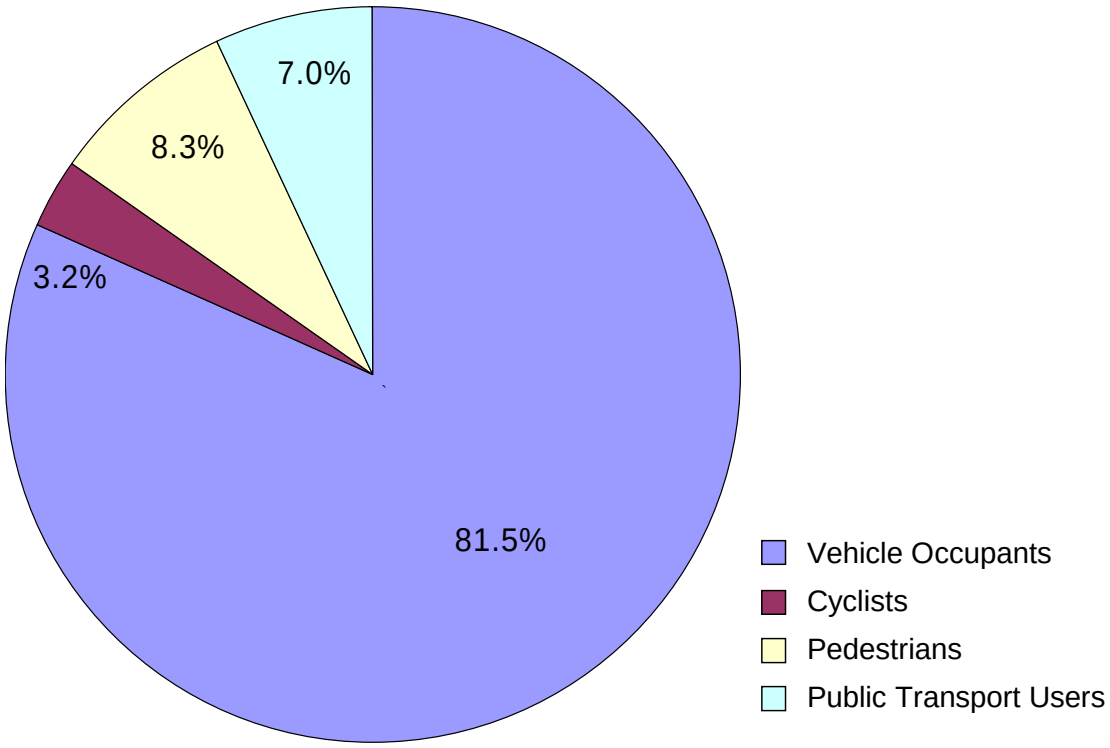


Figure 2.13 Modal Share for Business and Research Parks - PM Peak

Figures 2.14, **2.15** and **2.16** show the daily average, AM peak and PM peak modal splits, respectively, for the Cambridge Science Park only. Significantly, **Figure 2.15** suggests that car occupants make up a very large proportion (over 92%) of the total population movement in and out of Cambridge Research Park during the AM peak period. While institutions such as the UEA and the NNUH contribute a combination of sustainable and unsustainable trips to the NRP transport network, development similar to Cambridge Science Park without restraint on car use can be expected to produce primarily unsustainable trips.

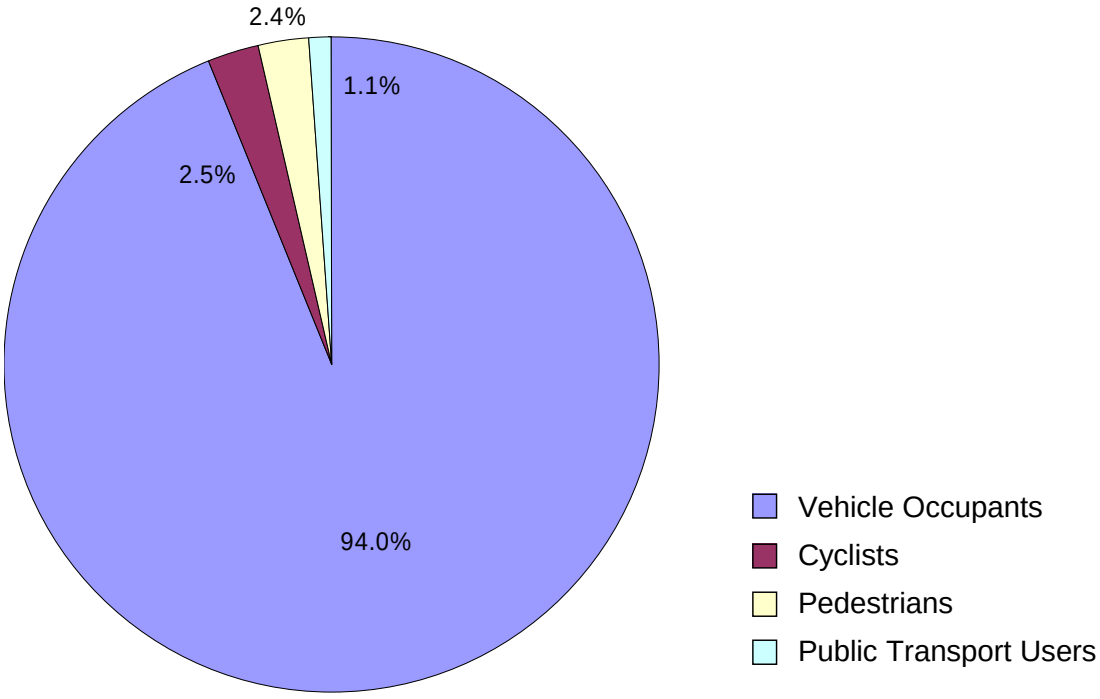


Figure 2.14 Modal Share for Cambridge Science Park - Daily Average

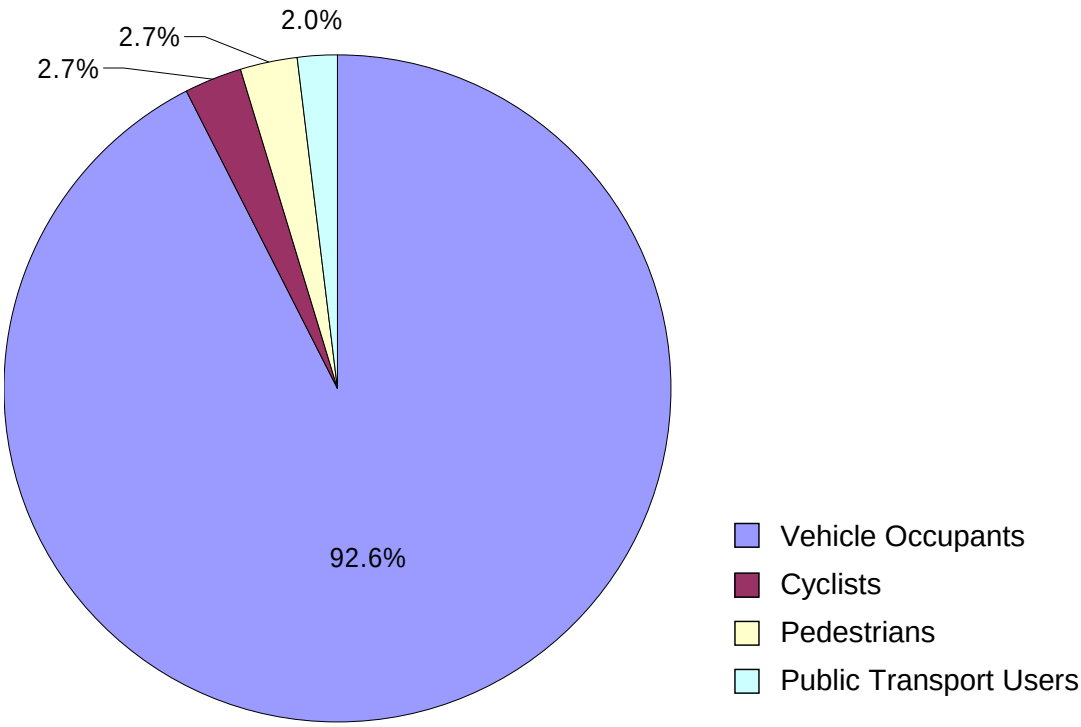


Figure 2.15 Modal Share for Cambridge Science Park - AM Peak

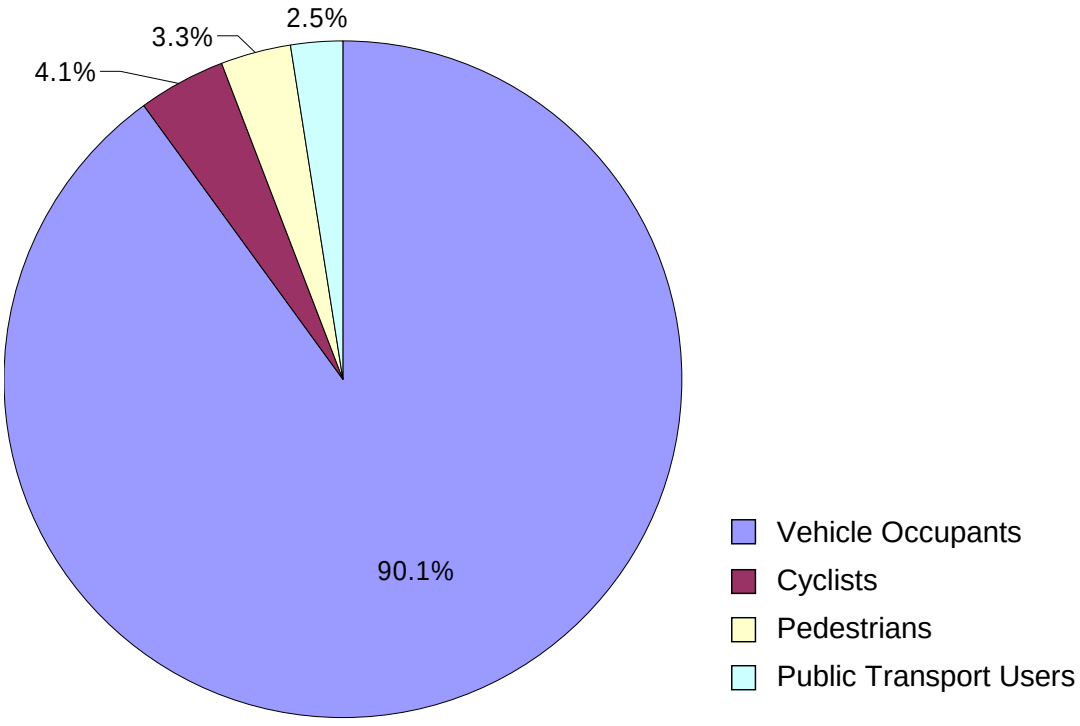


Figure 2.16 Modal Share for Cambridge Science Park - PM Peak

3 Development of the Norwich Research Park

3.1 NCC Report to Task Force 04.05.04

Table 3-1 summarises the planned development for Norwich Research Park stated in the 2004 NCC report to task force. The figures in **Table 3-1** are inline with a pamphlet produced by the local partnership of private and public sector interests known as the 'Vision Group' in 2002. In it, the group outlined their vision for 80 ha of development at NRP by 2025. More information on the Vision Group is available in the pamphlet, which is included as **Appendix A** to this report. The 2004 NCC report to task force also quotes an assumed average development plot ratio (development area / site area) of 24%, based on the figures from the Vision Group's pamphlet. Plot ratios for each of the sites identified in **Table 3-1** are shown below.

Table 3-1 Previous NRP Development Proposals

Site	Site Area (ha)	Assumed Development area (m²)	Plot Ratio (%)
UEA Triangular Site	5	11,000	22.0
School of Nursing and Midwifery	-	-	-
Hospital Parking	0	0	-
John Innes Foundation Expansion	11	24,000	21.8
Colney Developments Hethersett Lane	9	21,000	23.3
Hospital Expansion	5	11,000	22.0
Colney Hall	15	28,000	35.0
Contingency Site	14	31,000	22.1
Additional Vision	28	62,000	22.1
Total	80	188,000	23.5

The plot ratios calculated in **Table 3-1** are discussed in **Section 3.3** of this report.

3.2 Proposed Development

Appendix B to this report contains a note on ***Potential Development Requirements for Norwich Research Park*** (June 2005) prepared by LUC. The note proposes quantified developments in accordance with the South Norfolk Local Plan and the Vision Group's 2002 pamphlet (**Appendix A**). The development of the Norwich Research Park is a key feature of the South Norfolk Local Plan, which identifies some 54 ha of land for NRP development.

In their note (**Appendix B**), LUC make an estimate of the allocation of land for anticipated development from new investors in the park. Their note considers the pattern of development and land ownership at NRP together with the aspirations of the Vision Group. **Table 3-2** summarises the scales of these planned expansions and developments. The LUC ref column refers to plan C in the LUC note in **Appendix B**.

Table 3-2 Allocated Sites in the South Norfolk Local Plan

Institution	Site Area (ha)	Site Description	Policy	LUC ref
UEA triangle site expansion	3.8	Land north of IFR	-	5
NNUH expansion	5.0	Land east of Hethersett Lane, adjacent to NNUH	COL4	10
JIC expansion	11.4	Land west of JIC	COL1	6
Major organisation(s)	14.0	Land west of Hethersett Lane	COL2	9
Smaller organisations	23.6 (15.0 & 8.6)	Colney Hall & land NW of NNUH	COL1	8 & 7
Total by 2021	57.8	-	-	-

The figure of 57.8 ha includes the confirmed UEA triangle site development of 3.8 ha together with the 54 ha of land identified in the South Norfolk Local Plan. This leaves a requirement for a further 22.2 ha of development land to be identified to meet the Vision Group's estimated requirement of 80 ha of NRP development land by 2025.

Table 3-3 is taken from the LUC note and summarises the anticipated allocation of 'yet to be identified' land to meet the 80 ha target.

Table 3-3 Yet To Be Identified Land

Site Description	Site Area (ha)
Expansion of existing organisations	1.8
Sites for major organisations attracted to the park	2.0
Land to accommodate new businesses & investors to the Park	16.4
Sites for related facilities (e.g. hotels / leisure centres)	2.0
Total Additional Land	22.2

3.3 Rate of Development

According to LUC (**Appendix B**), similar research park developments around the UK have shown development rates as high as 3.2 ha/year. For the purpose of this study, it is assumed that the 57.8 ha of land identified by LUC in **Table 3-2** will be substantially developed by 2021. Furthermore, it is assumed the 22.2 ha deficit identified in **Table 3-3** to meet the Vision Group's target of 80 ha will be developed between 2021 and 2035.

The development in **Table 3-2** is assumed to take place before 2021. Development identified in **Table 3-3** will be included by 2035.

3.4 Plot Ratios

Plot ratios for the different assumed developments identified in **Table 3-1** for NRP are all in the region of 22% with the exception of Colney Hall, which has a significantly higher proposed plot ratio of 35%. This figure reflects the development of land allocated in the Local Plan.

In their note on Development Requirements (**Appendix B**), LUC quote plot ratios for four UK sites of varying size, as shown in **Table 3-4**.

Table 3-4 Existing Development Plot Ratios

Site	Total Developable Area (ha)	Plot Ratio (%)
Cambridge Science Park	61.5	16 (after 30 yrs)
Oxford Science Park	30.4	21
Granta Park (north of Cambridge)	34.8	20
Edinburgh Medi-Park	26.7	50

From **Table 3-4**, Oxford Science Park and Granta Park are seen to have very similar plot ratios of around 20%. Cambridge is slightly lower at 16% while Edinburgh Medi-Park is much higher at 50%. It is important that the figures in **Tables 3-1** and **3-4** are considered in conjunction with a number of points relevant to NRP and this study. These points are listed below:

- Edinburgh Medi-Park is an exception to the trend of completed science parks
- Different access strategies will have an effect on plot ratios through the need for increased or decreased parking provision (a large area for parking which leads to a correspondingly low plot ratio)
- Historical data may not necessarily be representative of future development densities.

There will always be some variation of plot ratio over different sites. This is especially true for NRP, where high density developments are simply not feasible on sites such as the Colney Hall site, which has extensive areas of woodland although for the purpose of this report the area is view as fully developable.

For this study, it is necessary to consider a selection of development scenarios based on a range of site-averaged plot ratios. These plot ratios will be used to quantify expected gross floor areas of B1b type development from projected site allocations for new investors to the park. Development of the UEA triangle site already has planning permission and the projected gross floor area of development is known to be 11,000 m². As such, this figure will be taken as independent of any overall plot ratio. The four plot ratios considered are as follows:

- 16% (based on the figure observed for Cambridge Science Park)
- 19% (based on an average of the plot ratios observed at Cambridge Science Park, Oxford Science Park and Granta Park)
- 24% (the target figure quoted in the 2004 NCC report to task force)
- 35% (considered to be an upper bound on what is achievable by 2021 / 2035)

Table 3-5 details the range of development calculated based on the above plot ratios and assumptions.

Table 3-5 Effect of Plot Ratio on Development if a 8ha development rate is assumed for NRP new small orgs

		Plot Ratio			
		16%	19%	24%	35%
Site	**Site Area (ha)**	**Gross Floor Area of Development (m²)**			
UEA Triangle	3.8	11000	11000	11000	11000
Hospital expansion	5.0	8000	9500	12000	17500
JIC expansion	11.4	18240	21660	27360	39900
NRP new small orgs(1)*	8.6	13760	16340	20640	30100
NRP new major orgs	14.0	22400	26600	33600	49000
NRP new small orgs(2)*	15.0	12800	15200	19200	28000
All NRP	37.6	60160	71440	90240	131600
Remaining Vision	20.2	32320	38380	48480	70700
Related facilities	2.0	3200	3800	4800	7000
Total (by 2035)	**80.0**	**121720**	**142480**	**177080**	**253200**

*New small organisations investing in NRP are split between the two sites detailed in **Table 3-2**.

3.5 Summary of Development at NRP

It can be seen from **Table 3-5** that the gross floor area of development at NRP becomes increasingly sensitive to development plot ratio with time. The adoption of a plot ratio of 24% produces development estimates that closely resemble the previous development proposals shown in **Table 3-1**. Significantly, the adoption of a plot ratio of 24% predicts that 72% of the development planned up to 2035 will have been completed by 2021. This compares to almost 75% with a plot ratio of 16% and less than 70% with a plot ratio of 35%.

4 Transport Strategies for NRP

To meet the demands of projected growth up to 2035, a range of transport strategy options have been considered. In this study, consideration has been given to transport strategy elements which could form alternative, less car-dependent strategies for access to new development in the Norwich Research Park. Infrastructure and service provision elements have been allocated into one of three access strategies, as summarised at the end of this section in **Table 4-1**. The three strategies considered are:

- A '**sustainable access' strategy**, reducing car-dependency to a minimum
- A '**car dependent' strategy**, with an access plan similar to that adopted by existing developments and other research parks
- An '**intermediate' strategy**, offering choice for more sustainable travel

Measures are also considered against their cost. An outline 'order-of-cost' figure is given for each strategy in **Table 4-1**. These figures are given for the purpose of comparison or preliminary budgeting only, and are not based on estimates.

The reduction of vehicle trip rates and revisions to modal shares are considered once the elements of alternative strategies are defined.

4.1 Strategy 1: Sustainable Access

This strategy employs both 'sticks' and 'carrots' to bring about minimisation of new vehicular trips.

A proportion of car trips could transfer to Park & Ride sites rather than be eliminated from the network altogether. In particular, car trips which form work trips from beyond the urban area are unlikely to shift to bus, cycle or walking modes. However, new employees might make their choice of employment or place to live on the basis of the available options for travel to work.

- Strategy elements identified could include:
- Provision of high standard walking and cycle routes to the residential catchment
- Provision of high quality internal walking and cycle network within the NRP
- Infrastructure and support for bus services through NRP
- Construction of a bus lane on the B1108
- Improved sustainable transport links with UEA
- Additional capacity of bus services if required
- Increased capacity of Park & Ride sites and new/enhanced services to NRP
- Dedicated bus services ('works' buses)
- Whole route bus priority measures
- Restricted car access to NRP (parking standards and access control)
- External parking restrictions everywhere within an 800 metre site perimeter
- Limited local road improvements

The strategy runs the risk of driving potential investment away from NRP to other, more car-friendly sites. Significant investment in public transport would be required to successfully implement such a strategy. Access/parking control could be difficult to enforce and large-scale external parking restrictions would restrict the amenity of residents and are likely to be difficult to achieve.

Its cost, excluding further new road infrastructure within the NRP, would be of the order of £10m.

4.2 Strategy 2: Car-dependent Access

This strategy is similar to the approach taken by previous proposals for access to the hospital and research park. The Cringleford link between the hospital and the A11 was part of the 2002 strategy and was opened in 2005. It is now part of the 'Do Minimum' scenario in any strategy.

Provision for car-dependent access is likely to be attractive to businesses and convenient for employees in the short to medium term. Adverse environmental impacts have been identified in previous assessments of this strategy but, as previously, traffic management on Earlham Road and external walking and cycling routes should be included in all access strategies considered. Its strategy elements could include:

- New / improved road infrastructure
- Provision of high standard walking and cycle routes to the residential catchment
- Provision of high quality internal walking and cycle network within the NRP
- Infrastructure for bus services through NRP
- Local bus priority measures
- Limited local road improvements
- This access strategy is likely to appeal to stakeholders in NRP by providing full standard parking.
- Its cost, excluding further new road infrastructure, would be of the order of £10.5m, which would be met by developers.

4.3 Strategy 3: Intermediate Access

This strategy is considered by means of a risk assessment type approach. The likelihood for the delivery of a number of sustainable access strategy elements is assessed together with their anticipated effectiveness in **Table C-1** of **Appendix C**. All of the elements identified in **Sections 4.1** and **4.2** are considered. The object of the assessment is to define an intermediate and achievable strategy that offers sustainable choices to reduce car-dependence while avoiding some of the negative impacts associated with a solely sustainable access strategy.

In **Table C-1** of **Appendix C**, ratings for individual elements are calculated by assigning numerical values to the likelihood (LIK) of their delivery and to their anticipated effectiveness (EFF) in reducing car-dependency. Values from 1 (low likelihood / low effectiveness) to 3 (high likelihood / high effectiveness) are assigned for likelihood and effectiveness and their product is taken to give a rating in the range of 1 – 9. A high rating indicates that a measure is considered very effective and very likely to be deliverable, while measures with a low rating cannot form part of a robust intermediate strategy for this assessment. This is not to say that highly effective but difficult measures should not be pursued.

For the purpose of choosing elements from **Table C-1** to form an intermediate strategy for this assessment, only those elements with a rating of 4 or more are taken forward. As stated previously, those measures with a low rating (3 or below) that are considered to be highly effective but difficult, should not necessarily be ignored without a more detailed feasibility study. The elements chosen based on **Table C-1** are as follows:

- Provision of high standard walking and cycle routes to the residential catchment
- Provision of high quality internal walking and cycle network within the NRP
- Infrastructure and support for bus services through NRP
- Construction of a bus lane on the B1108
- Additional capacity of bus services if required
- Whole route bus priority measures
- New Bus Only rear link to NNUH from UEA
- Restricted car access to NRP (parking standards and access control)
- New Road Infrastructure (Partly)
- New £6.5m road between B1108 and Hethersett Lane
- Signalisation of A47/B1108 roundabout
- Closure of B1108 / Hethersett Lane junction to car traffic

- Signalisation of junction at link road with B1108 or similar

Fundamentally, the intermediate strategy relies on 'soft' measures such as car-sharing in Travel Plans rather than 'hard' measures such as large scale parking restrictions. It represents a compromise between car dependency and sustainability, but may cause adverse impacts such as overspill parking.

Its cost, excluding further new road infrastructure, would be of the order of £7.5m.

Table 4-1 Access Strategy Elements

Element	Possible Measures (with comments)	Sustainable	Intermediate	Car Dependent
Provision of high standard walking and cycle routes to residential catchments	Network to Earlham, W Earlham, Bowthorpe and Cringleford (as proposed for B1108 multi-modal scheme) Complete B1108 cycle route and widen footway/cycleway over river bridge Improved crossing at Wilberforce Rd / Watton Rd Improve Hethersett Lane	✓	✓	✓
Provision of high quality internal walking and cycle network within the NRP	Well connected network on improved roads and within developments (Achievable, subject to support of NNUH for new rear access for sustainable transport/emergencies and connection to existing cross valley path to UEA)	✓	✓	✓
Infrastructure and support for bus services through NRP	Selective vehicle detection (bus priority) at Colney Lane junction University Drive bus contraflow, or Bluebell Road bus gate (Requires traffic regulation orders and support of UEA)	✓	✓	✓
Bus Lanes	Construction of a bus lane on the B1108	✓	✓	

Element	Possible Measures (with comments)	Sustainable	Intermediate	Car Dependent
Improved sustainable transport links with UEA	Provide a dedicated shuttle service	✓		
Additional capacity of bus services if required	More buses on route 25 (Depends on commercial operator or service support through NCC or developer agreements)	✓	✓	
Increased capacity of Park & Ride sites and new/enhanced services to NRP	Enlarge Thickthorn and/or Costessey P&R sites (Land and developer contribution required Services depend on commercial operator or service support through NCC or developer agreements)	✓	✓	
Dedicated bus services ('works' buses)	Private contracts by NRP developers. (Require binding obligation to operate within Travel Plans and planning agreements)	✓		
Whole route bus priority measures	Remove bottlenecks on route 25 (Requires measures as for bus services through NRP plus bus priority at Earlham Rd etc)	✓	✓	

Element	Possible Measures (with comments)	Sustainable	Intermediate	Car Dependent
New bus only rear (west) link to the NNUH	Widen current cycle and walking path to accommodate bus lane	✓	✓	✓
Restricted car access to NRP (reduced employee parking)	Access barriers at new developments. Reduced parking standards for employees. (Require binding obligation to maintain within Travel Plans and planning agreements)		✓	
Restricted car access to NRP (no employee parking)	Access barriers at new developments. Parking for disabled, servicing and visitors only. (Possibly unpopular with developers. Require binding obligation to maintain within Travel Plans and planning agreements)	✓		
External parking restrictions everywhere within 800 metres	Traffic regulation orders - e.g., no waiting before 9.30am, 2 hour limited waiting or Controlled Parking Zone (CPZ) - on all existing and new roads within ½ hour walking distance) (Affects amenity of existing residents and influences layout of new un-built residential developments. Remote from other parking enforcement areas. Unlikely to succeed without local support)	✓		

Element	Possible Measures (with comments)	Sustainable	Intermediate	Car Dependent
Limited local road improvements (programmed and safety)	B1108 single 2 lane improvement (committed) Hethersett Lane / B1108 safety improvements (committed)	✓	✓	✓
New road infrastructure	New 6.5m link road between the B1108 and Hethersett Lane	✓	✓	✓
	New 6.5m link road between Heathersett Lane and Colney Lane			✓
	Signalisation of A47/B1108 roundabout		✓	✓
	Additional eastbound lane on the B1108 between the A47 and Colney Hall Junction			✓
	New 2nd vehicular access to Colney Hall			✓
	Closure of B1108 / Hethersett Lane junction to car traffic	✓	✓	✓
	Signalisation of junction at link road with B1108 or similar access connection.		✓	✓

4.4 Assessment of Strategies

The 3 strategies differ principally in terms of development parking, sustainable transport measures and levels of restraint on off-site parking. Restricting car access to NRP could most easily be achieved with a reduction in the standard for the average level of parking provision for new class B1b development in NRP. This could be done in conjunction with the promotion of car sharing and use of public transport in Travel Plans. Reduced parking provision could lead to some overspill of parking on to the highway and other land as well as transfer of some trips to Park & Ride and other modes. If, as highlighted by the risk assessment in **Appendix C**, enhancement of existing Park and Ride services is difficult to achieve; it is possible that Park and Ride sites could be overloaded. Any take up of the existing park and ride spaces for the NRP will reduce the capacity available for the city centre

Table 4-2 shows car park capacity and recent average occupancy for both the Costessey and Thickthorn Park and Ride sites. The figures highlighted in orange represent the peak car park occupancies recorded at each site. It can be seen that both sites have significant spare car park capacity, suggesting they would not easily be overloaded.

Table 4-2 Park and Ride Site Car Park Occupancies

	Car Park Capacity	Period	2005 Car Park Occupancy (%)				
			Target	April	May	June	July
Costessey	1,100 spaces	Mon – Fri @ 1000	30	28	27	27	24
		Mon – Fri @ 1300	36	34	31	32	30
		Sat @ 1300	25	20	20	19	14
		Thursday evening	-	<1	1	6	1
Thickthorn	736 spaces	Mon – Fri @ 1000	25	22	24	28	29
		Mon – Fri @ 1300	29	26	29	36	41
		Sat @ 1300	33	23	33	34	30
		Thursday evening	-	0	2	3	4

5 Trip Generation for Access Strategies

5.1 Traffic generation information from NCC report to Task Force 04.05.04

In the NCC report to Task Force dated 4th May 2004, a morning peak trip generation figure of 0.7 trips per 100 m² GFA is quoted as the then current value for the existing Norwich Research Park. The report also supports the Vision Group's aspiration for the Norwich Research Park to emulate the Cambridge Science Park, which has an equivalent trip rate of 1.27 trips per 100 m² GFA in the AM peak. **Table 5-1** summarises the anticipated development and expected traffic generation figures quoted in the report. Traffic generation from the 52 ha already allocated in the Local Plan amounts to account for 67% of the anticipated development trip generation.

Table 5-1 Previous Traffic Generation Figures

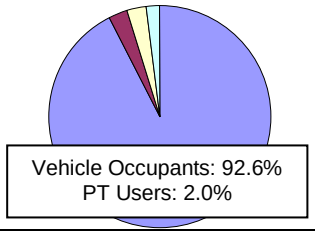
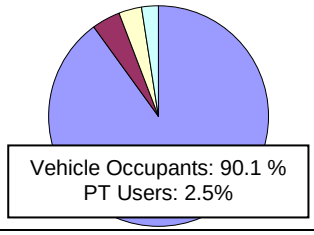
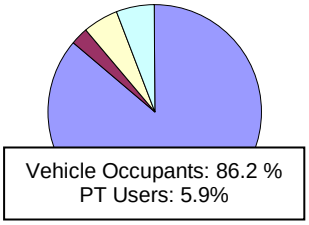
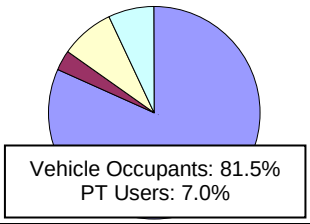
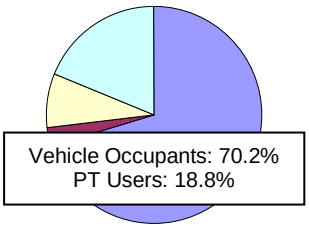
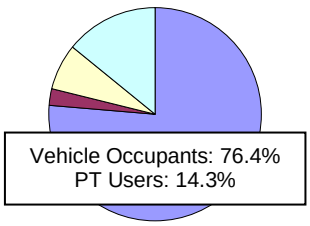
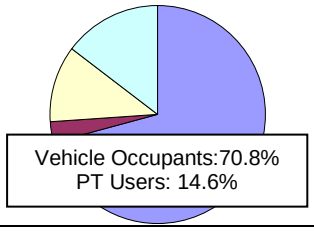
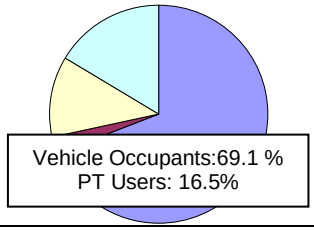
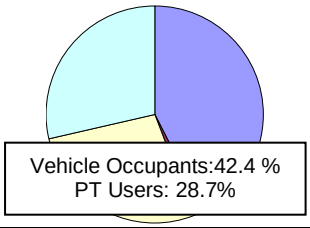
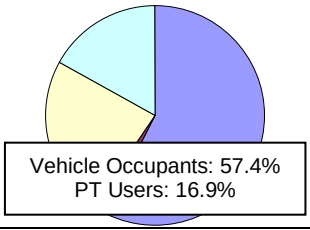
Site	Site Area (ha)	Assumed Development area (m²)	Assumed Trip Generation	
			AM	PM
UEA Triangular Site	5	11,000	301	283
School of Nursing and Midwifery	-	-	22	13
Hospital Parking	0	0	96	50
John Innes Foundation Expansion	11	24,000	102	85
Colney Developments Hethersett Lane	9	21,000	242	197
Hospital Expansion	5	11,000	113	92
Colney Hall	15	28,000	367	261
Contingency Site	14	31,000	394*	310*
Additional Vision	28	62,000	787*	620*
Total	80	188,000	2,424	1,911

*Figures calculated using Cambridge Science Park trip rates of 1.27 and 1.00 trips per 100m² GFA for AM and PM peaks respectively.

5.2 Application of Data from the TRICS Database

Table 5-2 summarises trip rate and modal share data taken from TRICS database version 2005(b) for a selection of relevant land use categories. The key for the modal split pie charts included in **Table 5-2** follows the table. Hotel modal share statistics were not available from TRICS.

Table 5-2 TRICS Data - From TRICS Database Version 2005(b)

Land use	Modal Share		Trip Rate/100 m² GFA			
			AM Peak		PM Peak	
	AM Peak	PM Peak	IN	OUT	IN	OUT
			TOTAL		**TOTAL**	
Cambridge Science Park			1.19	0.08	0.08	0.92
			1.27		**1.00**	
Business / Research Parks			1.38	0.11	0.12	1.05
			1.49		**1.17**	
Hospital with Casualty Dept.			0.89	0.26	0.27	0.69
			1.15		**0.96**	
Offices			1.27	0.17	0.17	1.05
			1.44		**1.22**	
Universities / Colleges			1.52	0.37	0.51	0.66
			1.89		**1.17**	
Hotels			**0.64**		**0.65**	

Key to Modal Split Pie Charts:

- Vehicle Occupants
- Cyclists
- Pedestrians
- Public Transport Users

The modal splits and trip rates shown in **Table 5-2** show significant differences between the travel patterns related to hospitals and universities when compared to those of more typical research park constituents. Notably, both hospitals and universities generate a large proportion of non-car trips. This may not be the case for the NNUH however; as its edge-of-urban location discourages sustainable trips.

5.3 Consideration of Access Strategies

An estimate has been made of vehicular trips prevented from being made to the development by reduction in parking provision.

For the purposes of this stage of assessment, only traffic generated during the AM peak period is considered.

From TRICS data, the car parking at the Cambridge Science Park reaches peak occupancy by 11.30am, of which 40.5% arrive between 0800 and 0900.

The parking standard for B1 development in Norfolk is 1 space per 30 m^2, which is the maximum standard in PPG13. The Cambridge parking standard for this type of development is 1 space per 40 m^2 (2.5 per 100 m^2) including disabled. The Cambridge parking standard for CPZ locations is 1 space per 100 m^2 plus disabled. In the latter case, parking is provided only for servicing and visitors.

This information has been used to estimate AM peak vehicular trip rates for new development in NRP with the intermediate and sustainable access strategies. **Table 5-3** summarises the methodology followed and the resulting distribution of trips between sustainable and vehicular modes for each access strategy. Both arrival and departure trip rates are calculated following the same methodology with the same factors.

Table 5-3 Summary of Vehicular Trip Rates

	Car-dependent (TRICS)			Intermediate Strategy			Sustainable Strategy		
	Spaces per 100m² GFA	AM Trips per 100m² GFA		Spaces per 100m² GFA	AM Trips per 100m² GFA		Spaces per 100m² GFA	AM Trips per 100m² GFA	
		Arr	Dep		Arr	Dep		Arr	Dep
Employees (see notes 1 & 2)	1.375	0.56	0.04	0.5	0.20	0.01	0	0.00	0.00
Servicing/Visitors (based on CPZ parking standard)	1	0.41	0.03	1	0.41	0.03	1	0.41	0.03
Disabled (@ 5% of full standard spaces)	0.125	0.05	0.00	0.125	0.05	0.00	0.125	0.05	0.00
Total parking	2.5 (1 space per 40m²)	-	-	1.625 (1 space per 60m² approx)	-	-	1.125 (1 space per 90m² approx)	-	-
'Kiss and Ride' trips (see notes 3 & 4)		0.17	0.01		0.29	0.02		0.31	0.02
Total Vehicular Trip rate		**1.19**	**0.08**		**0.81**	**0.05**		**0.77**	**0.05**
Residual trips transferred to P&R (see notes 3 & 4)		0.00	0.00		0.14	0.01		0.14	0.01
Residual trips transferred to bus (see notes 3 & 5)		0.00	0.00		0.12	0.01		0.14	0.01
Residual trips transferred to cycle/walk (see notes 3 & 5)		0.00	0.00		0.12	0.01		0.14	0.01
Total TRICS trips		**1.19**	**0.08**		**1.19**	**0.08**		**1.19**	**0.08**

Note 1: Employee parking obtained by deduction of disabled and servicing from full standard.

Note 2: For the intermediate strategy, it is necessary to make an assumption about the amount of employee parking. The Cambridge Science Park Travel Plan sets targets which approximate to a reduction of 20% in car trips by means of a Travel Plan alone, increasing car sharing, cycling and bus usage. This is considered realistic as the basis for an intermediate strategy, reducing employee car parking accordingly.

Note 3: 'Kiss and Ride' is being dropped off at the development by car. With the sustainable strategy, it is assumed that employees who would otherwise park on site will distribute between Park & Ride and additional bus, cycle/walk, and kiss and ride trips in approximately equal proportions. Hence, K&R and residual trips by sustainable modes each increase by 0.56/4 = 0.14.

Note 4: For the intermediate strategy, no allowance has been made for transfer of employee parking to Park and Ride or overspill e.g., on street.

Note 5: With the intermediate strategy, it is assumed that employees who would otherwise park on site, will distribute between additional P&R and bus, cycle/walk and K&R trips in approximately equal proportions. Hence, K&R and residual trips by sustainable modes each increase by (0.56-0.20)/3 = 0.12.

Table 5-4 illustrates estimated modal shares (AM peak) which result from the three strategies. By comparison with modal shares for the NNUH and UEA in **Section 2**, the minimum target for bus use in the intermediate strategy is similar to existing bus usage at UEA, and targets for cycling and walking are limited to a maximum of 15% in the sustainable strategy to take account of the edge-of-urban area location of NRP.

Table 5-4 Approximate Modal Shares for Access Strategies

	Car-dependent (as TRICS for Cambridge Science Park)	**Intermediate** (reduced employee parking)	**Sustainable** (no employee parking except disabled)
Car Occupants	92.6%	75%	60%
Bus Users	2%	15-20%	25-30%
Cyclists & Walkers	5.4%	5-10%	10-15%

Note: Car occupants for the Sustainable and Intermediate are estimated on the basis of reduced parking availability. Proportions for bus users and cyclists are approximate, and likely to fluctuate seasonally.

Tables 5-5 and **5-6** summarise the numbers of car trips generated by development up to 2021 and 2035, respectively, for the range of plot ratios discussed in **Section 3.4** of this report and the access options discussed in **Section 4**. A detailed breakdown for each of the figures in **Tables 5-5** and **5-6** is available in **Appendix D** to this report in **Tables D-1**, **D-2**, **D-3** and **D-4**.

Table 5-5 Trip Generation Matrix

Plot Ratio	Total GFA of development (m²)	Additional AM Peak Trips by 2021		
		Car Dependent Strategy	Intermediate Strategy	Sustainable strategy
16%	86200	1160	990	950
19%	100300	1340	1130	1100
24%	123800	1640	1370	1330
35%	175500	2300	1910	1840

Table 5-6 Trip Generation Matrix

Plot Ratio	Total GFA of development (m²)	Additional AM Peak Trips by 2035		
		Car Dependent Strategy	Intermediate Strategy	Sustainable strategy
16%	121720	1590	1380	1290
19%	142480	1850	1600	1490
24%	177080	2500	1970	1970
35%	253200	3240	2770	2570

Appendix A: Norwich Research Cluster towards a vision for growth, Norwich Research Park Vision Group pamphlet (September 2002)

RESEARCH CLUSTER

towards a vision for growth....

introduction

The Norwich Research Park has the potential to be a key driver of the Norfolk and regional economy. As such, the Park and the area that surrounds it are an extremely significant site for the county as part of a broader Norwich Research Cluster.

The development of the Norwich Research Cluster is seen as a key expansion issue in all the land use planning and economic development policies for the area. These include:

- Regional Planning Guidance
- Regional Economic Strategy
- Norfolk Structure Plan
- South Norfolk Local Plan
- Norwich City Local Plan
- Shaping the Future Economic Development Strategy

This document sets out a draft vision for a 25-year growth strategy for the development of that Research Cluster. It has been developed through a partnership between:

- Norfolk County Council, South Norfolk Council and Norwich City Council
- The University of East Anglia
- The Norfolk and Norwich University Hospital
- The John Innes Centre / Foundation
- The Institute of Food Research
- Invest East of England
- Colney Developments
- Colney Hall Estate
- East of England Development Agency

It is submitted now, as important evidence for the South Norfolk Local Plan Inquiry to consider. This working document will then evolve into wider consultation proposals on the broad concepts for the overall development of the area and key specific issues such as improving access to it. This will then be the subject of wider debate and public consultation.

shared commitment

The public and private sector partners who have developed this draft vision all have a specific interest in the development of the Norwich Research Cluster. They share a determination and belief that the Norwich Research Park will continue its evolution into an economic cluster of the highest quality which will be a catalyst for the future prosperity of Norwich, Norfolk and the Eastern Region.

This draft vision incorporates their initial conceptual thoughts about the framework to support this evolution and development and reflects their determination that the Park's potential for dynamic growth will be realised through collective effort.

In recent years, principal agencies have been criticised for not having developed a shared vision for such a significant area to provide a longer-term context for developing the potential of the Park with its consequent economic benefits. This work is now taking place and is brought forward at this time as evidence that provides important contextual information for discussions on the South Norfolk Local Plan.

the Research Park now

Norwich Research Park is one of Europe's largest and most successful single-site concentrations of research and development in the areas of plants, food, microbes, diet and health, environment and information systems.

The Park includes:

- The University of East Anglia
- The John Innes Centre for research and training in plant and microbial sciences.
- The Sainsbury Laboratory for plant pathology and molecular biology.
- The Institute of Food Research.
- University Hospital which has undergraduate teaching status.
- A new Genome Centre linked to the JIC incorporating the Norwich Bioincubator which provides laboratory space for new businesses
- Construction of an IT Innovation Centre linked to the UEA which should commence in 2002.

Excluding the UEA and the hospital, there is already a research cluster of some 50,000 square metres of buildings.

drivers for change

We consider here the drivers for change and development, and why more land is needed. Demand for space at the Research Park will come from:

1. The expansion of existing organisations at the Park:

- UEA – Over the next 5 years, planned activity at the UEA will take up available land within the campus. Further expansion will require additional land.

- John Innes Centre – A new Sainsbury Laboratory of 3700 square metres is proposed. Other opportunities for research collaborations are being sought actively and will require additional floor space.

- Institute of Food Research – The incorporation of the former British Sugar Technical Centre building into IFR now offers significant opportunity for future potential growth.

- Norfolk & Norwich University Hospital – The new hospital is running out of vacant development land and there are already hospital related projects that can be identified that will require an additional 17300sq.m. of floorspace up to 2006 and a further 12,500sq. m. beyond this time. These figures do not include associated land take required for amenity reasons or car parking. It is probable however that this identified scale of development will be the minimum requirement as there are many other factors, and particularly recent Government initiatives regarding increased health care spending, that could generate significant additional development at the hospital in the future.

2.The creation of new businesses involved in the commercial development of research undertaken by organisations at the Park, which is activity currently "lost" to Norfolk:

- The Norwich Bio-incubator, which forms part of the new Genome Centre at the John Innes Centre, provides laboratory space to accommodate new businesses linked to plant and biosciences.

- The UEA is proposing an innovation incubator centre to accommodate new businesses involved in IT and media-related activity.

- Both developments will be accompanied by high-quality back-up and business support services to enhance the prospects of business survival and growth.

- The second and third phase expansion of businesses graduating from the incubator facilities.

3. The attraction of inward investment in the form of new businesses involved in activities related to the specialisms of the Research Park. Marketing campaigns targeted at individual "best prospect" companies are being implemented in association with Invest East of England – the regional inward investment agency.

4. The possible attraction of other major organisations in the fields of research or activity complementary to the specialisms of the Park. Such users could require sites of 10 hectare-plus, which are readily available and served by high-quality infrastructure.

5. Support activities related to the core activities of the Park that will enhance its quality and marketability. This could include meeting and leisure facilities and various types of visitor accommodation.

To respond to such potential demand, the Rese
that land allocations should be at the upper en
next to the existing centres can be safeguard
between scientists.:

the Vision for 2025

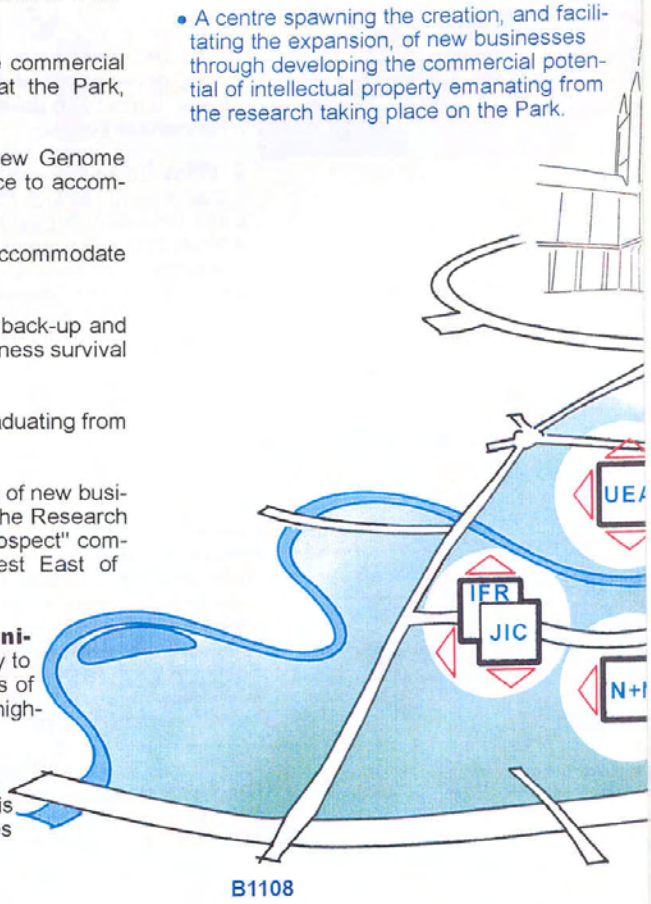
This developing vision is about creating the lon
of the Research Cluster, focused on the Rese
balance of potential development with the impo
ronment and providing the necessary infrastruc

By 2025, Norwich Research Cluster wi

- A world-renowned centre for research and development in plant, microbial and food science, health and life sciences, environmental sciences, information technology and creative industries.

- A high-quality, accessible and visible development in a parkland setting with the highest environmental standards of landscaping and building construction.

- A centre spawning the creation, and facilitating the expansion, of new businesses through developing the commercial potential of intellectual property emanating from the research taking place on the Park.



towards a vision for growth.....

arch Park requires flexible capacity. This means
l of potential demand. This will ensure that land
ed for activities requiring the closest exchange

-term framework needed to guide an expansion
arch Park. It recognises the need to ensure the
tant needs of protecting and enhancing the envi-
ture.

ll be:

- A location for inward investment from business new to the area from the UK and overseas, including major companies or organisations engaged in activities compatible with the ethos of the Park.
- A centre operating within a network of high-quality and accessible business support including access to locally based venture capitalists.
- A development providing access to a comprehensive range of ancillary facilities which make the Park a workplace of the highest quality.

how this vision compares

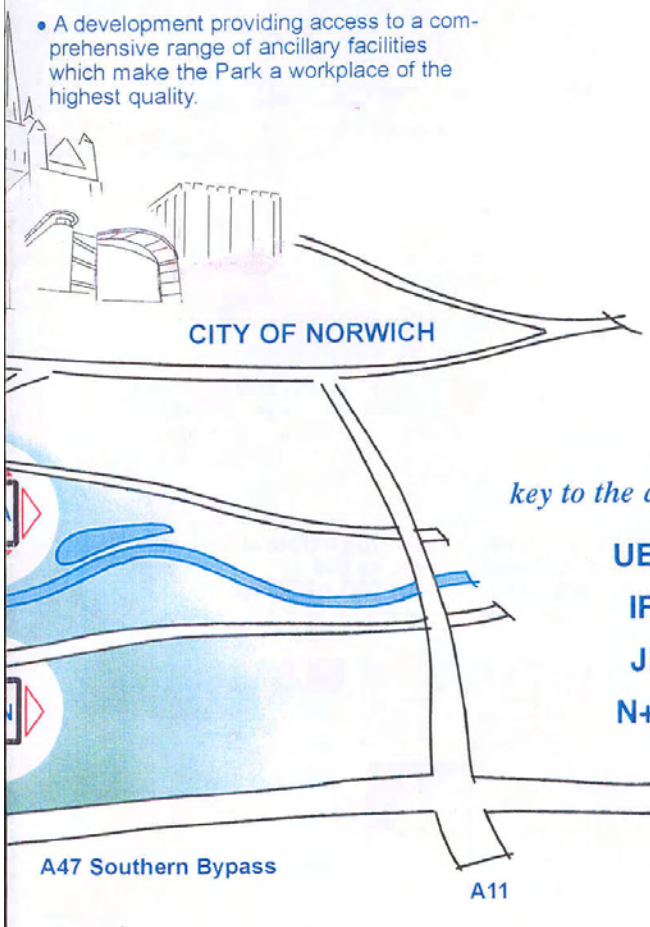
The closest comparison to the Norwich Research Park is the development of Research/Science Parks and related Business Parks in the Cambridge area.

There are 10 Parks in the Cambridge area specialising in accommodation for research and science activity. These comprise a total of 187 hectares of land, which could accommodate 354,000 square metres of floor space. (This excludes space for single-user research establishments). There is a further 55 hectares of general office park space, which could accommodate 172,000 square metres of floor space.

In the 15 years to 2000, nearly 300,000 square metres of floor space has been completed in the provision of both specialist property and good-quality space suitable for use by research-related and high-tech firms. Development on the specialist research/science parks over the same period amounts to some 170,000 square metres.

The rate of development of employment land in the 1990s in the South Cambridgeshire District Council area, where the majority of the Research/Science Parks are located, has been almost 10 hectares per year. The majority of this land will have been developed for research/high-tech business activity.

This proposed vision for growth of the Norwich Research Cluster would complement activity in the Cambridge area by focusing on the specialisms of the organisations already based at the Park. It also has the potential to take some of the pressure away from the "overheating" Cambridge economy.



key to the diagram

UEA The University of East Anglia
IFR Institute of Food Research
JIC John Innes Centre
N+N The Norfolk and Norwich University Hospital

NORWICH RESEARCH CLUSTER

towards a vision for growth.....

land required?

Possible extent of Research Cluster – the scale of land required in the area

The cluster will require adequate land to be made available to reach its full potential and bring the benefits we seek for the Norfolk and regional economy.

The key drivers of new development have provided estimates of anticipated growth in the short and medium-term that would require land outside the existing university, hospital, and science campuses.

There are obviously uncertainties associated with growth beyond 2010,but assumptions have been made based on best present estimates.

Development away from the core needs to be at a low-density to achieve the quality of landscaping which is desirable and to ensure that the importance of protecting and enhancing the landscape in the Yare river valley and adjoining the Southern Bypass is recognised. There is also a need for sufficient land to allow its release to be managed in such a way that it does not prejudice the longer-term expansion needs of organisations already at the Park and related activities. This means that sufficient land needs to be made available for development to ensure that the area can accommodate the potential demand for space whilst achieving a high quality of development.

Although demand is difficult to quantify with certainty and will be uneven over the next 20 years, this draft vision is based on the following assumptions for land requirements:

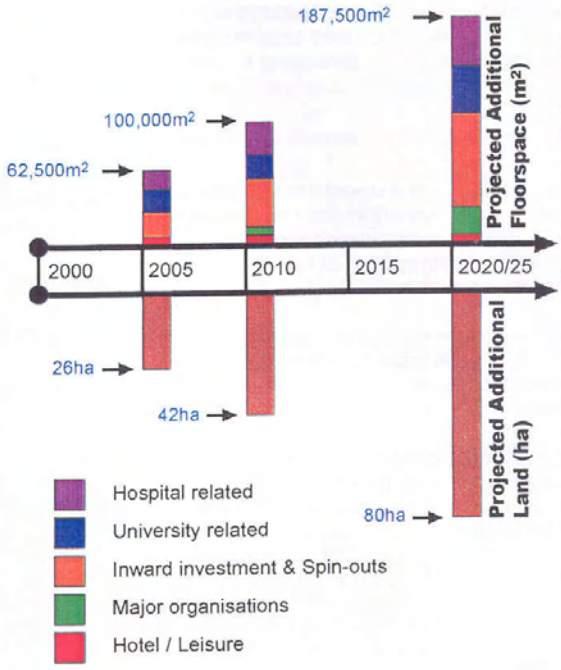
Expansion of existing organisations	**22** hectares
Sites for major organisations attracted to the Park	**16** hectares
Land to accommodate new businesses and their expansion and inward investors attracted to the Park.	**40** hectares

(This assumes a rate of development of 2.0 hectares/year. This is 20% of the rate of take-up of employment land in the Cambridge area during the 1990s and also assumes a relatively low density of development in a landscaped setting.)

Sites for related facilities (e.g. hotel/leisure)	**2** hectares
Total requirement for land	**80 hectares**

barchart of predicted growth

The key drivers of new development have provided estimates of anticipated short-, & medium-term growth which would require land outside the existing University, Hospital, and Science campuses. There are obviously uncertainties with growth beyond 2010 but assumptions have been made on best present estimates.



this vision

This vision will be further refined over the next 6 months, particularly as access issues become clearer, and will be the subject of wide consultation. It will be used to feed into and inform statutory Structure and Local Plan processes and provide a basis for guiding investment in the high-quality infrastructure necessary to serve the expansion of the Park.

**This document has been produced by the partners identified below.
Any queries should be addressed to John Norton at the
Norfolk County Council Economic Development Unit tel. 01603 - 223142.**

The Norfolk and Norwich University Hospital · colney hall estate · NORFOLK COUNTY COUNCIL · EEDA East of England Development Agency · JOHN INNES CENTRE · SOUTH NORFOLK COUNCIL · UEA NORWICH · NORWICH City Council · Colney Developments · ifr · investeastofengland

Taken from an aerial photograph reprinted with the kind permission of the John Innes Centre

Appendix B: A Background Note on Potential Development Requirements, Land Use Consultants (June 2005)

NORWICH RESEARCH PARK
Background Note on Potential Development Requirements

1. Introduction

1.1. This note has been prepared by Land Use Consultants (LUC) - who have been appointed to prepare the Development Brief for the Norwich Research Park (NRP) - as an input to the Transport Assessment of the NRP currently being carried out by Mott MacDonald on behalf of the County Council as the transport authority for this area.

1.2. The NRP lies at the south-west limit of Norwich, straddling the River Yare which defines the administrative boundary between Norwich City and South Norfolk District Council.

1.3. It comprises major existing well-established institutions such as the University of East Anglia (UEA), the John Innes Centre (JIC) and the Institute of Food Research (IFR), to which has recently been added the Norfolk and Norwich University Hospital (NNUH).

1.4. While provision has been made in the South Norfolk Local Plan for land to be allocated for further NRP development, there is some confusion as to the total area to be provided, and its justification. This note seeks to clarify this issue as far as possible.

1.5. The principal documents to which reference has been made in preparing this note are:

- *'Norwich Research Cluster – towards a vision for growth'*, a pamphlet prepared by the County economic development officer on behalf of a partnership of private and public sector interests (the Vision Group) which was included in a public consultation exercise carried out by the County Council on access options dated September 2002.
- The Inspector's report on the South Norfolk Local Plan which was adopted in March 2003.

2. Existing and Proposed Development

2.1. Existing NRP developments as at May 2005 comprise (see also Plan A):

	Site Area	Building floor area	Plot area ratio
University of East Anglia (UEA)	30.6ha		
John Innes Centre (JIC)	7.3ha	(to be completed)	
Institute of Food Research (IFR)	7.7ha		
UEA Triangle site (with permission	3.8ha		

but not yet developed)		
Norfolk and Norwich University Hospital (NNUH)	26.7ha	
Total	**76.1ha/188 acres**	**m^2**

2.2. In addition to this area of existing development, the South Norfolk Local Plan allocates a further 35ha of land for NRP development as covered by Policy COL1, plus a 14ha contingency reserve for further NRP development as covered by Policy COL2, and 5ha for hospital expansion under Policy COL4 (see Plan B). These allocations may be summarised as follows:

COL1 land adjoining JIC	20.0ha
COL1 land at Colney Hall (of the 15ha allocated it is envisaged that only 6-8ha would be suitable for development)	15.0ha
COL2 to the west of Hethersett Lane	14.0ha
COL4 to the east of Hethersett Lane adjacent to the Hospital	5.0ha
Total	**54.0ha/133 acres**

3. Views of the Vision Group

3.1. The Vision Group comprises:

- Norfolk County Council, South Norfolk Council, Norwich City Council
- The University of East Anglia
- The Norfolk and Norwich University Hospital
- The John Innes Centre/Foundation
- The Institute of Food Research
- Invest East of England
- Colney Developments
- Colney Hall Estate
- East of England Development Agency.

3.2. In addition to the land already occupied by existing NRP development (i.e. 76.1ha), the Vision Group envisaged that by 2020/25 there would be a requirement for an additional 80ha of development land made up as follows:

(i)	Expansion of existing organisations	22.0ha
(ii)	Sites for major organisations attracted to the Park	16.0ha
(iii)	Land to accommodate new businesses and their expansion and inward investors attracted to the Park	40.0ha
(iv)	Sites for related facilities (e.g. hotel/leisure)	2.0ha
	Total	**80.0ha/198 acres**

3.3. If account is taken of the pattern of development and land ownership (see Plan C), it can be seen that the categories outlined above can be sub-divided as follows:

(i)	Expansion of existing organisations (22ha)	
	- UEA triangle site (to north east of IFR)	3.8ha
	- JIC expansion land (part of COL1)	11.4ha
	- NNUH expansion (COL4)	5.0ha
	Sub-total	20.2ha
(ii)	Sites for major organisations attracted to the Park (16ha)	
	- COL2 land (owned by Colney Developments)	14.0ha
(iii)	Land to accommodate new businesses/inward investors to the Park (40ha)	8.6ha
	- COL1 land adjacent to JIC (owned by Colney Developments)	15.0ha
	- COL1 land (owned by Colney Hall Estate)	
	Sub-total	23.6ha
(iv)	Sites for related facilities (2ha)	
	- yet to be allocated	-
	Total	**57.8ha/143 acres**

3.4. From this it may be concluded that the following areas of land have yet to be identified if the Vision Group's target of 80ha is to be achieved:

(i)	Expansion of existing organisations	1.8ha
(ii)	Sites for major organisations attracted to the Park	2.0ha
(iii)	Land to accommodate new businesses/inward investors to the Park	16.4ha
(iv)	Sites for related facilities (e.g. hotel/leisure)	2.0ha
	Total	**22.2ha/55 acres**

3.5. Although each of the categories of land defined by the Vision Group has a clear purpose, the area of land yet to be allocated (22.2ha/55 acres) is by any standard fairly large. It is important therefore to ensure that the basis on which the amount of land identified for development is fully justified, not least as it will determine the level of infrastructure investment that will be required, including the need for additional transport investment.

3.6. As set out on the final page of the pamphlet, the assumed rate of development for the NRP is given at 2.0ha/year (i.e. 50ha over a 25 year period). We have compared this figure with information collected from a number of research parks around the country, from which we draw the following conclusions:

Cambridge Science Park

- total developable area	61.5ha
- total floor area	145,000m²
- of which 100,000m² completed in 33 year period 1971-2004	3,030m²/year
- plot ratio	16%
- equivalent development land/year	1.9ha/year

Oxford Science Park

- total developable area	30.4ha
- total floor area	65,000m²
- of which 40,000m² completed in 15 year period 1989-2004	2,666m²/year
- plot ratio	21%
- equivalent development land/year	1.27ha/year

Granta Park (to north of Cambridge)

- total developable area	34.8ha
- total floor area	70,000m²
- of which 57,600m² completed in 9 year period 1996-2004	6,400m²/year
- plot ratio	20%
- equivalent development land/year	3.2ha/year

Edinburgh Medi-Park

- total developable area	26.7ha
- total floor area	133,500m²
- construction not yet commenced	N/A
- plot ratio	50%
- equivalent development land/year	N/A

3.7. While the rate of development on these different research parks averages about 2.1ha/year (ranging from 1.27ha/year at the Oxford Science Park to 3.2ha/year at Granta Park), it would seem a fairly bold move to assume that the development of the NRP would equate with these better known and well established competitors, not least since there has been no development of the NRP land allocated in the Local Plan since it was first identified in 2002 other than the Genome Centre (c2ha) forming part of JIC. It is therefore recommended that the figure of 2ha/year be treated as an upper bound, with consideration also being given to a figure half this rate (i.e. 1ha/year) as a more prudent projection. On this basis, the allocation of additional land would need

to be c.25ha over the next 25 years. Even allowing for the 16ha site to be allocated in addition as a contingency for a single large user (i.e. 25ha + 16ha = 41ha) this is a long way short of the total allocation of 80ha identified by the Vision. Group.

4. Conclusions and Recommendations

4.1. The Norwich Research Park has the great advantage that its core partners – UEA, JIC, IFR – are well established and have been able to accommodate their requirements for new development on land within their ownership adjoining existing development. This has been true for JIC, for example, with the new Genome Centre, and for IFR with their occupation of the British Sugar Technical Centre.

4.2. However the position of UEA and NNUH is more pressing in that both organisations are expanding rapidly and are tight for space. From UEA's point of view this means they are actively investigating opportunities to cross over to the western side of the Valley to occupy their triangle site or other land in their ownership, while NNUH have the option of expanding onto the allocated COL4 land provided terms can be agreed with the landowner, Colney Developments. It may be anticipated, therefore, that a first phase of development would need to focus on the transport implications of bringing these two sites into active use, coupled with further incremental growth of the JIC COL1 site.

4.3. Colney Hall Estate is also actively considering how its COL1 site might be developed, including opportunities for a relatively high degree of transport self-containment (i.e. live-work on the same site). While these investigations are at an early stage of design development, it would also make sense for this site to be considered as part of the early phase of development.

4.4. This then leaves the remainder of the COL1 land (in Colney Developments ownership), and the COL2 site (also in Colney Developments ownership) which is to be retained as a reserve for a single large occupier, to be developed in the longer-term. It is very doubtful whether any land beyond these allocations will be required over the next 25 years. This is not to suggest that further development of the NRP should be ignored; rather that the requirements to accommodate new development on the allocated land should be accorded a higher priority.

4.5. It is therefore recommended that the Transport Assessment should focus in the first instance on what transport opportunities exist to service: the development of UEA land; further development of the COL1 area in JIC ownership; expansion of the Hospital; and the Colney Hall COL1 site. Thereafter the Assessment should identify what thresholds of transport investment would seem most feasible in order to facilitate the development of the remaining COL1 and COL2 allocated land, plus the requirement for additional land to realise the Vision Group's aspirations, where fully justified.

4.6. It is anticipated that the results of this Transport Assessment will form an important input into the next review of the Local Plans for both South Norfolk and Norwich in so far as they relate to the future development of the NRP.

Land Use Consultants
3 June, 2005
P:\ Norwich\MM Projects\215773 - Norfolk CC Transportation 3\215773-IA-01 N Research Park transport assessment\Docs\ Report Appendices\ML notes 030605.doc

Appendix C: Access Strategy Elements

Table C-1 Risk Assessment

Element	Possible Measures / Problems	LIK	EFF	Rating (1 – 9)	Order of Cost
Provision of high standard walking and cycle routes to residential catchments	Network to Earlham, W Earlham, Bowthorpe and Cringleford (as proposed for B1108 multi-modal scheme) Complete B1108 cycle route and widen footway/cycleway over river bridge Improved crossing at Wilberforce Rd / Watton Rd Improve Hethersett Lane	H	M	6	£0.5m
Provision of high quality internal walking and cycle network within the NRP	Well connected network on improved roads and within developments Achievable, subject to support of NNUH for new rear access for sustainable transport/emergencies and connection to existing cross valley path to UEA	H	M	6	Developer funded within developments
Infrastructure and support for bus services through NRP	Selective vehicle detection (bus priority) at Colney Lane junction University Drive bus contraflow, or Bluebell Road bus gate Requires traffic regulation orders and support of UEA	M	M	4	£0.5m
Bus Lanes	Construction of a bus lane on the B1108	L/M	M	2-4	£2m

Element	Possible Measures / Problems	LIK	EFF	Rating (1 – 9)	Order of Cost
Improved sustainable transport links with UEA	Range of measures from provision of dedicated shuttle service to new cross valley bus corridor	L/M	L/M	2/4	£2m
Additional capacity of bus services	More buses on route 25 Depends on commercial operator or service support through NCC or developer agreements	M	H	6	Nil if commercial
Increased capacity of Park & Ride sites and new/enhanced services to NRP	Enlarge Thickthorn and/or Costessey P&R sites Land and developer contribution required Services depend on commercial operator or service support through NCC or developer agreements	L	H	3	£3m
Dedicated bus services ('works' buses)	Private contracts by NRP developers. Require binding obligation to operate within Travel Plans and planning agreements	L	M	2	Developer funded £0.5m
Whole route bus priority measures	Remove bottlenecks on route 25 Requires measures as for bus services through NRP plus bus priority at Earlham Rd	M	M	4	£1.5m

Element	Possible Measures / Problems	LIK	EFF	Rating (1 – 9)	Order of Cost
New bus only rear (west) link to the NNUH	Widen current cycle and walking path to accommodate bus lane	M	M	4	£0.5m
Restricted car access to NRP (parking standards and access control)	Parking for disabled, servicing and visitors only. Access barriers at new developments. Reduced parking standards Possibly unpopular with developers. Require binding obligation to maintain within Travel Plans and planning agreements	L/M	H/M	3 or 4	Nil
External parking restrictions everywhere within 800 metres	Traffic regulation orders - e.g., no waiting before 9.30am, 2 hour limited waiting or Controlled Parking Zone (CPZ) - on all existing and new roads within ½ hour walking distance) Affects amenity of existing residents and influences layout of new un-built residential developments. Remote from other parking enforcement areas. Unlikely to succeed without local support.	L	H	3	£0.1m
Limited local road improvements (programmed and safety)	B1108 single 2 lane improvement (committed) Hethersett Lane improvement (committed)	H	L	3	£1m - £3m (subject to extent)

Element	Possible Measures / Problems	LIK	EFF	Rating (1 – 9)	Order of Cost
New Road Infrastructure	New 6.5m link road between the B1108 and Hethersett Lane	H	H	9	£1.6m
	New 6.5m link road between Hethersett Lane and Colney Lane	L	M	2	£1.3m
	Signalisation of A47/B1108 roundabout	M	M	4	£0.5m
	Additional eastbound lane on the B1108 between the A47 and Colney hall Junction	L	M	2	£0.9m
	New 2nd vehicular access to Colney Hall	L	L	1	£0.6m
	Closure of B1108 / Hethersett Lane junction to car traffic	H	H	9	£0.1m
	Signalisation of junction at link road with B1108 or similar access connection.	H	H	9	£0.5m

Appendix D: Trip Generation Variation with Plot Ratio

Table D1 Trip Generation with a plot ratio = 16%

Access to existing network	Site	Site Area (ha)	GFA (m^2)	Car dependent strategy				Intermediate strategy				Sustainable strategy			
				AM trip rates		AM trips		AM trip rates		AM trips		AM trip rates		AM trips	
				Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Colney Lane	UEA Triangle	3.8	11000	1.52	0.37	167	41	1.52	0.37	167	41	1.52	0.37	167	41
	Hospital expansion	5.0	8000	1.19	0.08	95	6	0.81	0.05	65	4	0.77	0.05	62	4
Hethersett Lane	JIC expansion	11.4	18240	1.19	0.08	217	15	0.81	0.05	148	9	0.77	0.05	140	9
	NRP new small orgs	8.6	13760	1.19	0.08	164	11	0.81	0.05	112	7	0.77	0.05	106	7
B1108 Watton Road	NRP new major orgs	14.0	22400	1.19	0.08	267	18	0.81	0.05	181	11	0.77	0.05	172	11
	Colney Hall	15.0	12800	1.19	0.08	152	10	0.81	0.05	104	6	0.77	0.05	99	6
Park & Ride	All NRP	54.0	86400	0.00	0.00	0	0	0.14	0.01	121	9	0.14	0.01	121	9
Total (2021)		**57.8**	**86200**			**1062**	**101**			**898**	**87**			**867**	**87**
	Remaining Vision	20.2	32320	1.19	0.08	385	26	0.95	0.06	307	19	0.77	0.05	249	16
	Related facilities	2.0	3200	0.29	0.35	9	11	0.29	0.35	9	11	0.29	0.35	9	11
Park & Ride	Vision	20.2	32320	0.00	0.00	0	0	0.14	0.01	45	3	0.14	0.01	45	3
Total (2035)		**80.0**	**121720**			**1456**	**138**			**1259**	**120**			**1170**	**117**

Table D2 Trip Generation with a plot ratio = 19%

Access to existing network	Site	Site Area (ha)	GFA (m^2)	Car dependent strategy				Intermediate strategy				Sustainable strategy			
				AM trip rates		AM trips		AM trip rates		AM trips		AM trip rates		AM trips	
				Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Colney Lane	UEA Triangle	3.8	11000	1.52	0.37	167	41	1.52	0.37	167	41	1.52	0.37	167	41
	Hospital expansion	5.0	9500	1.19	0.08	113	8	0.81	0.05	77	5	0.77	0.05	73	5
Hethersett Lane	JIC expansion	11.4	21660	1.19	0.08	258	17	0.81	0.05	175	11	0.77	0.05	167	11
	NRP new small orgs	8.6	16340	1.19	0.08	194	13	0.81	0.05	132	8	0.77	0.05	126	8
B1108 Watton Road	NRP new major orgs	14.0	26600	1.19	0.08	317	21	0.81	0.05	215	13	0.77	0.05	205	13
	Colney Hall	15.0	15200	1.19	0.08	181	12	0.81	0.05	123	8	0.77	0.05	117	8
Park & Ride	All NRP	54.0	102600	0.00	0.00	0	0	0.14	0.01	144	10	0.14	0.01	144	10
Total (2021)		**57.8**	**100300**			**1230**	**112**			**1033**	**96**			**999**	**96**
	Remaining Vision	20.2	38380	1.19	0.08	457	31	0.95	0.06	365	23	0.77	0.05	296	19
	Related facilities	2.0	3800	0.29	0.35	11	13	0.29	0.35	11	13	0.29	0.35	11	13
Park & Ride	Vision	20.2	38380	0	0	0	0	0.14	0.01	54	4	0.14	0.01	54	4
Total (2035)		**80.0**	**142480**			**1698**	**156**			**1463**	**136**			**1360**	**132**

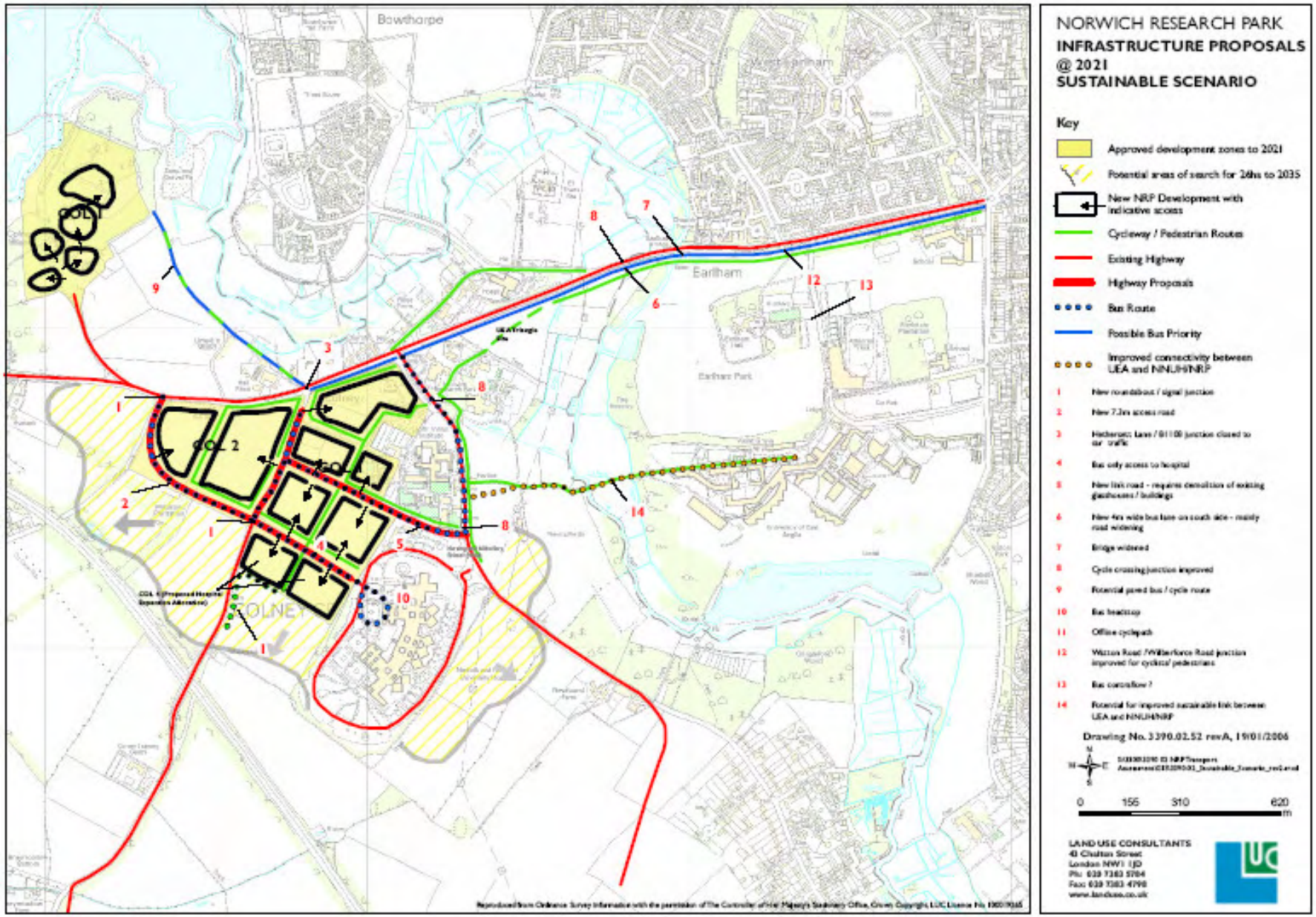
Table D3 Trip Generation with a plot ratio = 24%

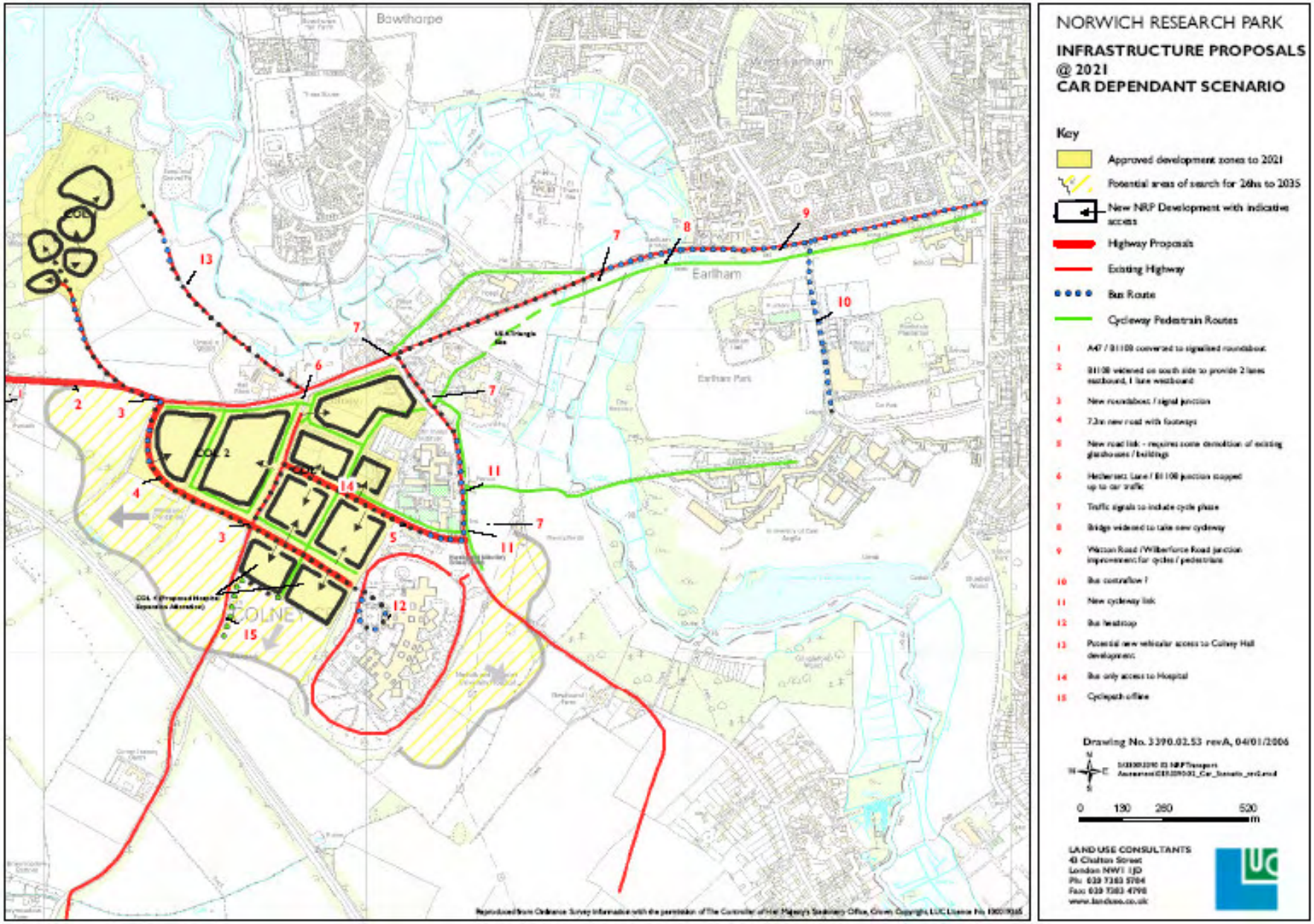
Access to existing network	Site	Site Area (ha)	GFA (m^2)	Car dependent strategy				Intermediate strategy				Sustainable strategy			
				AM trip rates		AM trips		AM trip rates		AM trips		AM trip rates		AM trips	
				Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Colney Lane	UEA Triangle	3.8	11000	1.52	0.37	167	41	1.52	0.37	167	41	1.52	0.37	167	41
	Hospital expansion	5.0	12000	1.19	0.08	143	10	0.81	0.05	97	6	0.77	0.05	92	6
Hethersett Lane	JIC expansion	11.4	27360	1.19	0.08	326	22	0.81	0.05	222	14	0.77	0.05	211	14
	NRP new small orgs	8.6	20640	1.19	0.08	246	17	0.81	0.05	167	10	0.77	0.05	159	10
B1108 Watton Road	NRP new major orgs	14.0	33600	1.19	0.08	400	27	0.81	0.05	272	17	0.77	0.05	259	17
	Colney Hall	15.0	19200	1.19	0.08	228	15	0.81	0.05	156	10	0.77	0.05	148	10
Park & Ride	All NRP	54.0	129600	0.00	0.00	0	0	0.14	0.01	181	13	0.14	0.01	181	13
Total (2021)		**57.8**	**123800**			**1510**	**132**			**1262**	**111**			**1217**	**111**
	Remaining Vision	20.2	48480	1.19	0.08	577	39	0.95	0.06	461	29	0.77	0.05	373	24
	Related facilities	2.0	4800	0.29	0.35	14	17	0.29	0.35	14	17	0.29	0.35	14	17
Park & Ride	Vision	20.2	48480	0	0	0	0	0.14	0.01	68	5	0.14	0.01	68	5
Total (2035)		**80.0**	**177080**			**2300**	**200**			**1805**	**162**			**1802**	**164**

Table D4 Trip Generation with a plot ratio = 35%

Access to existing network	Site	Site Area (ha)	GFA (m^2)	Car dependent strategy				Intermediate strategy				Sustainable strategy			
				AM trip rates		AM trips		AM trip rates		AM trips		AM trip rates		AM trips	
				Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Colney Lane	UEA Triangle	3.8	11000	1.52	0.37	167	41	1.52	0.37	167	41	1.52	0.37	167	41
	Hospital expansion	5.0	17500	1.19	0.08	208	14	0.81	0.05	142	9	0.77	0.05	135	9
Hethersett Lane	JIC expansion	11.4	39900	1.19	0.08	475	32	0.81	0.05	323	20	0.77	0.05	307	20
	NRP new small orgs	8.6	30100	1.19	0.08	358	24	0.81	0.05	244	15	0.77	0.05	232	15
B1108 Watton Road	NRP new major orgs	14.0	49000	1.19	0.08	583	39	0.81	0.05	397	25	0.77	0.05	377	25
	Colney Hall	15	28000	1.19	0.08	333	22	0.81	0.05	227	14	0.77	0.05	216	14
Park & Ride	All NRP	54.0	189000	0.00	0.00	0	0	0.14	0.01	265	19	0.14	0.01	265	19
Total (2021)		**57.8**	**175500**			**2124**	**172**			**1765**	**143**			**1699**	**143**
	Remaining Vision	20.2	70700	1.19	0.08	841	57	0.95	0.06	672	42	0.77	0.05	544	35
	Related facilities	2.0	7000	0.29	0.35	20	25	0.29	0.35	20	25	0.29	0.35	20	25
Park & Ride	Vision	20.2	70700	0	0	0	0	0.14	0.01	99	7	0.14	0.01	99	7
Total (2035)		**80.0**	**253200**			**2985**	**254**			**2556**	**217**			**2362**	**210**

Appendix E: Infrastructure Proposals


Bowthorpe
Earlham
Colney
NORWICH RESEARCH PARK
INFRASTRUCTURE PROPOSALS
@ 2021
SUSTAINABLE SCENARIO
Key
Approved development zones to 2021
Potential areas of search for 16ha to 2035
New NRP Development with indicative access
Cycleway / Pedestrian Routes
Existing Highway
Highway Proposals
Bus Route
Possible Bus Priority
Improved connectivity between UEA and NNUH/NRP
1 New roundabout / signal junction
2 New 7.3m access road
3 Hethersett Lane / B1108 junction closed to car traffic
4 Bus only access to hospital
5 New link road - requires demolition of existing glasshouses / buildings
6 New 4m wide bus lane on south side - mainly road widening
7 Bridge widened
8 Cycle crossing junction improved
9 Potential paved bus / cycle route
10 Bus headstop
11 Offline cyclepath
12 Watton Road /Wilberforce Road junction improved for cyclists/ pedestrians
13 Bus contraflow ?
14 Potential for improved sustainable link between UEA and NNUH/NRP
Drawing No. 3390.02.52 revA, 19/01/2006
0 155 310 620
m
LAND USE CONSULTANTS
40 Chalton Street
London NW1 1JD
Ph: 020 7383 5784
Fax: 020 7383 4798
www.landuse.co.uk


Bowthorpe
Earlham
COLNEY
NORWICH RESEARCH PARK
INFRASTRUCTURE PROPOSALS
@ 2021
CAR DEPENDANT SCENARIO
Key
Approved development zones to 2021
Potential areas of search for 26hs to 2035
New NRP Development with indicative access
Highway Proposals
Existing Highway
Bus Route
Cycleway Pedestrain Routes
1 A47 / B1108 converted to signalled roundabout
2 B1108 widened on south side to provide 2 lanes eastbound, 1 lane westbound
3 New roundabout / signal junction
4 72m new road with footways
5 New road link - requires some demolition of existing glasshouses / buildings
6 Hethersett Lane / B1108 junction stopped up to car traffic
7 Traffic signals to include cycle phase
8 Bridge widened to take new cycleway
9 Watson Road / Wilberforce Road junction improvement for cycles / pedestrians
10 Bus contraflow !
11 New cycleway link
12 Bus headstop
13 Potential new vehicular access to Colney Hall development
14 Bus only access to Hospital
15 Cyclepath offline
Drawing No. 3390.02.53 rev.A, 04/01/2006
0 140 280 520 m
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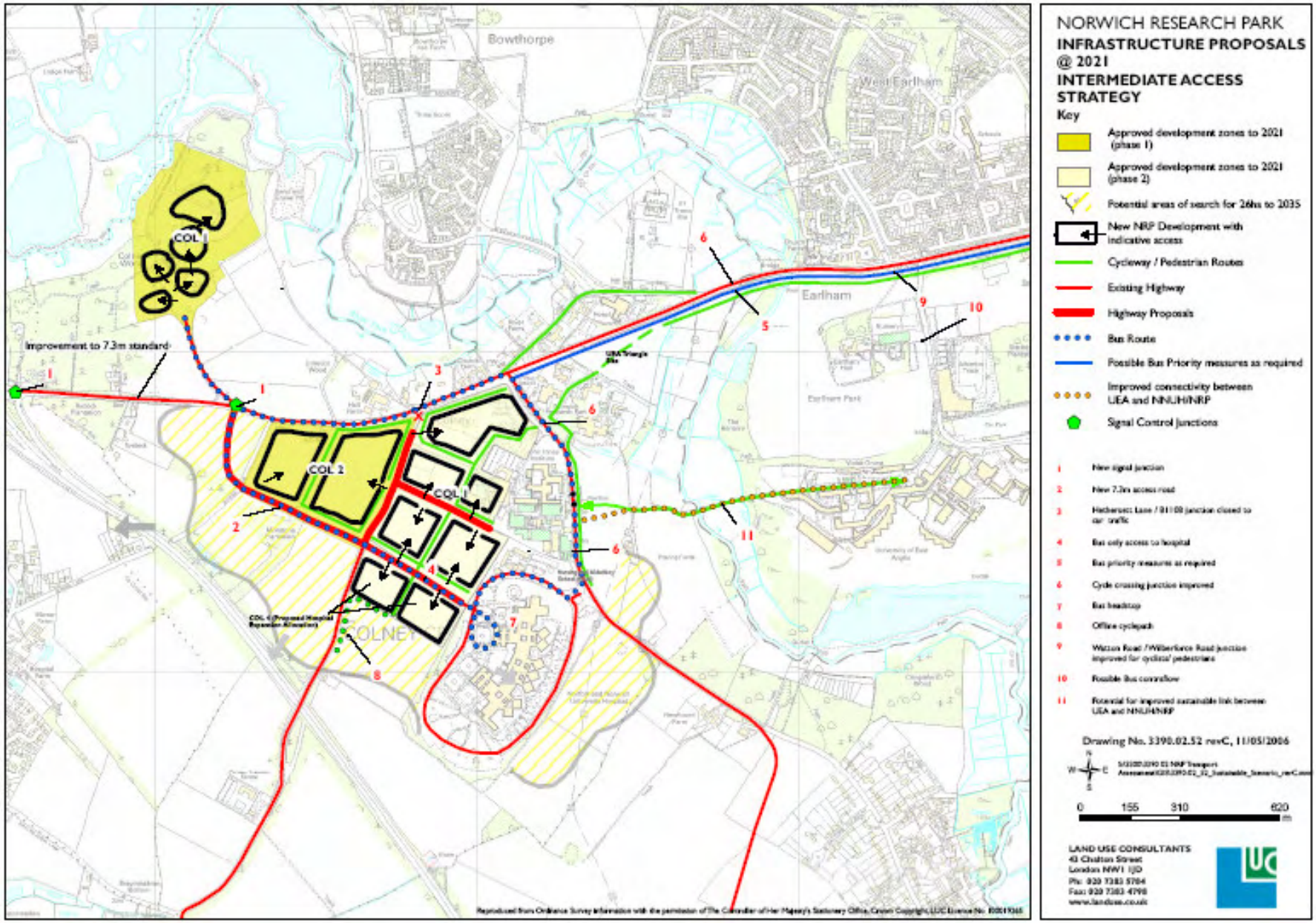
Bowthorpe
West Earlham
Earlham
COL 1
COL 2
COL 3
COL 4 (Proposed Hospital Expansion Allocation)
COLNEY
Improvement to 7.3m standard
1
2
3
4
5
6
7
8
9
10
11
NORWICH RESEARCH PARK
INFRASTRUCTURE PROPOSALS @ 2021
INTERMEDIATE ACCESS STRATEGY
Key
Approved development zones to 2021 (phase 1)
Approved development zones to 2021 (phase 2)
Potential areas of search for 26ha to 2035
New NRP Development with indicative access
Cycleway / Pedestrian Routes
Existing Highway
Highway Proposals
Bus Route
Possible Bus Priority measures as required
Improved connectivity between UEA and NNUH/NRP
Signal Control Junctions
1 New signal junction
2 New 7.3m access road
3 Hethersett Lane / B1108 junction closed to car traffic
4 Bus only access to hospital
5 Bus priority measures as required
6 Cycle crossing junction improved
7 Bus headstop
8 Offline cyclepath
9 Watton Road / Willerforce Road junction improved for cyclist/ pedestrians
10 Possible Bus contraflow
11 Potential for improved sustainable link between UEA and NNUH/NRP
Drawing No. 3390.02.52 revC, 11/05/2006
0 155 310 620
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