

### Summary of Recommendations

- Tackling climate change and reducing energy consumption must become the guiding principles for all transport and town planning in Oxford. Addressing these challenges will also bring benefits to health and quality of life.
- Oxford's failure to achieve National Air Quality Objectives is a threat to public health. The Low Emission Zone will help in some places, but will not solve the problem. More urgent action to reduce traffic pollution is needed.
- Extending the pedestrianised areas of the City Centre as proposed in *Transform Oxford* is a useful first step, which could be strengthened by the introduction of a carfree residential population to the pedestrianised areas
- The principles of *Transform Oxford* should also be applied to District Centres such as Cowley, Headington and Summertown. Although complete pedestrianisation may not be possible, the fundamental problem of traffic volumes must be addressed.
- Facilities for cyclists across the City are generally poor. Oxford should aim to match Dutch standards of comprehensive, continuous cycle networks which give an advantage in time and convenience over the private car.
- Selective closures of roads to through traffic – already applied in many places around the City – can be a powerful tool for reducing car dependency.
- Oxford is reaching the limits of what can be achieved with conventional buses: a public transport strategy for the future will need to offer more competitive alternatives to the car, such as trams, light rail, and new rail stations.
- Housing and planning policy should encourage urban intensification within Oxford's existing boundaries.
- European-style carfree developments and carfree neighbourhoods should be part of the plan.
- Expansion of Oxford is a more sustainable option than major expansions of the surrounding smaller towns, which would lead to more commuting.
- Any major extensions to Oxford must be served by a viable public transport alternative (i.e. more than conventional buses).

Census Statistics on Car Ownership and Travel to Work - Oxford and Extensions

Ward	No car or van in household	2 + cars or vans	Home workers	Driving a car or van*	Passenger in a car or van*	Train/tram*	Bus, minibus, coach*	Bicycle*	On foot*	Other*
Yarnton, Gosford and Water Eaton	4.5%	59.6%	9.0%	67.5%	5.7%	0.6%	13.3%	6.3%	4.8%	3.9%
Kidlington North	7.8%	47.3%	7.8%	59.4%	6.4%	0.8%	16.4%	7.5%	7.8%	3.1%
Botley#	8.7%	50.2%	10.0%	56.3%	4.3%	2.2%	16.1%	10.8%	7.3%	2.9%
Wolvercote	12.8%	41.1%	11.8%	49.8%	4.1%	2.5%	18.9%	17.1%	6.2%	3.5%
Quarry and Risinghurst	14.3%	40.0%	7.6%	51.1%	4.8%	0.9%	17.0%	13.1%	10.9%	3.0%
Lye Valley	14.9%	42.5%	7.1%	49.1%	5.2%	0.7%	16.5%	14.2%	11.6%	2.8%
Marston	15.4%	37.8%	7.2%	44.8%	5.9%	1.7%	13.1%	21.7%	10.8%	3.0%
Headington	17.0%	38.3%	9.8%	36.8%	2.4%	1.0%	17.4%	14.0%	26.9%	3.3%
Headington Hill and Northway	17.4%	35.2%	7.3%	42.9%	6.0%	1.0%	17.8%	16.8%	12.4%	4.4%
Littlemore	18.3%	35.8%	7.5%	52.2%	6.2%	0.7%	16.6%	12.3%	10.0%	3.2%
Cowley	19.8%	31.8%	6.5%	45.3%	5.5%	1.2%	18.6%	15.3%	11.8%	3.4%
Rose Hill and Iffley	20.5%	33.1%	7.7%	44.3%	5.5%	1.4%	20.6%	14.9%	10.8%	3.5%
Summertown	22.0%	28.0%	11.8%	38.9%	3.1%	3.8%	18.4%	20.9%	12.9%	3.2%
Barton and Sandhills	22.4%	30.8%	6.7%	48.2%	7.1%	0.8%	21.9%	11.0%	8.4%	3.3%
Northfield Brook	22.9%	27.1%	4.1%	53.7%	6.5%	0.7%	22.0%	8.9%	6.6%	3.1%
Iffley Fields	25.6%	28.9%	8.9%	37.6%	4.3%	2.7%	19.0%	21.5%	13.8%	3.7%
North	26.5%	27.4%	12.6%	28.7%	2.0%	4.7%	8.4%	22.1%	31.4%	4.5%
Churchill	27.4%	28.2%	6.1%	38.1%	5.9%	1.1%	21.3%	11.6%	19.6%	3.4%
Cowley Marsh	27.5%	29.2%	6.0%	38.1%	4.7%	1.5%	21.7%	18.1%	13.7%	3.6%
St Margaret's	27.7%	28.0%	14.9%	32.9%	2.7%	5.7%	13.6%	24.2%	20.5%	5.8%
Hinksey Park	28.5%	25.8%	9.8%	35.4%	3.0%	3.8%	14.7%	19.6%	21.4%	3.3%
St Clement's	28.5%	33.2%	9.8%	31.5%	3.7%	2.1%	19.9%	20.2%	21.1%	3.7%
Blackbird Leys	31.5%	21.8%	5.0%	41.6%	7.9%	0.7%	24.2%	11.5%	11.7%	3.5%
Jericho and Osney	32.3%	22.1%	9.4%	33.7%	2.4%	6.9%	10.9%	16.3%	28.8%	3.1%
St Mary's	35.0%	24.7%	8.6%	28.5%	2.9%	2.1%	22.1%	21.1%	22.3%	4.6%
Holywell	43.9%	18.2%	13.7%	10.1%	1.3%	3.2%	6.2%	19.1%	55.5%	18.2%
Carfax	50.3%	13.6%	11.9%	20.8%	2.0%	6.1%	14.6%	11.3%	43.9%	8.8%
<b>Oxford City</b>	23.6%	31.1%	8.4%	41.1%	4.6%	2.2%	17.8%	16.2%	16.0%	0.2%
<b>England</b>	16.9%	41.0%	8.3%	60.5%	6.7%	8.1%	8.2%	3.1%	11.0%	2.4%

All percentages as a proportion of adults aged 16 to 74. # pieced together from smaller Census Areas. \* Excluding home workers

**Distances and Modes of Travel to Work from 2001 Census**

	<b>All Distances</b>	<b>&lt;2km</b>	<b>2 - 5km</b>	<b>5 - 10km</b>	<b>10 - 20km</b>	<b>20 - 40km</b>	<b>40 - 60km</b>	<b>&gt;60km (inc. London)</b>
Train	2.0%	0.3%	0.2%	0.5%	1.4%	5.4%	7.9%	<b>22.7%</b>
Bus, minibus, coach	17.8%	8.3%	<b>29.9%</b>	<b>24.6%</b>	9.0%	4.7%	3.7%	<b>18.6%</b>
Driving a car or van	41.1%	<b>22.9%</b>	<b>34.4%</b>	<b>56.6%</b>	<b>78.1%</b>	<b>79.2%</b>	<b>81.3%</b>	<b>42.6%</b>
Passenger in a car or van	4.6%	3.2%	4.5%	5.8%	6.8%	4.9%	3.5%	3.0%
Bicycle	16.2%	<b>22.6%</b>	<b>22.4%</b>	7.9%	1.9%	1.7%	1.0%	2.5%
On foot	16.0%	<b>41.0%</b>	6.4%	2.6%	1.0%	2.1%	1.0%	6.2%
Other	2.2%	1.7%	2.1%	2.1%	1.8%	2.0%	1.6%	4.4%
Column Total:	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Oxford (proportion of all commuters):	100.0%	31.2%	34.1%	10.9%	7.9%	4.3%	2.3%	4.9%
England (proportion of all commuters):	100.0%	22.0%	22.1%	20.1%	16.7%	8.5%	2.4%	3.0%

Note: Home workers (8.4% in Oxford, 8.3% in England) are excluded from all the above statistics

## Transport and Planning Practice in European University Cities

Over the past 3 years, the author of this report has visited and studied several cities across north-west Europe which have been relatively successful in reducing dependence on the private car. The three examples described in this appendix are all relevant comparators to Oxford: university cities with historic centres which have been progressively pedestrianised. One key difference, however, is that the historic road patterns have enabled traffic to bypass the city centres more easily than in Oxford.

The other cities are larger than Oxford, with larger proportions of students, according to the latest available figures, although there are potential differences of definition:<sup>1</sup>

	<b>Oxford</b>	<b>Freiburg</b>	<b>Groningen</b>	<b>Muenster</b>
<b>Population:</b>	151,000	219,000	181,000	278,000
<b>Students:</b>	11%	14%	25%	22%

The terrain in Muenster and Groningen is almost entirely flat, whereas Freiburg is more similar to Oxford: substantially flat, but with some challenging slopes on the outskirts.

The graph in the main report illustrates the following modal share statistics:

	<b>Oxford*</b>	<b>Cambridge*</b>	<b>Freiburg</b>	<b>Muenster</b>	<b>Groningen</b>
<b>Car</b>	46%	45%	32%	41%	33%
<b>P.T.</b>	18%	9%	18%	11%	5%
<b>Walk</b>	16%	15%	23%	13%	22%
<b>Cycle</b>	16%	28%	27%	35%	39%

\* travel to work only. Sources: 2001 Census, (Ligermoet 2006) & City Councils

### 1. Freiburg, Germany

Freiburg, in Southwest Germany, is often held up as a good example of planning and transport practice; between the 1970s and 1990s, at a time when car use was rising elsewhere in Germany and the developed world, Freiburg succeeded in reducing it.

The following notes were drawn up following a two week study visit there in August 2006. It included interviews with planners and transport planners from the City Council, and representatives of NGOs.

<sup>1</sup> Sources: (Ligermoet 2006), (SLB-W 2009), (Pucher, Buelher 2007). The Oxford information comes from two different sources: the proportion of students from the 2001 Census, which includes only 'usually resident' students. The population comes shown is the National Statistics mid year estimate on: [www.oxford.gov.uk/community/popnstats.cfm](http://www.oxford.gov.uk/community/popnstats.cfm). This page also states that there are now "more than 30,000 students" at the two universities which would equate to more than 20% without F.E. students etc.

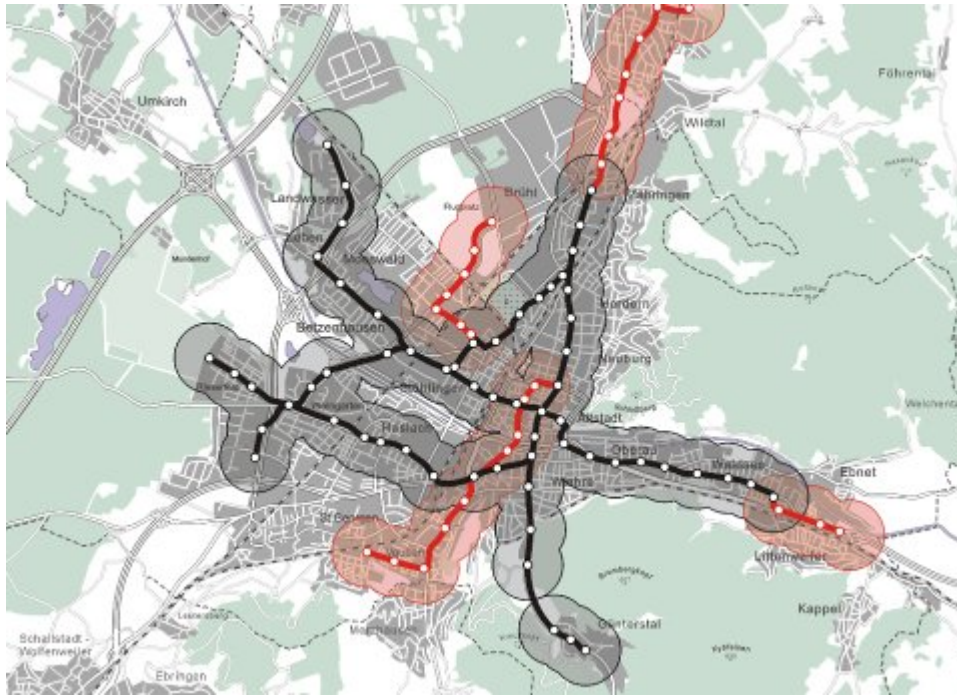
Several of interviewees referred to a successful campaign during the 1970s against plans for a nuclear power plant as a turning point in Freiburg's history. These events, they explained, radicalised public opinion and led to the birth of the German green movement.

Freiburg's historic centre was progressively pedestrianised from 1971 onwards (Monheim 1997) and the following year, contrary to the national trend, a decision was taken to retain and extend the tram network. In 1984 a low-cost all mode regional public transport pass was introduced, which Fitzroy and Smith (1998) identify as the most important factor behind the doubling of public transport journeys over the following decade. In 2006, the season ticket cost 41€ per month and was transferable within households. "Nearly every household has one" according to the City transport planner.

Freiburg City Council describes the principles of its transport strategy as five 'pillars':

- Extension of the public transport network
- Promotion of cycling
- Traffic restraint
- Channelling of motor traffic
- Parking space management

Unlike the UK outside London, the public transport system benefits from a general subsidy and is directly run or franchised by the City Council. The tram system provides the backbone to the network. 70% of local public transport trips are made by tram; 30% by bus. Buses, along with regional rail serve suburbs and surrounding towns and villages as well as the inner city, but do not compete with trams along the central east-west spine of the City Centre. The trams run mainly along streets, often the central lanes of boulevards, with greater priority than the buses, but the system was suffering from a bottleneck along that central spine, where concentrations of pedestrians delayed their progress. As a result, cycling was often quicker. At the time of the visit, some extensions were planned to alleviate this bottleneck, although funding had not yet been secured – some of the planned improvements shown in red below had not occurred by the end of 2008.



**Freiburg Tram Network with Walkable Catchment Areas (recent and planned extensions in red)**

The city's land use planning policies have favoured concentration around public transport routes and appear to have encouraged development at relatively high densities compared to UK cities of a similar size. Neighbourhood shopping centres and local markets are favoured by planning policy with larger retail outlets concentrated in the City Centre (although there were also some edge of city retail parks, particularly to the Northwest of the city).

City Centre parking capacity does not appear to exert any significant constraint. 14 car parks in and around the centre have more than compensated for the suppression of on-street parking. Hourly rates varying from 50c in the suburbs to 2€ to the City Centre were believed to be expensive, but were modest by UK standards at the exchange rate of the time.

As in Oxford, the residential areas of the city have been covered by a 30 kmh (18 mph) speed limit, with the through routes kept at 50 kmh (31 mph).

A comparison between the two plans below illustrates the limited network of through routes for motor traffic contrasting with the fine grain cycle network. Similar traffic planning principles were observed, and sometimes articulated by transport planners, in other European cities with low levels of car use, including Groningen, as described below. The concept was described by Melia (2008) as *filtered permeability*. This term was subsequently adopted in the Eco-towns Transport Worksheet (TCPA, DCLG 2008) which defines it as: "separating the sustainable modes from private motor traffic in order to give them an advantage in terms of speed, distance and convenience". In Freiburg, cycling and trams are the modes particularly favoured.



of cycle lanes, shared paths, junction priority and traffic calmed roads can be found in many UK or French cities but the key differences are the comprehensiveness, continuity and consistent priority of cycle routes.



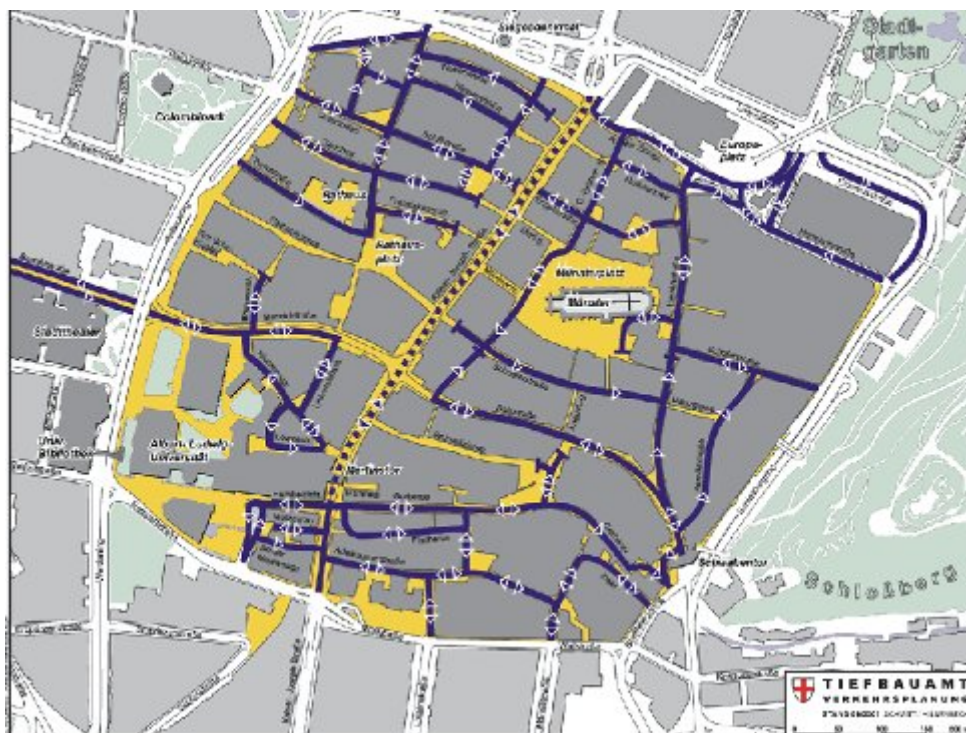
*Junction priority lane*



*Cycle park at main railway station*

Cycle parking is a problem in the centre, despite the 1000 place cycle park by the main railway station. By UK standards, drivers were courteous, respecting the priority measures, but some of the cyclists seemed comparatively aggressive. There are occasional conflicts with pedestrians on shared paths – facilities which the cycling federation has campaigned against.

Cyclists are allowed on the routes shown in blue through most of the pedestrianised area, but as shown below the main East-West and North-South routes are severed. This arrangement has not been without its problems: cyclists do not always respect the rules.



**Pedestrianised area yellow, blue routes open to cyclists, dotted blue evenings & weekends**

Through this combination of policies, according to municipal statistics, the modal share of car travel was reduced from 60% in 1979 to 43% in 1999 (Heller Undated). Cycling rose from 18% to 29%. These statistics did not include walking. Walking as a principal mode fell from 32% in 1982 to 23% in 1999. This was explained by the increasing take-up of the public transport season tickets: trips by public transport were believed to be substituting for some journeys which would otherwise have been entirely walked.

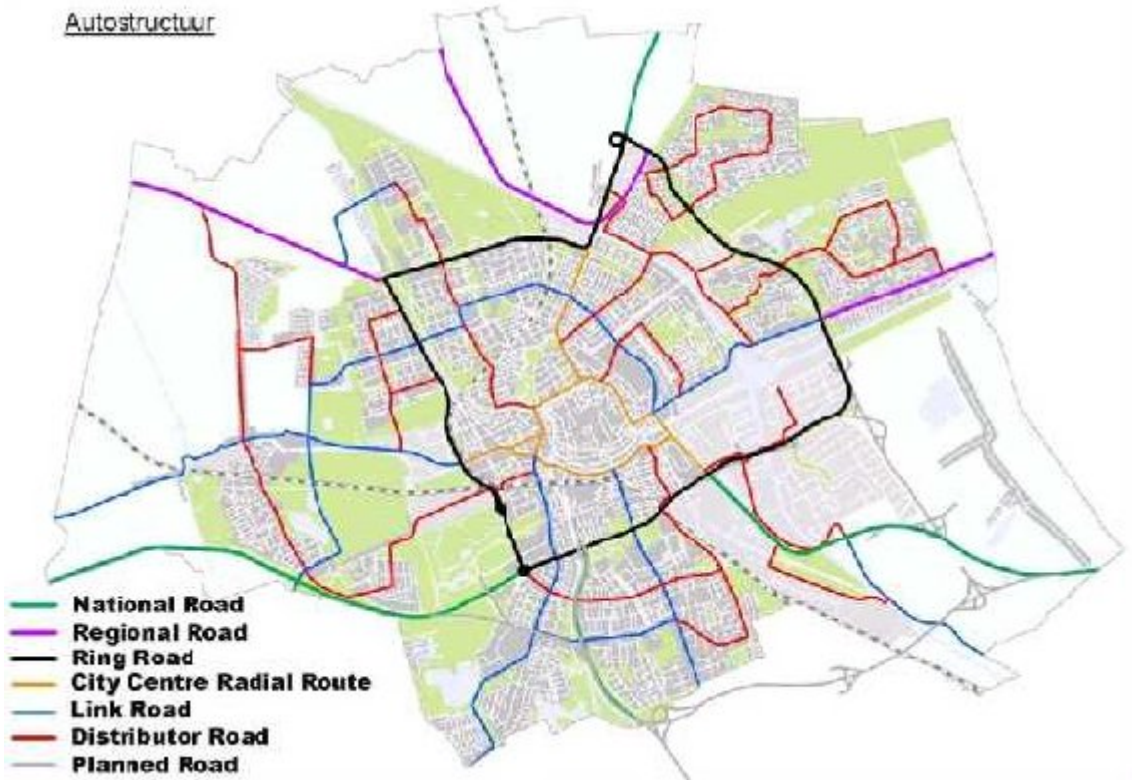
## **2. Groningen, Netherlands**

Groningen is a city in the North of the Netherlands. Like Freiburg the removal of traffic from its city centre began in the 1970s. Unlike pedestrianised city centres in Britain, it has a relatively large residential population, which has grown by 18% in the decade to 2008 (Gemeente Groningen 2008). It was visited for five days during July 2007, including an interview with the Senior Transport Planner for the City Council.

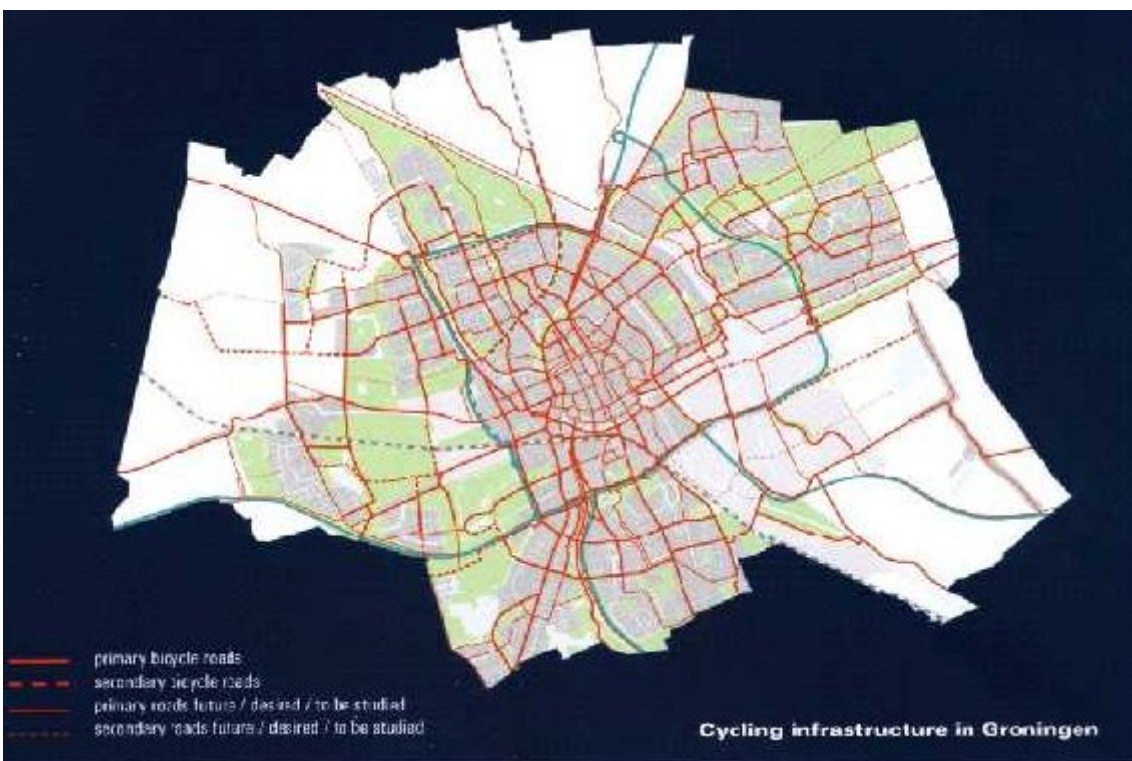
The transport and planning policies of Groningen bear several similarities to those of Freiburg. Planning policy aims to create a “compact and complete city” (Gemeente Groningen 2006), attracting more people, including families with children, to live in the central areas of the city. Although the residential densities have fallen in recent decades, the city remains concentrated around its historic core: 78% of its residents and 90% of its jobs are located within 3km of the centre (Ligermoet 2006). Major retail outlets are concentrated in or directly adjacent to the City Centre.

Filtered permeability is an explicit element of transport policy, described as creating a “coarse grain” for private motor vehicles and a “fine grain” for bicycles. The policy has three related strands: creating shortcuts for bicycles (and buses in some places), channelling of through traffic onto a limited network of roads with minimal obstructions and the creation of artificial dead ends and other traffic-free areas “to make car travel more circuitous, less convenient and more time consuming than bike travel” (Pucher, Buelher 2007).

The cycle network shown below has been progressively developed since the publication of a new traffic plan in 1969. In common with most Dutch cities, there is a strong preference for higher levels of segregation between cyclists and general traffic, with separate paths preferred to on-road lanes, wherever possible. This approach is directly contrary to the one followed in the UK where the most recent guidance re-states a hierarchy of solutions, seeking to avoid segregation wherever possible (DfT 2008).



Groningen 'Coarse Grain' Network for Motors (With permission: Gemeente Groningen)



Groningen 'Fine Grain' Network for Cycling (With permission: Gemeente Groningen)

In recent years, Groningen has alternated with Zwolle as the city with highest proportion of trips by bicycle in the Netherlands (Ligermoet 2006) and probably the developed world, as the Netherlands has the highest proportion at a national level. According to the transport

planner, cycling rates in Groningen followed national trends: falling through the 1960s and early 1970s, then recovering, and had been rising strongly during the previous five or six years. The initial fall was caused by rising car ownership and use and a planning policy which encouraged decentralisation. Factors influencing the recovery have included:

- A rise in the status of the bike
- Growing concern over health
- Traffic congestion
- Constraints on driving and parking
- The growing network of cycle infrastructure
- A planning policy oriented towards urban intensification

On the most recent measure, using traffic counters, cycling accounted for 59% of traffic movements within the city (Vissers 2008).

The Council believes the relatively low modal share for public transport is due to the high proportion of cycling. Unlike the other cities described above, Groningen has no tram system. There are plans to build one by 2014, as the city is planned to expand to the East and West (Gemeente Groningen 2006).

### **Pedestrianisation**

During the 1960s there was a considerable increase in car traffic leading to a traffic plan for major roadbuilding within the city boundaries. In 1972, a new coalition Council decided to radically change the traffic plan. The aim was to bar through traffic from the City Centre, whilst improving access for buses and bicycles. This was initially done by dividing the historic centre into four segments which, whilst each remained open to traffic, were divided by a cordon permeable for bikes but not cars. The plan was strongly opposed by retail business interests. Following its implementation in 1977 surveys provided conflicting evidence on the impact of the changes on city centre shops. Those studies which asked shopkeepers to report on the effects tended to show a more negative picture than those which examined objective measures such as visitor numbers (Tsubohara 2007). During the late 1970s the Council resisted pressure from the retail businesses to reverse the traffic plan, and as the progressive removal of traffic continued the businesses gradually became more positive towards the strategy.

The transport planner said that the City Council and Chamber of Commerce worked closely together. During the time of the visit, the Chamber was funding a trial of free supervised cycle parking in the multi-storey car parks within the City Centre. Some research (reported, not seen) indicated that shoppers by bicycle spent a similar amount to shoppers by car, but spread over a larger number of trips. Amongst Groningen residents, 46% of trips to the City Centre are made by bicycle compared to just 9% by car.

Visitors from outside the city tend to use the car or public transport to a greater extent, which changes the overall modal shares. An important element of these journeys to the City Centre is the culture of shopping by bicycle, which is observable everywhere across the City and in many other places in the Netherlands. The thirty guarded cycle parking facilities around the city and particularly in the City Centre may have helped the development of this culture.

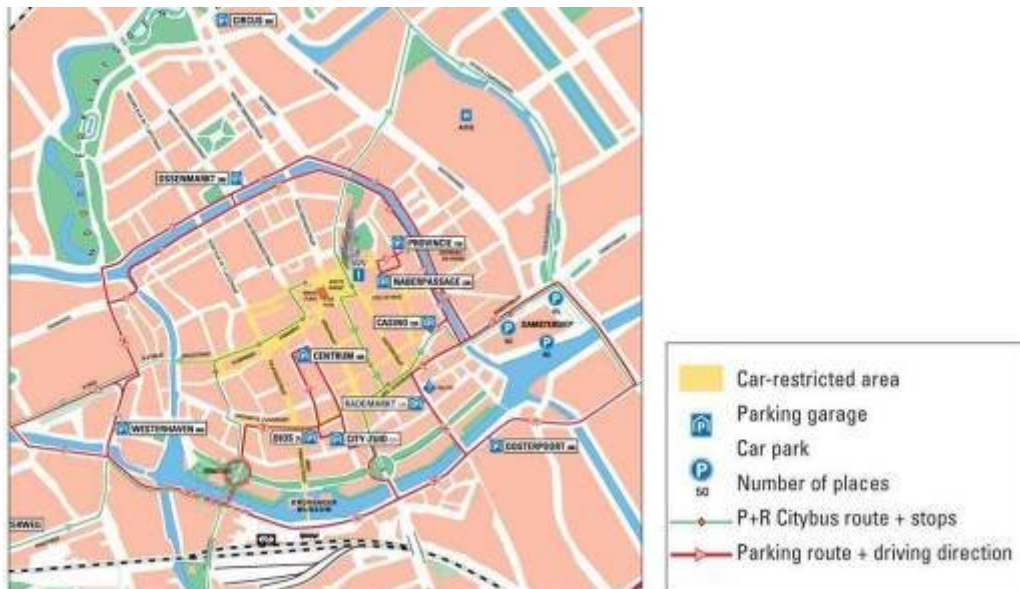


**Groningen Shopping Precinct**



**Groningen Inner Ringroad**

The layout of the City Centre today is shown below. Some streets allow traffic in and out – usually towards one of the multi-storey car parks. Some streets are open only to bikes and pedestrians and some are entirely pedestrianised. These streets, highlighted in yellow, are mainly commercial in nature, although they do have some residents. In some streets, cars are allowed from 6 – 11am and from 4 – 6pm. There are no through routes for private motor vehicles through the centre. The Inner Ringroad provides a fairly slow bypass for motor vehicles around the city centre in both directions. Priority in its design has been given to cycling and public transport.



**Groningen City Centre (the area within the moat – roughly 1km<sup>2</sup>)**

The centre of Groningen differs from pedestrianised centres of British cities both in terms of its size and the number of people living there: 16,551 at the last survey conducted by the City Council (Gemeente Groningen 2008). In 1965 car ownership in Groningen was slightly above the national average (Ligermoet 2006). By 2008, this situation had changed:

**Cars/100 households**

Netherlands	89.1
Groningen	50.7
Groningen City Centre	28.7

**Car Ownership in Groningen and the Netherlands. Source: Gemeente Groningen 2008**

There does not appear to have been any specific research into the reasons for this pattern of relatively low car ownership. Apart from the general transport and planning policies of the city, three factors would appear to be significant: the proportion of students, household income and parking policy.

The proportion of students has grown since the 1960s, and as students represent around a quarter of the population. The proportion of single person households (58%) is unusually high, for example. The University Hospital borders the City Centre, so the concentration of students in the City Centre is probably greater than the city average, again, similar to Oxford. Household income in the Centre was 7% lower than the city average which was in turn 18% below the national average (Gemeente Groningen 2008).

There are 900 metered on-street parking spaces within the City Centre intended for short-stay parking. City Centre residents and businesses can apply for permits for these, but by 2006 the number of permits granted had exceeded the number of spaces so no more were being issued (Gemeente Groningen 2006). There were also 1640 spaces in multi-storey car parks within the centre. There were plans to change the most central car park ('Centrum' on the map above) from a general public facility to one reserved for residents only. Most of the multi-storey car parks were charging 1.50€ per hour, which was lower than Amsterdam, Freiburg and most British cities of a similar size.

Observing the traffic conditions across the city, in the Centre, the bicycle was clearly the predominant mode of transport. There was relatively little motor traffic and the volume of cycle traffic appeared to be the highest of any of the cities visited. This was particularly apparent in the Grote Markt, the central square, where the frequency of cycle movements made crossing the road on foot difficult at times.



**Groningen Grote Markt**



**Groningen suburban bus/cycle gate**

The examples of filtered permeability across the City were many and various, including separate cycle paths, bridges, underpasses and bus/cycle gates. The flows of cycle traffic on radial routes between the centre and suburbs were also substantial. In other aspects such as density and relatively unrestricted parking the suburbs built during the 1970s and 1980s appeared similar to those built around the same time in British cities.

### 3. Muenster, Germany

Muenster (population 278,000) is “Germany’s No.1 cycling city”, with rates of cycling increasing to 35% of journeys by 2001 (Ligermoet, 2006). It has approximately 60,000 students and its terrain is fairly flat. It was visited for three days during the summer of 2008.

Unlike a number of German cities of similar size, Muenster has no tram or metro system. The share of local public transport – essentially buses – at 11% is lower than cities such as Freiburg. The city centre is substantially pedestrianised and closed to through traffic.

Ligermoet (2006) and Pucher and Buelher (2007) describe the comprehensive strategy which has supported the growth in cycle use in Muenster. The cycling network is comparable in quality and comprehensiveness to Dutch cities, with one difference. Although policy aims to provide separate space for cyclists and pedestrians, often using separate paths, following usual German practice, on-street cycle routes are often built into the pavements on the same level. Both cyclists and pedestrians tend to treat the whole surface as a shared space in those circumstances, which is acceptable where the flows are limited; the hybrid paths used in the Netherlands and Denmark lead to greater segregation and tend to function better where flows are higher.



**Cycle path flush with pavement**



**Muenster Promenade**

The centre-piece of Muenster’s cycle network is the Promenade - an ‘inner ring-road’ open only to cyclists and pedestrians. It is full road width with one or two separate pavements on either side. Although some pedestrians walk on the central path, cyclists are able to make more rapid progress than in conventional shared paths or shared space streets. Its intersections with the radial roads use traffic signals and some underpasses.

Filtered permeability is an important principle of transport management in Muenster, not only in the centre, but across the city as a whole. One aspect of this policy is described by Pucher and Buelher as follows:

“car travel is often detoured by artificial dead ends and deliberate street blockages of various sorts, reducing the speed and convenience of car travel.”

Many examples of this policy were visible across the city, sometimes using bollards. In some places it appeared part of a policy to reclaim road space for the public realm.



**Bollarded street**

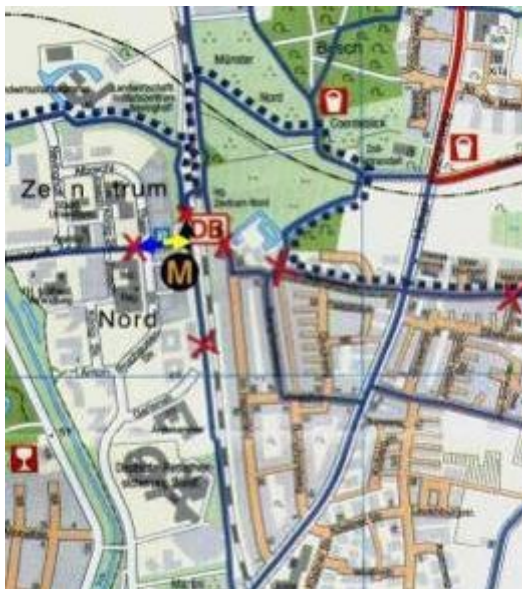


**Reclaimed street space**

The full panoply of means to create shortcuts for cyclists and pedestrians can be seen across Muenster, including its suburbs e.g. separate paths, bridges, underpasses, false one-way streets etc.

### **Muenster North**

The area around Muenster North railway station provides an interesting mini case study of how filtered permeability is achieved there. Muenster North is on the edge of the city, 2.5km from the centre.



**Muenster North**



**Employment Area near Muenster North Station (blue arrow plan left)**



**Muenster North Station (yellow arrow)**

The western side of the station was mainly employment area, the eastern side mainly residential. On the above plan the blue lines are the cycle network, some of which are on segregated paths (often as wide as a road) and some on roads closed to through traffic. The red crosses indicate key points where pedestrians and cyclists are allowed through, and motor vehicles are not. A small car park and covered cycle parking is provided at the station, which is also a nodal point for buses. Observing the station around the evening rush hour, the largest proportion of station customers arrived on foot, followed by cyclists. Relatively few appeared to use cars or buses.

#### **4. Lessons for Oxford**

Lessons from these three examples have informed the main report. The first conclusion which may be drawn is a hopeful one: the progressive removal of traffic suggested by *Transform Oxford* has been a key part of the successful strategy of these three cities to restrain car use and promote quality of life, though other factors have also been important.

The modal share statistics shown in the introduction to this appendix come from differing sources, so the comparison should not be taken as exact, but the pattern of trams contributing to higher modal shares for public transport has been observed across Germany and elsewhere (Hass-Klau 2001). To some extent, the sustainable modes appear to substitute for each other – the reduction in walking observed in Freiburg offers a cautionary tale of unintended consequences in this respect. But in all three cities, comprehensive transport and planning policies have helped to restrain car use.

Filtered permeability, comprehensive and continuous cycle networks, and the quality of segregated facilities have all contributed to the higher rates of cycling in these three cities. Cycle parking has been a problem, but more effort has been put into tackling these problems than seen so far in Oxford. With a similar focus on improving conditions for cycling, there should be considerable potential for increasing rates of cycling across the city.

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