Reducing Car Traffic in Wimbledon Town Centre:

An Interactive Qualifying Project

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Abstract

Traffic within Wimbledon Town Centre has increased to a problematic level. The goal of this project, conducted for the London Borough of Merton, Wimbledon's governing body, was to recommend ways to decrease automobile use for short trips to Wimbledon Town Centre. Through collecting information from shoppers, business owners and managers, and concerned citizens, we developed several recommendations for the Borough of Merton and a follow-up study to determine the success of any recommendations implemented.

Executive Summary

Wimbledon Town Centre is the largest and most widely used town centre within the London Borough of Merton. Its wide array of shops, activities, and public transport draws crowds of people every day. Because of Wimbledon's popularity, traffic is beginning to exceed the limits that the town centre can handle. This increase is resulting in excessive noise, high emission levels, and health and safety risks.

One goal of the Borough is to decrease car traffic, particularly short trip car usage within Wimbledon Town Centre. Therefore, the goal of this project was to provide the Borough of Merton with recommendations to decrease the number of short trips made by car to Wimbledon Town Centre. In the context of our project, a short trip is defined as a trip made to Wimbledon Town Centre from the towns of Wimbledon, Wimbledon Commons, Wimbledon Park, Wimbledon Village, South Wimbledon, and Raynes Park. These six locations make up the area we have defined as our catch basin.

A 1999 study conducted by W.S. Atkins shows that shoppers are the primary users of the town centre. For this reason, it was important for us to understand how these people get to and from the town centre. We interviewed 295 shoppers in the town centre to find out where they travelled from, what mode of transport they took to the town centre, and why they used that specific transport mode. Our success rate in interviewing was 21.4%. We compared the results of our interviews with the data from the W.S. Atkins survey to validate our sampling method. These interviews were conducted at various locations throughout the town centre in an attempt to interview shoppers using various stores.

After the interviews were conducted, the results were divided into three categories: data from respondents who made short trips by car, data from respondents who made long trips by car, and data from respondents who made trips using alternate transport modes. For the respondents who drove a short distance, we took the reasons they drove and plotted the frequency of the responses; a frequency graph of the responses can be found in *Figure 4*. Starting with the most common responses, the main reasons that people gave for driving the car a short distance are that:

- Transporting baggage, especially numerous shopping bags, by other modes of transport is too difficult;
- Transporting their children, especially ones in strollers, on other modes of transport is too difficult;
- Driving is less expensive than utilising other modes of transport;
- Alternate modes of transport, in particular buses, are infrequent and unreliable;
- Driving provides greater privacy than other modes of transport;
- Driving is more convenient than other modes of transport;
- Driving provides better protection from weather conditions than other modes.

From the responses of people who used modes of transport other than the car, we compiled a frequency list of the favourable aspects of those transport modes, so that we could avoid making recommendations that would detract from current positive aspects of the transport system within the town centre. Information from people who drove to the town centre from outside the catch basin was not pertinent to our project, and therefore was not analysed or used.

Managers and owners of businesses are major stakeholders in Wimbledon Town Centre. For this reason we conducted interviews with managers and

storeowners to obtain their opinions and concerns on local transport issues. We wanted to determine what impact, if any, a reduction in car traffic might have on their businesses. We obtained responses from 23 of the 26 businesses we targeted. We asked each business if they felt that a reduction of cars in and around the town centre would negatively affect their sales in the short and long term, if they had any ideas for incentives that would encourage shoppers to stop driving, and if they would be willing to participate.

To form our recommendations, we developed a ranking system to determine which recommendations would best accomplish our goal. We first compiled a list of possible recommendations based on responses from the shoppers. We entered the possibilities into a table and evaluated each alternative against the following criteria:

- Ability to address the problems stated;
- Ease of implementation;
- Cost to implement;
- Impact on the town centre's character;
- Impact on business.

The criteria were weighed according to their importance and relevance to our goal. For each of the recommendations we assigned a value that quantified the relationship between the recommendation and the criteria. One example is the ability to address the issues raised by shoppers. For this column, we summed up the frequency of responses for each of the problems the recommendation was developed to eliminate. Then we divided the total by a constant to translate the value into the one to seven scale. The assigned value was then multiplied by the weight of the criteria and the resulting products were added. Since the ability to address the issues was the most important to realising our goal, it had the heaviest weight where as the impact on the town character relates less to the goal, it had a lower weight. The resulting sum was the score each possible recommendation received. We ranked the possibilities by their scores and chose the five highest ranked as the primary recommendations. These recommendations are:

- Increase parking fares and use the money to promote more sustainable transport.
- Eliminate non-residential on-street parking within Wimbledon Town Centre.
- Create a family bus fare.
- Collect a public transport tax within the Borough and use the revenue to provide travel cards for all residents of the Borough.
- Implement a tax for those who have automobiles and use the money generated revenue to promote sustainable transport.

In order to measure the success of the recommendations once they are implemented, we created a benchmark. The benchmark chosen was a count of the number of cars parked in Centre Court Car Park throughout the day. We determined

that the number of cars in Centre Court Car Park is an accurate measure of the project because the majority of people who use the Centre Court Car Park fall within our short-trip range. An initial count of the cars within the car park was done at 9:30, and then between 9:30 and 16:30 the cars entering and exiting the car park were counted. Then at 16:30, a final count of the number of car in the lot was taken. This count provided an estimate of the number of cars within the car park throughout the course of the day. The count was performed 3 times, once on Thursday 6 April 2000, once on Friday 14 April 2000, and once on Saturday 8 April 2000. The number of cars in the car park ranged from 182 to 596 over the three days.

A follow up count at the Centre Court Car Park should be conducted after any recommendations have been fully implemented and on a business day. One can count the spaces used in Centre Court Car Park at a specific time and compare the number to the value from our benchmark at the correlating time. The result should be lower than the benchmark number minus 51, which was our largest error. If the follow-up study shows a decrease in the number of people parking in the town centre then our goal of reducing car traffic in Wimbledon Town Centre has been successful. If a follow-up study shows that the number of cars parked in the Centre Court Car Park has stayed the same or increased, minus the error from our study, then further information will have to be collected about the drivers to determine if they are making short trips. With this data one could determine if the recommendations we provided were successful in reducing short car trips to Wimbledon Town Centre.

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1. Introduction

Wimbledon Town Centre is the largest and most widely used town centre within the London Borough of Merton. The centre contains the Borough's most varied and extensive shopping options for both food and non-food items. In addition to its shopping appeal, Wimbledon is a cultural centre of the Borough, with a theatre, a cinema, and tennis facilities all located there. The town centre is also a popular place to access public transport. Wimbledon Station, located within the town centre, serves both heavy rail and underground users. There also exists the public bus service and the new Corydon-Merton tram link.

With all of its attractions, Wimbledon lures thousands of people a week into its town centre for business, shopping, transport, and recreation. These people walk, cycle, use public transport, drive, or take taxis to access the town centre. One problem created by the use of the town centre is a strain upon the transport system. Wimbledon is expected to continue growing, and as it does, car traffic will exceed the capacity that the town centre can handle. This capacity refers not only to the physical limit on the number of vehicles and people that can exist within the town centre at a given time, but also to the noise and emission levels, the health and safety risks, and the impacts on business that are associated with excess traffic.

In Wimbledon, the largest and fastest growth in transport has been in the use of the private vehicle. This is undesirable because the car is among the least sustainable modes of transport. Sustainable transport modes are the most efficient, equitable, and environmentally sensitive methods of travel.

The Borough of Merton would like not only to stop this trend of increased car use, but also to reverse it. Merton wants to see a shift from private car use to the use of more sustainable transport modes within Wimbledon Town Centre. According to the Unitary Development Plan, the Borough recognises the necessity of discouraging car usage within the town centre, but a specific strategy to accomplish this has not yet been developed. The goal of this Interactive Qualifying Project is to develop recommendations that the Borough can use to decrease the use of the private car for short trips to Wimbledon Town Centre. Short car trips are being targeted because they make up a large portion of the trips made by shoppers, and they are trips that can be made by other transport modes.

Through interviews, public forums, and a debate we collected valuable information about why people make short car trips to Wimbledon Town Centre. These methods of data collection were chosen because they allowed the acquisition of information directly from the public and area stakeholders. Additionally, we performed a parking study that can be used as a benchmark for determining if any future changes the Borough may make have affected the public's driving habits.

2. Literature Review

This chapter presents necessary background information for our project, covering our research on the transport planning process, the British transport system, the Borough of Merton's transport development goals, and car-free environments. First, we outline the steps generally taken in designing a transport plan, also known as the Transport Planning Process. After transport planning, more specific details are given concerning British Transport. This includes both the national government's transport policy and some of the major modes of transport within the United Kingdom. The transport modes discussed are the automobile, the rail system, the bus system, and highly sustainable modes of transport including cycling and walking. Then, we explain Merton's transport development goals, including a brief overview of the Unitary Development Plan, the Interim Transport Plan, and specific plans for Wimbledon Town Centre. Finally, we describe the concept of a car-free environment and look at several locations that have used carfree ideas for reducing car traffic.

2.1. The Transport Planning Process

Urban design and the process of planning transport systems have developed over time and have improved with better allocation of resources. In the context of transport, proper allocation of resources refers to limiting the amount of inhabitable land used up by roads, as well as to the proper allocation of fossil fuels, reduced

impact on the environment, and the choice of transport methods that best meet the needs of the project (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976).

In this section, the transport planning process is presented in six stages in order to simplify and clarify the important concepts of this process. There is no universal system of planning, but the steps presented here are common elements in the transport planning process used by most civil engineers and urban planners (Akaha 1990, Dunn, 1981; OECD, 1977; Starkie, 1976). The first step of the process is to identify transport needs. Secondly, a plan or goal for the area must be developed. Third, the travel demands of this planned land usage are estimated. Fourth, the different methods by which the travel demands can be met are formulated. The fifth stage is to recommend a plan that most benefits the community. The sixth and final stage is to submit the plan for approval and implementation. Each of these steps will now be described in more detail (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976).

Identifying transport needs is the first step in transport planning. The Organisation for Economic Co-operation and Development (OECD) defines a transport need as "the requirement for an individual or group of individuals to travel in order to carry out a variety of activities" (1971, pp. 35). The needs of a system change as the system itself changes. In other words, in order to anticipate the transport needs of an urban area, the future changes that the area will undergo must be anticipated (Akaha, 1990; Dunn, 1981; OECD, 1971; Starkie, 1976).

After identifying its needs, a community must decide how it wishes to use its land. This is the second step in transport planning. Each community has a unique set of requirements that arise from many aspects of past development and various goals for the future. Furthermore, urban growth is limited by the availability of transport to and from the city and by the carrying capacity of the transport network within the city. There is a limit to the amount of traffic a given area can tolerate; once that point is passed a loss of many amenities of city life may occur. Several transport experts agree that the following points be considered in an assessment of future land and transport needs (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976):

- There is no guarantee that greater mobility will lead to greater satisfaction even though a lack of mobility will limit the level of attainable satisfaction.
- When planning a new site, accessibility should be given the greatest attention. If the public is not able to get to the new site conveniently, the area will not be used.
- There is not always a need to change infrastructure, since users will find a way to adapt to changes even if the infrastructure cannot support demand. These adaptations include altering the route, time, transport mode, and destination of travel, the elimination of non-essential trips, and the combination of trips to avoid facing the congestion more than necessary.
- Each different method of transport must play its appropriate role in the total transport system. This will ensure that the transport system is effective and efficient.

(Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976)

After future transport needs and land use requirements have been established, the next step in the design process is the collection of data. Knowledge of the area in question is needed if one is to develop different methods to address transport needs. In the past, the process of collecting data involved extensive, long-term technical and analytical studies at infrequent intervals by committees. More recently, data collection has most commonly becomes a continual review process involving community input (OECD, 1977). Thus, an important development in the process of collecting data is the recognition of the value of input from the public. For example, the London Borough of Merton holds annual public forums as a method of collecting community input that might influence future transport policy (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976).

After data is collected, it is necessary to analyse the information and decide upon possible techniques that may be used to alter transport trends and habits. This is the fourth step in the planning process. Some techniques are better suited for certain situations. In some cases, the techniques are interchangeable and in others, they will yield entirely different results. For example, a reduction in public transport fares may be influential in persuading some commuters to leave their cars at home and take the bus. Alternatively, such a reduction may not persuade any private commuters to change modes of transport; instead, it may allow access to the public transport system for a large section of the population that could not previously afford the fare, and consequently overload the bus system. This would create a new transport problem (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976).

In particular, there are numerous possible methods to reduce car usage. These methods include: limiting parking, charging high fees to park, not operating parking

lots at times of heavy traffic, designating lanes specifically for bus or taxi use, promoting pedestrianisation of streets, requiring a special car license and taxing the license, taxing private parking spaces, closing roads to through traffic, closing roads to all traffic, banning private transport, and raising fuel taxes. These methods may or may not be applicable to all urban areas, but they serve as a starting point for the consideration of alternatives to driving in the city (Akaha, 1990; Dunn, 1981; OECD, 1977; Starkie, 1976).

The fifth stage in transport planning is to select the best plan from the possibilities that have been formulated. One method for analysing the possibilities is to compare the current transport situation with other similar cases. By noting similarities and differences, and by analysing the success of the plans implemented in the model cases, one may be able to predict with some accuracy the outcome of the current plans. Continual data collection along with the review of other transport projects can help to build the reliability of this method of selecting and analysing transport plans (OECD, 1977).

The sixth and final step is to submit the chosen plan to the proper parties. The plan will be thoroughly reviewed and evaluated. If approved, the plan will then be implemented.

As mentioned in the first step, it is important to evaluate the success of each project to help determine how better to design the next project. However, this evaluation is not intended to replace the process of transport policy formation. When evaluating a past policy it is important not only to note how well it accomplished the task it was designed for, but also to note the environmental impact of the project. The

OECD believes that cost/benefit analysis and community input will help in future planning processes (1977).

2.2. British Transport

In many large urban areas, a public transport system is beneficial and plays a key role in reducing automobile traffic (Akaha, 1990). An OECD study found that in areas where a high population density is linked to a good public transport system, levels of car ownership remain lower (1977). Not only is a good public transport system a major contributor in reducing car traffic, but it is also a means of mobility for many people who would otherwise be without access to transport. For example, about thirty percent of an urban population falls into the categories of poor, young, old, or disabled; these groups are usually highly dependent upon the public transport system. Many studies have found that London's public transport system is one of the most effective in the world due to its integration of commuter railroad, subways, and buses (Dunn, 1981; OECD, 1977; UDP, 1999; ITP, 1999). However, both the OECD and Interim Transport Plan (ITP, 1999) have found that in large cities such as London, private car ownership and usage have increased while the usage of public transport and pedestrian transport have decreased. The following subsections provide background on transport policy in London and information on the many transport options available in London (ITP, 1999; OECD, 1977).

2.2.1. Transport Policy in London

General transport policy objectives shared by many European cities, including London, involve the improvement of pedestrian traffic, safety, road capacity, public transport access, goods traffic, and the quality of public transport. These policies also seek to restrict the use of private vehicle, the increase in the city size (area), environmental and noise pollution, urban sprawl, and expenditures. With the exception of increasing road capacity, all of the above objectives apply to transport in London. The primary focuses of British transport policy are the promotion of public and pedestrian transport and the reduction of the reliance on private vehicle use. Also, it is the policy of the government to encourage use of railways and internal waterways (rivers and canals) for freight hauling to reduce traffic and pollution caused by trucking (Akaha, 1990; Dunn, 1981; OECD, 1971).

A somewhat recent policy of the British government is the encouragement of the privatisation of certain transport industries. An example of this is the privatisation of the British airline industry, which occurred in the middle to late 1980s under the Thatcher Government. With a decline in bus service, the government is also trying to encourage the privatisation of passenger services (Akaha, 1990, chap. 9; Dunn, 1981).

In 1999, the British Government implemented the Green Plan to encourage alternatives to travelling by automobile. It was noted that in the period from 1985 to 1995, the percentage of people travelling to work by car had increased from 57% to 70%. The Green Plan is an attempt to stop or even reverse this trend of driving to work. It was also noted "even a small shift in commuting journeys away from the car would have considerable impact on congestion at peak times" (DETR, 2000).

Achieving this objective is a long-term process involving the government, employers, and neighbourhoods. The hope is that in the future, employers will encourage the use of other modes of transport to work, including rail, bus, cycling, and walking, or will even encourage work at home (DETR, 2000).

In the London Borough of Merton, the town council has decided to lead by example with the Green Transport Plan. The Council has decreased staff car parking and allowances for car usage on business trips. In addition, the Council has decided that the Borough will no longer be allowed to lease cars. An allowance, which equals the payment for use of a private car, is rewarded to those members of the council who cycle. Even a new gas powered vehicle that releases less harmful emissions than petrol is being driven and tested by members of the Merton Council. All of these changes are being monitored and the results of these changes will be released to other business in hopes they too will discourage car transport (ITP, 1999).

2.2.2. Car Transport

The 20th century has often been called the motor age; during this time, cars have become the dominant force in transport in much of the world. Over the last 30 years, the number of drivers has increased steadily (ITP, 1999). In 1999, 66% of the households in Merton owned at least one vehicle and 20% owned at least two. Car ownership is expected to continue growing at a rate of about 1% each year. The Borough transport department has concluded that Merton's road network cannot support the present amount of car traffic. If the increase in car traffic continues, the

Borough's ability to support the traffic will decrease; this is the case throughout many of London's Boroughs (ITP, 1999).

2.2.3. Rail Transport

As mentioned previously, an effective rail system is one means of reducing car transport. The London rail system is comprised of three rail networks: the Underground tube system, the heavy rail, and the tram system.

London had the world's first underground train system. It opened on January 10, 1863 and travelled from Paddington to Farringdon. Today, the London Underground has developed to over ten lines that take more than 2.4 million people over 171 km of track every day (London Transport, 2000).

The underground consists of two types of train lines, the surface lines and the tube lines. The surface lines, including the Metropolitan, District, Circle and the Hammersmith & City lines, are the oldest and were built using the cut and cover method. Abandoned in the late 1800 because it was disrupting traffic on the streets above, the method included destroying the road, excavating a trench below it for the railway, and then covering the tracks with a brick lined tunnel and restoring the road surface. The remaining lines are considered tube lines that are buried deep under the city (London Transport, 2000).

In 1889, the District Line was extended to Wimbledon. Today, the District Line is the most used line of the Underground, with over 182 million people travelling on it during 1998 and 1999. With Wimbledon as the last stop on the District Line,

located favourably in Travel Zone 3, many people commute to the town centre and then take the underground into London (London Transport, 2000; WS Atkins, 1999).

2.2.4. Bus Transport

Although rail transport is popular in London, the bus service is the major component of the city's transport system. Opened in 1933, the bus system now has more than 5400 buses running on more than 700 routes, 24 hours a day. The bus system transports more than 1267 million passengers a year. This averages to about four million people a day (London Transport, 2000).

A list of criteria has been developed by London Transport to determine the placement bus routes. The most important aspect of route placement is the ability to benefit the maximum number of passengers without exceeding London Transport's budget. Generally, stops are chosen at a maximum of 400-600 meters away from town centres, near residential areas with high population density, or wherever there is a strong public demand (London Transport, 2000).

In addition to optimising placement of bus routes, London Transport is looking at ways to improve its buses. They have developed a list of goals for major improvement. These goals include better enforcement of parking and driving restrictions within bus lanes and red zones, and restricting traffic volumes within these areas (London Transport, 2000).

2.2.5. Sustainable Modes of Transport

Both rail and bus transports are more sustainable than car transport. However, there are transport modes even more sustainable than public transport such as walking and cycling. Sustainable transport is transport that provides the most efficient, equitable, and environmentally sensitive method of travel (Reinventing Transport, 2000). The focus of sustainable transport is to rely more on non-motorised forms of travel, especially for local transport. In order for sustainable transport usage to increase, the public transport system must improve and expand in local areas. In implementing policy regarding sustainable transport, the quality of and access to goods and activities needs to be considered. The two most common forms of sustainable transport are walking and cycling. There are other forms of transport that are considered sustainable, such as public transport vehicles with electric engines, but no other forms are as environmentally friendly as walking and cycling (Reinventing Transport, 2000).

2.2.5.1. National Cycling Strategy

A study conducted by DETR in 1995 found that the number of cycling trips made in the United Kingdom had rapidly declined. The percentage of trips by bicycle in the United Kingdom is considerably low (only 2% of the trip in 1995) compared to that of other European countries, as seen in *Figure 1*. Even countries that have arguably worse climates, such as Sweden, and more challenging topography, for example Switzerland, have higher levels of cycle use than the United Kingdom.

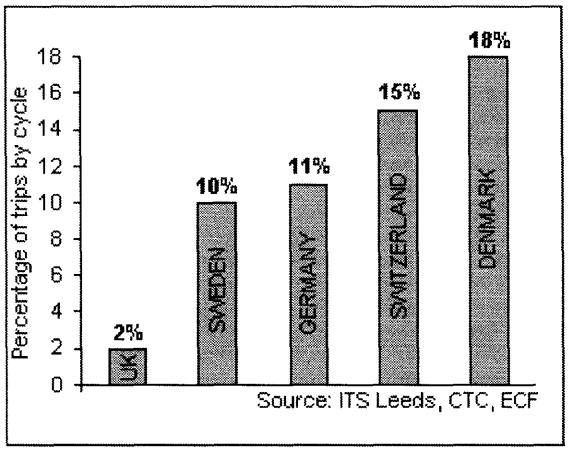

Figure 1: Percentage of Trips by Cycle

The National Cycling Strategy is a policy that Central Government has issued to improve the appeal of cycling and its use as a mode of transport. The policy's main objective is to increase cycle use, with the specific goal of doubling the number of cycle trips made by the end of the year 2002 (DETR, 2000).

Some reasons for increasing cycling are to reduce pollution levels, enhance the environment, and promote personal health. It is also hoped that through encouraging cycling there will be a shift from driving cars to riding bicycles (DETR, 2000).

The following is a list of steps that the National Cycling Strategy or NCS plans to pursue in achieving its goal of increasing cycling:

- Provide convenient cycle access to key destinations;

- Improve cycle safety;
- Increase cycle use in combination with other modes of transport;
- Improve security by decreasing theft;
- Raise awareness and expertise amongst transport providers.

There are three groups involved with the NCS development plans: the city planners, the existing road users, and the potential cyclist. According to DETR, when any changes are made to promote a different mode of transport, all three groups should have equal say in the change. The plan should be presented to the community in a way that will appeal to peoples' interests. One plan suggested by DETR entails community involvement in which the residents help to decide the programme for encouraging cycling. The community is involved in deciding where improvements can be made and how the changes will be implemented (DETR, 2000).

2.2.5.2. Walking as a Mode of Transport

Cities are often plagued with congested streets, making them difficult places in which to drive cars. Walking, a sustainable transport mode, allows a person to move more easily through areas that would otherwise be extremely difficult to traverse by automobile. This makes walking a convenient mode of transport within cities. In addition to being convenient, walking also provides a source of exercise, which is important in keeping health problems such as heart disease at bay (Carfree, 2000; Walkable Communities Inc., 2000; DETR, 1999).

Although walking offers several benefits to individuals and communities, many people do not choose it as a mode of transport. In 1990, Tolley studied walking

levels in the United Kingdom and discovered that only 1 in 3 trips were made on foot and that these were generally short in length (DETR, 2000).

One reason for the use of other modes of transport over walking is the fast pace of today's society. When one wishes to go somewhere in the quickest fashion, walking is often seen as too slow (DETR, 2000). The car is one method of transport that is often chosen to replace walking for this reason.

To decrease the use of the car for short trips, one must determine specifically why people do not walk, and then develop methods for altering their behaviour. WS Atkins conducted a study and found that the most common reason people do not walk is because of safety concerns. Hence, most plans to promote walking involve making roads safer for pedestrians (ITP, 1999).

Roads have been designed primarily for drivers. Signs are placed at a height such that drivers can easily see them. Traffic signals are usually timed to provide maximum car flow through an intersection, often leaving the pedestrians scrambling for the other side of the road (DETR, 2000).

Vehicle speed also influences pedestrian traffic. In fact, excessive speed is one of the largest causes of road casualties. At 40 mph, a vehicle has an 85% chance of killing a pedestrian, but at 20 mph the risk falls to 5%. Road safety strategies do, therefore, give high priority to speed reduction measures (DETR, 2000).

Speed cameras have been used to monitor speed behavior of motorists. According to DETR, "Monitoring shows that 72% of cars, 66% of light goods vehicles and 50% of heavy goods vehicles exceed the urban speed limit of 30 mph," (1999). Excessive speeds are dangerous, and fast traffic discourages pedestrian use of that route (DETR, 2000).

Besides speeding traffic, another deterrent to walking is low lighting. Low lighting is designed to help drivers by not blinding them, but many people refuse to walk at night because they fear for their personal security especially in the low-lit areas (DETR, 2000).

The US Department of Transport (US D.O.T, 2000) states that a way to promote better pedestrian safety is to provide more lighting for those who walk. Poor lighting puts a pedestrian at risk of both being attacked in the dark street or being hit by a car (FHA, 2000). To ensure pedestrian safety, dim light should be used to light the street, and brighter lighting should face the walkways (US D.O.T, 2000). This will improve pedestrian safety at night (FHA, 2000).

A second method that the US D.O.T. has identified to increase pedestrian safety is to make walkers more visible to motorists. One design that attempts to do this is an illuminated crosswalk that has lights within the crossing. These light up when there is a person using the crosswalk. The lights, which are visible during both the day and night, ensure that pedestrians crossing the street are noticed by drivers (US D.O.T., 2000; FHA, 2000).

The US D.O.T. feels that pedestrian safety can be improved by the use of a pedestrian detection device. One problem in many areas is that pedestrians do not have enough time to cross the street because traffic signals are usually designed to maximise vehicle traffic flow in the area (US D.O.T, 2000). A pedestrian detection device is designed to give walkers enough time to cross the street. Microwave and infrared are two types of such detectors. Both allow pedestrians to cross the street at their own pace. Microwave and infrared detectors both track people crossing the street by using sensors at the curbs and in the middle of the street. These sensors use

radiation or heat to determine when a person is in the crosswalk. When a person nears the far side of the street the DON'T WALK sign will begin to flash. When the person reaches the curb the device allows traffic to start once again (US D.O.T., 2000; FHA, 2000).

According to the advocacy group Carfree.com, decreasing usage of the car is another way to improve pedestrian safety. One way they suggest to reduce car usage is to limit automobile traffic in certain areas. Increasing parking prices, according to both DETR and Carfree.com, is another way to discourage traffic to a particular area. In addition, they both state that parking on the outskirts of the city could be provided in order to encourage people not to drive into the city, and instead to park on the outskirts and use the public transport system to enter the city (DETR, 2000). Another method would be to declare certain areas of the city "no car zones," eliminating cars from that particular area (Carfree, 2000; DETR, 2000).

Besides attempting to physically block traffic in certain areas, another method suggested by Carefree.com and DETR to decrease the usage of the automobile is to educate the public on problems associated with car use. One such problem is the negative effect of driving on social interaction. Donald Appleyard has studied the effects of urban transport and city social life and has found that the amount of social contact in a city is inversely proportional to its level of traffic. He states that people who drive in their cars promote isolation, which in turn limits social connection between people. This, he claims, has destroyed a social city life, and as a result, there has been a decrease in pedestrian activity (Carfree, 2000; DETR, 2000).

In addition to safety reasons, the Department of Environment, Transport, and the Regions (DETR) and Carfree.com have found that people do not walk because

driving is regarded as a faster mode of transport. To address this, Carfree.com has proposed an urban design that would encourage walking as a mode of transport by making walking faster than driving a car. The model was designed for a city of one million people and divides the city into six lobes. The city would be set up like a flower, with each of the six lobes representing a petal, all of which are centralised about a main point. Along the lobes are the main streets and metro lines within the city off which other streets branch (Carfree, 2000). The lobes would contain up to a hundred districts, each of which would be a community of about 12,000 people. They would be planned so that to get from one end of the district to the other would require no more than a five-minute walk. The roads would be 25 feet wide, which is ideal for walking, but much too narrow for driving (Carfree, 2000).

Only three metro lines would run through the city, each circling one lobe, running into the centre, and then back out to circle the adjacent lobe. There would be three transfer locations instead of one large, crowded central location. With such a design, only one transfer is ever required to reach any location within the city. The efficiency of the transport system would be high, the constriction costs would be minimised, and the journey times would all be relatively short. All areas of the city would be within quick reach of the town centre (Carfree, 2000).

2.3. The Borough of Merton's Transport Goals

The Borough of Merton governs Wimbledon, whose town centre we examined. Currently, there are many cars on the road in Merton. As stated previously in Section 2.2.2., around 66% of the households in the Borough of Merton have at least one vehicle, and 20% have two or more cars (ITP, 1999). An increase in car ownership could indicate an increase of traffic and a decrease in the dependence on public transport (ITP, 1999).

Based on this trend of increasing car ownership and traffic, the Merton Council has set a goal to reduce the traffic flows by 20% on local roads by 2008. In addition, the Council wishes to increase the percentage of the Borough with good public transport accessibility from 57% (using 1992 statistics) to 65% by 2006. Finally, the council wishes to develop and support the Green Transport Plan by 2001 (UDP, 1999; ITP, 1999).

To decrease car traffic, the Borough of Merton has set forth a set of plans called the Unitary Development Plans (UDP, 1999), which outlines the plans Merton would like to use to attack the need to develop more and better public transport. There is also the Interim Transport Plan (ITP, 1999). The ITP outlines the policies and goals introduced in the UDP.

2.3.1. Unitary Development Plans

The vision of Merton for 2011 presented in the Unitary Development Plan is to encourage more people to use sustainable transport and to ensure that public

transport can meet the increasing demands for its usage. This goal is part of the South East Regional Planning Conference (SERPLAN) Strategies. The SERPLAN contains six elements, one of which is to reduce travel by car in favour of more environmentally friendly forms of transport.

The Unitary Development Plan outlines the strategic policies set by the Merton Council. Its key focus is the promotion of sustainable development and transport. It also provides detailed development plans for the next ten years.

Merton has categorised transport into seven classes in an attempt to show necessary improvements in the transport system. *Figure 2: The Transport Hierarchy* shows the Borough of Merton's way of defining sustainable transport. The higher a mode is on the pyramid, the more sustainable the mode; the lower a mode, the less sustainable the transport mode. The purpose of this hierarchy is to define which transport modes are desired and should be encouraged, and which modes are not desired and should be discouraged. As shown in *Figure 2*, cars are seen as the least sustainable mode of transport; correspondingly, the Borough has a policy of reducing the use of cars. In particular, Merton desires that the car not be used at all for short trips that could be easily made by employing alternative modes of transport (UDP, 1999).

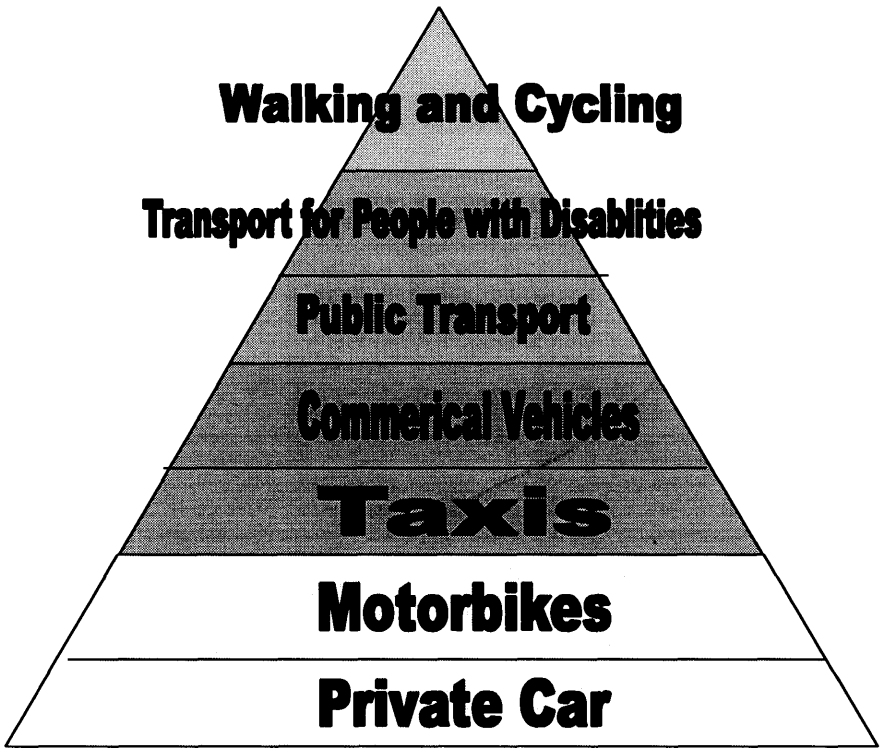

Figure 2: Sustainable Transport Hierarchy

2.3.2. The Interim Transport Plan and Road Safety Plan 2000 / 2001

While the UDP explains the goals of urban planning and economics of the Borough, the Interim Transport Plan for 2000 / 2001 (ITP) is a document outlining Merton's transport policies and goals, and the costs associated with them. The report lays out guidelines as to how the Merton Council intends to proceed to improve local transport. In addition, it gives some forward thought to future projects and possible

plans for 2002-2005. The main theme of the plan is restricting the use of the car and increasing usage of more sustainable modes of transport.

2.3.3. Plans to Promote Walking

In May of 1999, WS Atkins, in conjunction with the Borough of Merton, examined the usage levels of town centres in the Borough. The Town Centre Capacity Study also examined improvements that could be made to town centres. The report concluded that the perception that walking is dangerous means that people would take only shorter walks (WS Atkins, 1999). For short trips under half a kilometre, 20% of the people surveyed use the car; 50% use their car for trips less than three kilometres.

Based on a decline in walking, the Council has set some objectives. Their goal is to increase walking as a mode of transport, increase pedestrian access to public transport modes, make crossing the road easier, increase the awareness of the benefits of walking, and integrate walking into the public transport programs. The Council has a current policy to encourage these goals. First, it will review the current and potential role of walking as a means of travel. Then, it will set targets for increasing walking. Next, it will adopt land use policies to increase walking. Finally, the Council will improve the walking environment (ITP, 1999).

2.3.4. Current Public Transport Policy

In addition to promoting walking, the Council has outlined a plan to increase the use of public transport. This policy includes four main objectives, the first of which is to implement new and improved bus, train, tram, and rail services to increase accessibility and meet existing and potential demand. A second objective is to better integrate public transport services, which includes new interchanges and passenger facilities. The third objective is to develop a low cost and integrated fare policy, which along with the second objective is a step towards creating a fully integrated public transport system where a person can move from one form to another with ease. Lastly, it is a goal of the Merton Council to ensure the public transport system is frequent, reliable, safe, and accessible to the community.

2.3.5. Wimbledon Town Centre

The town of Wimbledon is located in the London Borough of Merton and is the economic centre of the Borough. A large number of people travel to Wimbledon Town Centre in order to shop as well as to use the underground and commuter rail station located there. With this large number of people there is a large amount of traffic (WS Atkins, 1999).

Because of Wimbledon's commercial status, the UDP has identified special considerations for Wimbledon within the broader context of Merton's transport goals. For instance, there is a major emphasis on encouraging business within the town centre. In particular, ease of access to the town centre is one point to keep in mind. The most recent improvements within Wimbledon regarding transport were widening

of the pavements from the major shopping centre, Centre Court Shopping Centre, to a second shopping centre (the P3 site), which is currently under construction. This widening was done in order to provide easier pedestrian access from one shopping area to another (UDP, 1999; Urban Design Group, 2000).

A second consideration is that many people shop in Wimbledon because of its character as a town centre. Any changes made to the centre must take into consideration the character of the town centre, and ensure that it is not damaged by the changes (Urban Design Group, 2000).

2.4. Promoting a Car-free Environment

One consideration of many cities is to completely eliminate cars, which could also improve the town centre character. According to the advocacy group Carfree.com, many cities around the world are finding an increase in traffic. More and more people are driving cars in areas that used to be primarily travelled by pedestrians. This has led to streets becoming unfriendly to pedestrians (Carfree, 2000; DETR, 2000). Many government planners have noticed this trend and have attempted to develop a friendlier pedestrian environment. Lyon France, and the Borough of Hammersmith and Fulham are two examples of urban areas trying to increase pedestrian travel. In some cases the goal is not just to make the area more pedestrian friendly, but to make it carfree (Carfree, 2000).

2.4.1. A Carfree City

There are several reasons why a city in which limited or non-existent automobile use is desirable. One such reason is increased social interaction. Carfree.com advocates that being a large centre of population, a city is the ideal location for social interaction, and by driving in our cars rather than walking or taking public transport, people are missing out on a great deal of the social interaction available.

According to Carfree.com, a carfree city also promotes good environmental behaviours and enhancement of the city's natural beauty. Without cars, air quality can improve and smog will decrease. The main cause of air and noise pollution in many cities around the world is automobile traffic; with a carfree city the levels of these pollutants should decrease drastically. Many countries have begun to recognise this and have begun to shift their attention towards reducing automotive pollution (Carfree, 2000; DETR, 2000).

2.4.2. Lyon, France

Lyon, France is undergoing radical changes in an attempt to convert from a car-congested city into a carfree city. Lyon is a prototype city for becoming carfree by following the model presented by Carfree.com. The city is being broken down into lobes and districts. Since Lyon was not originally being designed and constructed to be carfree, the city's government explored ideas on how to go about redesigning the city. The first step decided upon is to make small carfree areas. This allows pedestrian traffic to be maximised and at the same time allows delivery trucks to get close to their delivery destinations. The second step will be to allow no cars into the city at all. The problem this presents is that some sort of infrastructure would need to be built so that deliveries could be made. One plan that is being considered in particular is building a structure whereby delivery trucks can travel through an underground network of tunnels to reach their destination (Carfree, 2000; Ghent, 2000).

On the Day of the Dead in 1998, Lyon banned driving in the city for the day. During the city's annual Day of the Dead parade, people pulled cars that had signs reading, "Death to Cars." The funeral procession was lead by a Grim Reaper who stood upon a car, while crowds chanted, "Death to the Car." The officials and carfree enthusiasts who planned the event considered the day a success (Ghent, 2000).

2.4.3. The London Borough of Hammersmith and Fulham

The London Borough of Hammersmith and Fulham has tried to improve the walking conditions in the Borough by experimenting with some ways to improve pedestrian safety, with the hopes that this would increase walking. This was successful in that currently 80% of the town's people consider themselves pedestrians. Before the changes, it was found that there were problems with roads not having a crossing, with people waiting too long at crosswalks, and with crosswalks not having signals at all. It was therefore the goal of the Borough to improve these conditions by making the area more pedestrian friendly (The Hammersmith & Fulham Pedestrian Association, 2000). On Gliddon Road, for instance, the town has built speed humps. The town's pedestrian association is also trying to get the Labour Government's pledge to reduce speed limits by 10 mph (16 km/h) and to change urban limits from 30 mph (50 km/h) to 20 mph. The association has suggested a low-cost way of changing the speed limit; instead of completely changing all the signs to a new speed limit, it was proposed that the signs could just have change the units. Currently, the signs read 30 mph; if they were to read 30 km/hr, the speed limit would be reduced by a third (The Hammersmith & Fulham Pedestrian Association, 2000).

Though the walking association of Hammersmith and Fulham find the improvements most beneficial and would like more improvements to be made, many of the town's people and Hammersmith and Fulham Council are unhappy with the changes to its Borough. As a result, a bridge that had been shut down for three years to only pedestrian traffic has recently been reopened to car traffic (The Hammersmith & Fulham Pedestrian Association, 2000).

3. Methodology

This chapter of the project provides a detailed description of the methods that we used to attain data, and the analysis of the data to achieve our goal. Because shoppers are the primary users of the town centre, we conducted on-street interviews to find their driving motivation. We attended The Merton Forums and the Wimbledon Speed Debate to gain more insight to the motivations of why people drive. We conducted business interviews to determine if changes to the transport system would have any effect on area business. This data was then analysed for each step to form a list preliminary recommendations. The list was narrowed by KT analysis to determine which recommendations would be most helpful to the Borough. We then formulated a list of recommendations for submission to the Borough. Also, we performed a parking study of car activity in short stay car parks and on-street parking to provide a benchmark to measure the success of our recommendations.

3.1 Development of the Goal and Background Research

The London Borough of Merton has identified a traffic problem in Wimbledon Town Centre. To aid in improving the town centre, the Borough of Merton has asked us to devise recommendations to help reduce the traffic problem. At first we examined the least sustainable modes of transport and what we could do to reduce them or to improve other modes of transport. From there we made the decision that our goal would be to reduce the number of short trips made to Wimbledon Town Centre by car. We felt this would be the best focus for our project because the Borough least desires car traffic. After we established our goal, we conducted

extensive background research to help form a base of information on which to build our project. Research included British transport, the transport planning process, carfree environments, and the Borough of Merton.

3.2. Familiarisation with Wimbledon Town Centre

Before our group could perform any data collection, it was necessary to become familiar with Wimbledon Town Centre. This familiarisation process gave us the information necessary to design our data collection methods of the car parking study, shopper interviews, and storeowner and manager interviews.

From previous research, we had a general idea of the layout of the town centre, but did not have full knowledge of how the town was set up or of its character so we visited the town centre. First, as a group we took public transport into the outskirts of Wimbledon Town Centre. Second, we walked around with notebooks and recorded information on the locations of possible interviewing sites including stores, shops, pubs, restaurants, and other areas frequented by shoppers. We noted the locations of on-street parking and car parks. Furthermore, we noted any problems we found regarding pedestrian safety, cleanliness of pavements, and ease of use of the crosswalks and pavements, and the bus and tube stops.

3.2.1. Familiarisation with Parking in Wimbledon

Car park attendants can be a useful source of information regarding the basic workings of a car park. The reason we interviewed the attendants was to save time; they were able to give us information based on their everyday observations of the parks that would have taken us extensive observation to gather on our own. This information includes who uses the car parks and when the car parks are busy.

Since our concentration is on shoppers who drive a short distance, we needed to know which car parks are used primarily by shoppers. We interviewed car park attendants at Wimbledon Bridge Long-stay Car Park and Centre Court Short-stay Car Park. The interview questions found in Appendix A were aimed at collecting information concerning what times the car parks fill and empty, whether employees or shoppers use the car park, and if they tended to drive alone or in a shared car. In addition, hourly rates at the lots were either given by the attendants or read off signs. This information can be found in Appendix B. A map of the car parks in Wimbledon Town Centre can be found in Appendix I.

These interviews had some disadvantages. Parking attendants are a good source of approximate information such as when a lot fills; however, they are not the best source for information regarding people's motivation to drive or how to change people's attitudes towards driving. They also did not have exact numbers of how many people enter and exit the car parks at specific times.

In addition to interviewing the car park attendants, we also counted the number of spaces available in the on-street parking areas and at the car parks without attendants. The streets were selected by using the criterion of their nearness to shops

in the town centre. To count, we walked around and noted the number of spaces. This process was repeated for the car parks that didn't have the numbers posted. The data collected was useful in our parking study when we needed to know the number of used spaces. Finally, we confirmed our counted numbers with Bernie Hewing from the London Borough of Merton. He is knowledgeable as to the amount of parking in Wimbledon and confirmed the data we got from the parking attendants.

3.3 Interviews at Key Shopping Locations within Wimbledon Town Centre

According to the Town Centre Capacity Survey of 1999, shoppers make up 53 percent of all the people entering Wimbledon Town Centre on a given day. Although Wimbledon attracts shoppers from all over Southwest London, many of the shoppers in the town centre come from areas only a short distance away. The same study shows that fifty four percent of people living in Wimbledon drive to the town centre to do their shopping, making shoppers an excellent group of people to target for reduction of car usage for short trips. In order to achieve our goal of recommending methods that the Borough can use to reduce short car trips, we found it necessary to establish what motivates shoppers to drive. Our project team decided that interviews administered in the town centre near various shopping locations would aid us in acquiring the information from our target population.

We chose interviewing in the town centre over other methods of data collection such as phone surveys, mail surveys, questionnaires, and door-to-door interviewing because we felt this method was the easiest, cheapest, and most effective method of collecting data. In addition, the fact that we administered the interviews in

the town centre during the day helped us to focus on a population that consisted mainly of shoppers. There are some drawbacks associated with interviewing. These include the time consuming nature of this data collection method and the fact that we are only able to collect data from the individuals who are willing to stop and share their time and input with us. However, we felt that the focus, speed, and response rate of an on-street interview outweighed the benefits associated with other data collection methods.

We designed the shopper interviews to gather information on where the interviewees came from, what mode of transport they used to reach Wimbledon Town Centre, and what motivated them to use that transport mode. Some of the respondents also went into detail on what would encourage them to use a more sustainable mode of transport than private car. Along with the three questions, we recorded the interviewee's age and gender and the date and location of the interview. A copy of the interview that we administered in the town centre can be found in Appendix C.

We asked an open-ended interview question regarding a person's motivations for using a particular mode of transport. We designed this question to be open-ended because it allowed the respondent to answer freely and without the bias of any pre-selected answers; we felt that if we had listed choices on the final question, we might have missed answers that otherwise could have been frequent responses. Nonetheless, there is a possible drawback to using open-ended questions. If the respondents have not thought about the topic before the interview, then they may not have an answer for the question. In this case, an interviewer can pursue two options; first, the interviewer can thank the respondent and end the interview, or alternatively, he may choose to probe the respondent with a few possible responses. However, probing is risky

because it may bias the response and the interviewing procedure will not conform to that of the other interviews. As not to bias our data, we chose to end the interview instead of probe the respondent.

In attempt to target predominantly shoppers, we conducted our interviews in the town centre during the day. We started interviewing in the morning as the commute to work was winding down—this coincided with the time at which most stores and shops opened for business—and concluded our interviewing just as the afternoon commute home was beginning. The interviewing locations were selected throughout the town centre to get a mix of shoppers using the smaller shops along the streets and the shoppers using the larger stores such as Safeway and Sainsbury supermarkets and those in the Centre Court Shopping Centre. A map showing the various interviewing locations can be found in Appendix D.

London is a city notorious for its dreary, inclement weather. Weather, among other things, will have an effect on a person's shopping habits and on their willingness to stop and give an interview. We were fortunate enough when the weather was rainy to obtain permission to interview within the Centre Court mall. This helped tremendously because it would have been nearly impossible to convince anyone to stop outside for an interview. In all, we conducted interviews on rainy, sunny, cold, warm, and windy days. This is important because if all the interviews were collected on cold and wet days, then there may have been a bias on the use of transport modes that offer protection from the elements. Alternately, if the conditions had been warm and sunny during every interview there may have been a bias towards the use of transport modes that let one enjoy the weather.

When approaching prospective interviewees, the most important thing to do is to make them want to answer the interview questions. However, it is also imperative that the interviewer does not reveal too much information on the content of the interview because there is the potential to bias the sample population to people that express interested in, or to people who may be opinionated towards, the subject of the questions. The method that we used when approaching prospective interviewees was to appeal to their compassion, conscience, and sensibility. In our own individual ways, we mentioned that we were students working on a project in conjunction with the Borough of Merton that concerned the transport situation in the town centre. Our student status was intended to appeal to their compassion; we hoped that people would tend to be willing to help students. The transport issue was intended to appeal to people's conscience; the issue is one that affects the area in which they live and shop, and people may feel an obligation to help improve it. We also mentioned one of the most important characteristics of the interview was the fact that it only consisted of three questions and would take just a minute or two of the respondents' time. This part was meant to appeal to people's sensibility. Our method of approaching possible interviewees seemed to be an effective one, about one in five people who we approached stopped to give an interview. This can be compared to an average success rate for London of one in seven, as reported in the article, *Six Out of Seven Avoid Researchers Like the Plague* from The Independent on March 16, 2000.

With a data collection method that relies on the target population's willingness to participate in providing data, there exists the possibility that the sample population we interviewed may not be representative of the entire population we targeted. To validate our data and ensure that it came from an appropriate sample of the

population, we compared it with data from the Town Centre Capacity Study, a 1999 study performed by WS Atkins on behalf of the Borough of Merton. The study regarded the population accessing Wimbledon Town Centre. The main purpose of our interviews was to collect data regarding the motivation of shoppers to use a certain transport mode. Although this is a qualitative procedure, it was necessary to examine the data to ensure that we obtained a representative sample of the population. Data from the WS Atkins study concerning the demographics of town centre users and their transport modes was compared to our data. In this comparison we determined that we have a 95% confidence level that the data we collected came from a sample consistent with the WS Atkins sample for the 295 interviews we conducted of people accessing the town a short distance by car. From this data we compared the breakdown of transport modes used by the population that accessed the town centre from the W.S. Atkins Study with the percentages from our interviews. Please refer to Appendix E for the statistics formulae, the calculation of our confidence levels, and a comparison of the transport ratios.

3.3.1. Preliminary Analysis of Shopper Interviews

After the interviews were completed, we entered all the data into a database (Appendix F) so that it would be easy to access the different information that we needed to help form our recommendations for the Borough. The responses from the open-ended question were coded by shortening lengthy responses to one word and the codes were written down so that we could refer to the answers at a later time. With all the information in a database, we were able to access the information on individuals

who drove to Wimbledon Town Centre from a short distance. We examined the responses they gave and noted the most common ones. These responses were given heavy consideration in the process for formulating our recommendations.
From these interviews, we also collected data on the opinions of non-drivers and why they used more sustainable modes of transport. This data was considered essential to our study because we did not want to make recommendations detrimental to other modes of transport that are currently working well.

The responses of both short-trip drivers and non-drivers were grouped by the frequency of a response. The short-trip driver responses helped make a preliminary list of recommendations, while the non-driver responses were used to eliminate any recommendation that would negatively impact an alternative mode of transport. This preliminary list of recommendations will be used and narrowed in the integrated analysis procedure.

3.4. Method to Collect Data About Business

Our goal is to recommend methods to reduce car use for short trips to the town centre. One consideration when making recommendations of this nature is how such recommendations might affect businesses within Wimbledon Town Centre. The primary goal of these interviews was to obtain the opinions of business owners and managers regarding how they felt that changes in car usage would affect their businesses.

One possible recommendation that involves businesses would be an incentive program whereby the businesses encourage their employees and/or shoppers to use

modes of transport other than driving. An example would be giving a discount to shoppers who show a bus pass. In order for such a program to be implemented, the businesses must support it. Accordingly, the secondary goal of the owner and manager interviews was to determine if incentive programs would be supported. The business interview in Appendix G was created to gather this information from the businesses.

An interview with open-ended questions was used because we felt that it was the best way to obtain the desired information. The open-ended questions allowed the owner/manager to provide information beyond what would be gathered from multiple-choice questions that limit responses. Interviews with open-ended questions can be time consuming. For this reason, in designing these interviews we took into consideration the length of the interview. We limited the number of questions to 4.

The first question was designed to discover how business owners and managers feel their businesses would be affected if driving were discouraged within the town centre. We decided to break the question into two parts, one part regarding the short-term effects and the second part regarding the long-term effects, because a difference between perceptions of these effects was expected.

We designed the second question to determine if the business owners and managers felt their business would be negatively affected in either the long or short-term by a reduction in car usage within Wimbledon Town Centre. This open-ended question produced information on how to create recommendations that would limit the negative impact upon businesses.

The third and fourth questions regarded incentive programs. The third question was designed to determine if businesses are interested in participating in

such programs. The fourth question was designed to give the owners and managers an opportunity to give any ideas that could possibly be recommended.

The businesses that we interviewed were chosen to represent several types of shops existing in the town centre. This was to obtain a variety of opinions that the various shops had regarding the reduction of car usage. We identified the types of businesses we wished to target during our familiarisation with Wimbledon Town Centre, as described in section 3.2. of the methodology. These different business types included: a fast food restaurant, a collectible shop, a mall, a video rental store, a grocery store, a department store, a shoe store, a CD store, a book store, a pub, a cycle shop, a pet store, an electronics store, a music store, a liquor store, a photo shop, a street vendor, a café, a pawn shop, a bakery, and a convenience store.

We approached the owners and managers when the stores were not busy, which was usually right after they opened, and told them that we were students doing a transport project in conjunction with the Borough of Merton. If they agreed to answer our interview questions, we conducted the interview. We attempted to interview at each of the business types in the town centre. After conducting the business interviews within Wimbledon Town Centre we were able to begin the analysis process.

To begin the analysis, all of the interview data was placed into a database. The response to each part of the first question was recorded as positive, negative, or neutral. The total of each response was added up for both long and short-term. If there were a large number of negative responses compared to the other two responses, then it would be concluded that any recommendations must be careful so as not to harm business. If there were a large number of neutral or positive responses then it

would be concluded that business considerations are not as relevant in making recommendations.

If it were concluded that the opinions of the businesses were important in creating recommendations, then the responses to question two would be taken into account. If there were certain changes that would not harm businesses, then these would be taken into account during the integrated analysis process where each recommendation is ranked.

3.5. Method to Collect In-depth Public Opinions

We deemed it necessary to collect some information from the public that was more in-depth than the information we could gather from quick on-street interviews. The information from the on-street interviews was very useful but it did not always give us a good understanding of what people's motivations are for taking particular modes of transport. We found two ways of getting this information. The first was a series of forums on transport issues, specifically or the bus system, sustainable transport, and transport and environment, run by the Borough of Merton; the second was a debate on speed and traffic in Wimbledon. Sitting in and taking notes on the debate allowed us to gather in-depth insights from others. Also, these forums and the debate allowed our group members to raise issues, pose concerns, and obtain feedback.

The Borough of Merton is in the process of determining what changes can be made to improve its transport system, and therefore held multiple transport focus groups in late March. The Borough wished to obtain community input about what

needs to be improved with the local transport to update the Interim Transport Plan. Our group was also looking for the general population's feelings on the local transport, so these forums and debate offered an excellent opportunity for us to sit in on the meetings and understand how both the Borough officials and the residents would respond to the topics discussed, which included buses, transport and the environment, sustainable transport and the Wimbledon speed debate.

There were many advantages associated with attending the Borough's forums. Alternate methods of acquiring the in-depth information included facilitating our own focus groups or conducting numerous in-depth interviews. The problem with conducting numerous in-depth interviews is that its very time consuming and not feasible in a short time. Holding our own focus groups presents many problems also. First, the problem of getting people to show up. The Borough of Merton has the advantage of being able to advertise the forums and since the Borough is holding the focus group, people were more apt to attend to voice their opinion to the Merton Council who has a more direct influence on transport changes in the Borough than a group of college students. Secondly, planning and conducting our own focus groups would require research, planning, and practice. The Borough of Merton has experienced and trained moderators that can control the meeting to let all attendants to be heard express themselves, whereas we would be relatively inexperienced at facilitating these groups.

There were some disadvantages of the Borough run focus group. Many of the attendants may have specific complaints about a certain topics and feel as if they had to dominate the meeting with their opinion. The other possible disadvantage of these focus groups was that we were not in control. However, we did not have to worry

about the meeting getting out of hand because the Merton Council members had the ability to steer the questioning in the directions as to elicit the responses that the council members desire. The specific topics discussed in each forum are located in Appendix H.

The first forum we attended was on March 28th, run by a panel of Merton officials and heads of stakeholder groups, in regards to the bus system. The bus system plays a huge role in transport in London. For this reason we desired to obtain specific information regarding areas needing improvement within the bus system. We also felt that finding out good characteristics of the bus system would be beneficial so that our recommendations would not change anything that the people like about the bus.

We attended the next two forums on March 29th, run by a panel of Merton officials and heads of stakeholder groups, which were on sustainable transport and transport and the environment. From the sustainable transport forum, we also wished to discover what the public feels are the problematic and positive qualities of sustainable transport. From the transport and the environment forum, we desired to obtain a more focused discussion on ways to discourage people to end using the car for short trips using the deterioration of the environment as a motivating factor and again also the possible problems with public and sustainable transport.

Finally, we attended the Wimbledon Speed Debate on April 7th, run by a panel of Merton officials and heads of stakeholder groups. We wished to gather the opinions of the public about the effects that reducing the speed within Wimbledon Town Centre might have on reducing traffic and possible problems that this could present.

3.6. Parking Study

In Section 2.1. of the Literature Review, we outlined a six-step process for transport planning, and pointed out that it is important to be able to evaluate the success of each transport project to help determine how better to design the next project. One way of determining the success of a project is to conduct a benchmark study before the project recommendations are implemented and to conduct a follow up study after the effects of the recommendations have been realised. A benchmark is a representation of the characteristics of a given area at a certain point in time. Future studies of the same area can be compared to the benchmark and differences can be noted. The benchmark is a common tool in transport projects. It will be valuable to provide a method of measuring the success of the recommendations we outline in this Interactive Qualifying Project. The parking study we conducted will serve this purpose.

Based on survey data and the general character of the town centre, we deduced that the majority of people using the short-term car parks and the on-street parking spaces in Wimbledon Town Centre between the hours of 10:00 and 16:00 are shoppers. We also know from the WS Atkins Town Centre Capacity Study that a majority of the population shopping in the town centre drives there. Hence, we expected that if our recommendations were to be implemented and successful in reducing short car trips to the town centre, there would be less of a demand for parking during these daytime hours, and that fewer parking spaces would be used as a result. Since our goal is to reduce the number of people who drive short trips to the

Wimbledon Town Centre, and not the percentage, a reduced number of cars parking could indicate that the initiatives had been successful.

In order to count the number of parking spaces the shoppers were using, it was necessary to select times and locations at which shoppers would be parking; these shoppers have been assumed to be the majority of those who take short car trips to the town centre. The hours of 10:00 to 16:00 were determined to be the hours that the short stay parking was used primarily by shoppers. For our study, we extended the hours to 9:30 and 16:30 in order to have a better understanding of conditions leading up to and immediately following the times that we thought were important. We chose to conduct our study at Centre Court Car Park, Broadway Car Park, and Hartfield Road Car Park, all of which are short stay parking determined through our familiarisation of the area to be used primarily by shoppers. In addition to these car parks, shoppers also use some on-street parking areas. These were chosen as explained in Section 3.1.1. A map of the parking areas chosen can be found in Appendix I.

There were two methods used to perform the parking counts. The first method, which was used for counting the cars within the Centre Court Car Park, involved counting the cars that left and entered the car park. The second method, which was used for Broadway and Hartfield Road Car Parks and the on-street parking, was to conduct several counts of the empty spaces over a certain time interval. Both methods were used at the same time to give an estimate of the total usage of the town centre between the hours of 9:30 and 16:30 of a weekday and a Saturday.

The car park car count started at about 9:25. At this time the number of cars within the Centre Court Car Park were counted and recorded. Then at 9:30, a person

sitting outside the entrance to the car park began to count the number of cars that entered and exited the car park. The cars were counted for 15 minutes and then the numbers were recorded. This process was repeated every 15 minutes until 16:30, at which time the number of cars in the car park was once again counted.

The car count for Broadway, Hartfield, and on-street parking started at 9:30. This count was conducted by walking around to all parking spaces and counting and recording the amount of empty spaces. Performing this count once took approximately one hour. This was then repeated at 11:30, 13:30, and 15:30.

In order to take into account certain considerations such as the day of the week and the weather, the count was done on four different days, with several different weather conditions. We decided to conduct the count on a Thursday, a Friday, and a Saturday.

The number of cars parked within the various car-parking areas was calculated. The number of cars within the Centre Court Shopping Centre car park was calculated by adding the number of cars within the car park at the beginning of the counting interval to the number of cars that have entered, and subtracting the number of cars that left during the fifteen-minute interval. This resulted in an estimation of the number of cars within the car park at the end of each 15-minute interval.

For the on-street, Hartfield, and Broadway count, the number of empty spaces was subtracted from the number of spaces in each parking area to determine the number of cars parking there; these subtotals were then added up for each count. This gave an estimate of the total number of cars parking in the on-street parking spots as well as the Hartfield Road and Broadway short stay car parks at certain times of day. A follow-up study for this benchmark will be outlined in Chapter 5.

There are several possible sources of error in the parking count. In conducting the Centre Court Car Park count, there is a period of time between when the parked cars are counted and when one starts counting the cars that are entering and leaving. This is also the case at the end of the day when a final count of the cars in the lot is done. It is expected that the error from this will remain approximately the same, and should not be a problem for benchmarking purposes.

This method also assumes that most people who are making short trips to the town centre by car are parking in the counted parking areas. Some people who take short trips to the town centre do not use these parking areas. It is expected that the number of people taking these trips and not parking in these areas is small, and that therefore the benchmark should still be a good representation.

There is also the consideration that a construction project within Wimbledon Town Centre is in the process of being done. This project, known as the P3 project, is expected to increase business within the town centre, and therefore increase the flow of people into the centre.

3.7. Integrated Analysis Procedure

In order to develop recommendations, we analysed the data from the shopper interviews, the business interviews, and the forums and debate in an integrated manner. This process of integration began with development of initial recommendations. As described in Section 3.2., we determined from the interviews the most common reasons why people take short car trips to Wimbledon Town Centre. We then developed recommendations from ideas presented at the forums and debate. To rank each recommendation, we identified five criteria that representing the main issues from interviews with shoppers and businesses affecting transport policy decisions. Each of the criteria was assigned a weight based on its relative importance (7 being most important) to realising our goal. Seven was chosen as to keep the weight on the same scale as the ranking numbers for reasons discussed later. The following is a list of the criteria with their respective weights.

- **Criterion 1: The ability of the recommendation to address the concerns of the shoppers.**
  - Weight: 7
  - Comment: This criterion addressed the main point of our project goal and was therefore given the highest weight.

- **Criterion 2: The ease of implementation of the recommendation.**
  - Weight: 5
  - Comment: This criterion was important because it would have been impractical to recommend changes that could not have been implemented with relative ease. The assigned value takes into consideration the political resistance to the recommendation and the feasibility of the recommendation to be implemented.

- **Criterion 3: The expense of implementing the recommendation.**
  - Weight: 5
  - Comment: This was given the second highest weight since the Borough has a limited budget, the recommendations, which are reasonably cost effective, should have a heavier weight.

- **Criterion 4: The impact of the recommendation on the character of the town centre.**
  - Weight: 4
  - Comment: Although not the main focus of our goal, we felt that it was important to recommend changes with either no impact or a positive impact on the character of the town centre.

- **Criterion 5: The effect of the recommendation on businesses in the town centre.**
  - Weight: 4
  - Comment: As with the first criterion, this was not the main focus of our goal. That is why it was weighted lower than other criteria. However, we included this because we felt that it was very important that our recommendations had as little of a negative affect on businesses as possible.

We took each of the possible recommendations and assigned a value to them for each of the five criteria. Since recommendations can have negative and positive

impacts, we devised a numbering system that takes the varying range of the impacts into account. The values ranged from one to seven; 1 represented the most negative or least desirable change or affect, 4 represented no affect, and 7 represented the most positive or desirable change or affect. Seven was chosen because it was odd and there was a middle number so as to represent a neutral effect. The other reason is because we thought a 9 scale or higher was too many levels to distinguish the impact of the recommendation and might inflate the recommendation's impact on the various criteria. A lower scale would not allow for a wide enough range of values to distinguish the impact of the recommendation.

For the criterion *Impact on the Character of the Town Centre* we assigned the values based on how the recommendation would change the physical appearance of Wimbledon Town Centre. We used the UDP, ITP, our own knowledge and perceptions, and input from the public.

For the two criteria *Ease of Implementation* and *Expense of Implementation* we assigned the values based on our own experience in project planning and on input from the Borough.

For the criterion *Affects on Businesses in the Town Centre* we assigned the values based on the data and feedback collected from our storeowner and manager interviews.

For the criterion *Ability of the Recommendation to Address the Concerns of the Shoppers* we assigned values based on the data gained in our shopper interviews. Using the frequency histogram of the shopper concerns in *Figure 4*, we listed the concerns that each recommendation would address. Some concerns were raised more frequently by interviewees than others and were given greater weight. To assign

values, we totalled the frequencies of each of the concerns addressed by the recommendation. To place the totals on a scale of 1-7, the greatest total was divided by a constant so that its answer was 7. All the totals were then divided by that same number, placing each total on a 1-7 scale.

With a value assigned to each recommendation for each criterion, we were then able to score and rank the possible recommendations. We multiplied each value for each recommendation by the weight of the respective criterion. Then, we added the results to obtain a score for each recommendation. The highest score reflected the recommendation that encompassed each category, weighted appropriately. The scores were ranked, plotted out, and gaps in the graph were noticed. A gap appeared after the top five recommendations. Because of the Borough's limited resources we concluded that this would be a logical place to separate the highly recommended recommendations from the rest of the recommendations.

4. Analysis

This chapter details the data we collected using the methods presented in the previous chapter. When we introduced the data collection methods, we also made a few generalizations on what data we would hope to gain. In the following sections, we present the field data collected and how we used the resulting information to devise our recommendations. Shopper interviews were a main source of data that explained why people drive. In addition, other sections present analysis of the results of the business owner interviews, the Merton focus groups and the Wimbledon speed debate, and the parking study. The integrated analysis procedure helped us to determine which recommendations to present to the Borough of Merton.

4.1. Shopper Interview Results and Data Analysis

In gathering data from the shopping population of Wimbledon Town Centre, we performed two hundred and ninety five interviews, with a response rate of 21.4%. A database of the information from these interviews can be found in Appendix F.

As a test of the degree to which our data is representative of the population of shoppers using the town centre, we compared our data with data from a 1999 survey conducted by WS Atkins on behalf of the Borough of Merton. We used the Atkins study as a comparison because it was conducted very recently and because it targeted a large population. Specifically, we compared the percentages of the people who took various modes of transport. *Figure 3: Transport Modes* is a graph comparing the

data we collected with that from the Atkins study. Of the people we interviewed, 56% drove, 13% took the bus, 24% walked, and 7% took other modes of transport.

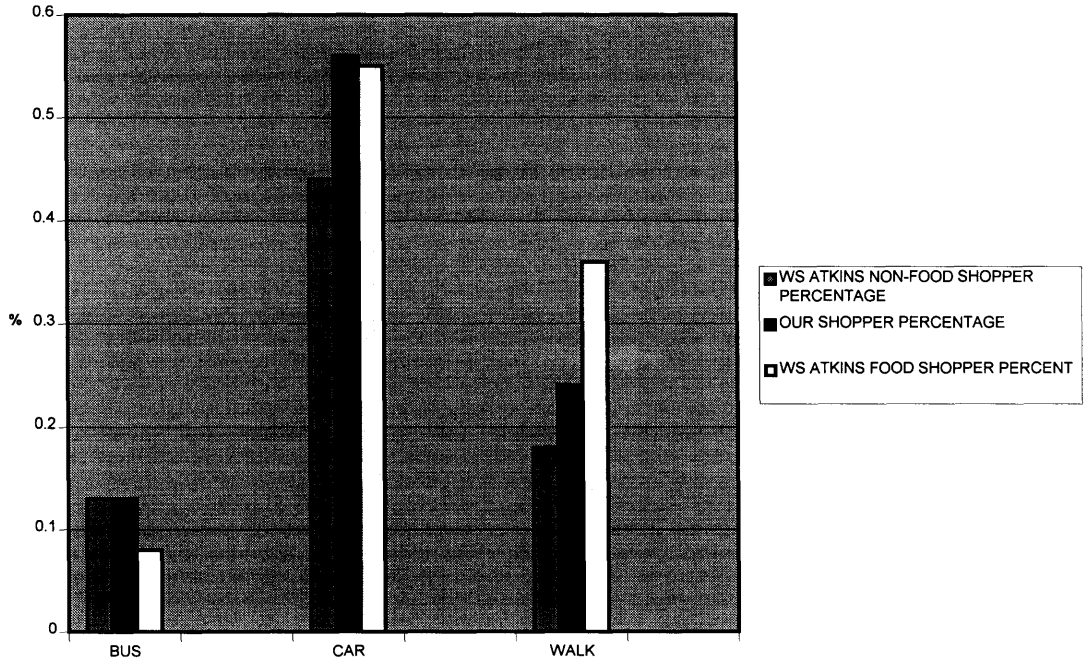

Figure 3: Transport Modes Used by Shoppers Travelling Short Distances, Compared Results of 1999 WS Atkins Survey

With the exception of those who drove, our values fall between the values from the WS Atkins study. The two groups of shoppers the study identified were food shoppers and non-food shoppers. Since our sample population is made up of both groups of shoppers, we would expect our percentages to fall between the two. This is not the case for the private car users, but the percentage falls only one percent above the range from WS Atkins's survey. This may be a result of any of the interviewing drawbacks associated with interviewing outlined in Chapter 3.2.

Of the 295 people interviewed, 109 (37%) people had driven a short distance. The reasons given by the interviewees for using their chosen transport modes were entered into a database. This information can be found in Appendix F. Below is a

frequency graph of the answers given by those we surveyed who travel a short distance to Wimbledon Town Centre.

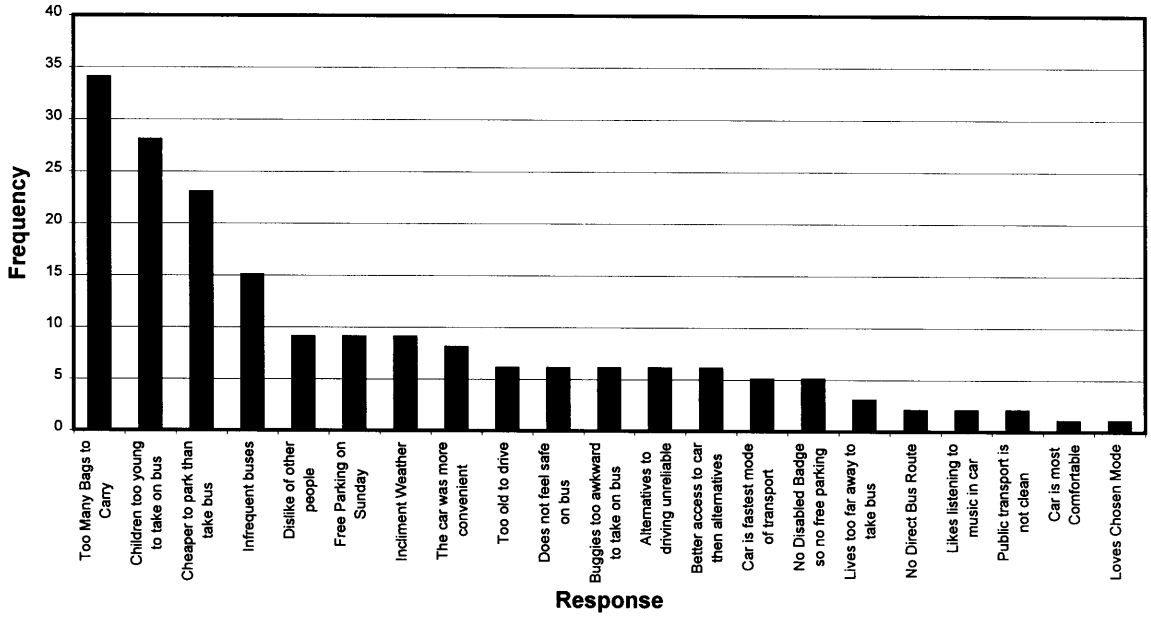

Figure 4: Frequent Responses to Why Drivers Drive Over a Short Distance

The most frequent reasons given for driving were shopping bags, children, money concerns, and infrequent buses. If one were to repeat our parking study, we are 95% confident that of the people who drive a short distance to the town centre, 31.2% ± 8.9% would consider bags to be a reason for driving. Similarly, 25.7% ± 8.4% of respondents would believe having children with them to be a reason to drive, 21.1% ± 7.8% would believe costs to be a reason to drive, and 13.8% ± 6.6% would believe the infrequency of the buses to be a reason to drive. When forming recommendations to decrease car usage, these four issues were most highly considered.

Of the 295 people interviewed, 136 of them were found to have taken modes of transport other than by car. From these people, we hoped to learn what they liked about their particular mode of transport. This information was needed to ensure that no recommendations made would decrease the amount of people presently using transport modes other than the car. A frequency diagram can be found in *Figure 4*. There is a 95% confidence that 10.8% ± 4.6% of the people who use modes of transport other than driving to shop considered the free pass to be an attractive aspect of the public transport system. The next two most frequent reasons, both at 4.2% ± 2.9%, were that the respondent was too old to be using other transport means, and that the cost of public transport. These three, being the most frequent responses, were given high consideration when making our final recommendations.

4.2. Analysis of Data from Business Owners/Managers

Wimbledon has shops selling goods ranging from pet supplies to jewellery, restaurants serving anything from Mongolian barbecue to traditional boiled dinners, along with pubs, grocery stores, and department stores. All of these exist in a unique environment. Wimbledon has a mall, Centre Court, with an array of stores, and a main street, Broadway, lined with thriving shops. With the interviews of store business owners and managers in Wimbledon Town Centre, it was our goal to gather opinions from as many different types of establishments as possible. Twenty-six businesses within Wimbledon Town Centre were targeted for interviewing. Out of the 26 targeted, 23 agreed to be interviewed. A list of the businesses interviewed and their responses is located in Appendix J.

The responses to the two main questions were grouped under either positive, negative, or neutral. Positive means that the business would improve if car use were reduced within Wimbledon Town Centre. Negative means that the business would suffer loss if cars were reduced within the town centre. Neutral means that the business would not be affected by a reduction in car use in the town centre.

The results of the questions on how businesses felt they would be affected by a decrease in car traffic can be found in *Figure 5: Business Concerns Frequency Graph.*

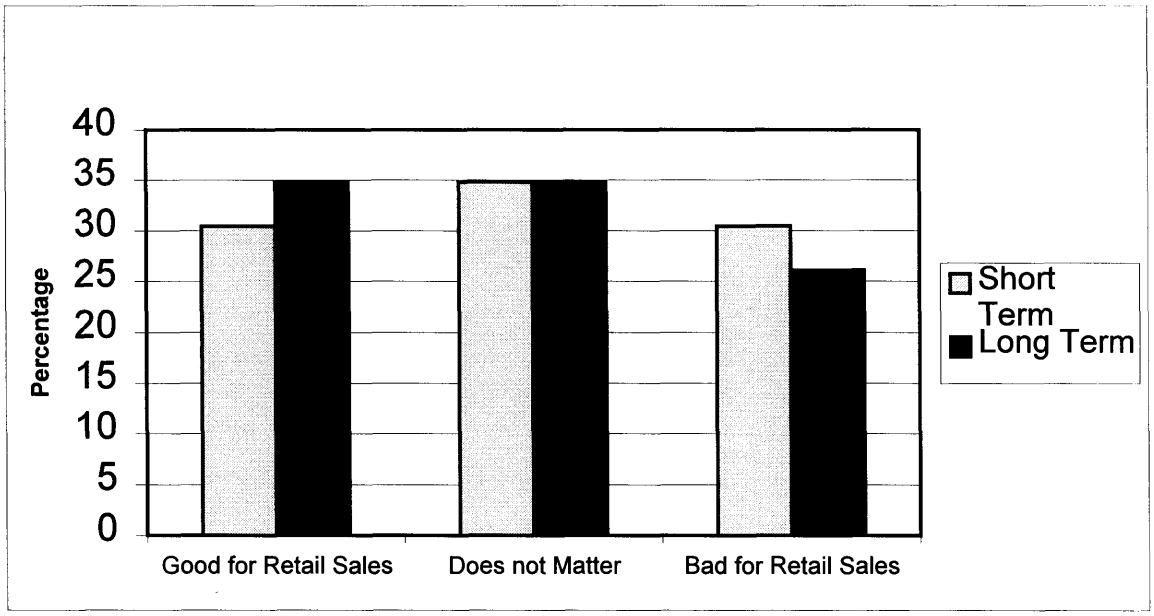

Figure 5: Business Concerns Frequency Graph

Our data shows that a 35% of the business owners/managers feel that they would be unaffected in both the long and short-term. The data also shows that 30% of the interviewees foresee positive short-term affects and 35% foresee positive long-term affects due to a reduction in car traffic, while 30% of interviewees foresee negative

short-term affects and 25% foresee negative long-term affects due to a reduction in car traffic.

4.3. Analysis of the Focus Groups

The Merton Transport Forums were a way to get an in-depth view on what specific transport problems are occurring in Merton. These forums were held over two nights. The first night about 40 people from the Borough showed up. Forty percent of these people were women over 50 and thirty percent were men over 50. This limited demographic presents the problem of the forum not being completely representative of the entire population.

About half of these people attended the focus group pertaining to buses. In this meeting, a representative from London Transport discussed some of the criteria in selecting the placement of a bus stop. The representative explained there are certain guidelines that should be adhered to, but no set-in-stone criteria to follow.

The focus group attendees were asked how they would like to see traffic regulated to result in better service from the bus system. The major complaint was that the buses were infrequent; people have to wait too long for the buses to show up. When the buses finally arrive, it was argued, they come in a convoy, despite the fact that a representative of London Transport claimed this to be a myth in the Borough of Merton.

The attendees then wanted to target how to fix this problem. One suggested method to reduce this infrequency was to eliminate parking and the driving of cars in the bus lane. Currently, the law in Merton says there can be no parking in bus lanes,

but that it is acceptable to drive in them. Merton is considering changing the law to make it illegal to drive or park in these bus lanes. The main problem with this is enforcement of the regulations. One attendee suggested enforcing the law using moving cameras that are attached to the buses, with the hope that the fear of a ticket might deter people from abusing the bus lanes.

Another concern of the citizens was having more direct bus routes to places of interest. One such example is the hospital; currently, there is no direct route that travels between Mitcham and St. Heliena's hospital. Instead, people have to change buses to get there, while direct bus routes to the hospital service other areas. Another example is direct bus service to the tram link; there is no link between Mitcham Town Centre and the tram at Mitcham Junction.

The remainder of the people at the forum attended the other two workshops, one on rail and intermediate modes, and the other on integration of modes of transport. The main points of the integration were the need for accessibility to all services by all people and the desire for information that is easier to read. The main point of the rail focus group was better accessibility and feasibility.

The second night of forums focused on transport and its effects on the environment. The attendance level was about 40 people, and the gender and age breakdowns were about the same as the night before. Two workshops were attended on this night. The first was on sustainable transport and the second was on transport and the environment.

The transport and the environment forum addressed the ways to reduce car usage in the Borough and how car usage affects the environment. The chairman of the Chamber of Commerce, representing the businesses of Wimbledon, suggested that

one way to decrease car usage is to increase pricing. It was found in a recent survey sponsored by the Borough that 67 percent of the Borough's residents are in favour of road pricing as long as the money goes into the Borough or Public Transport.

The Wimbledon Speed and Traffic Debate was held on April 7, 2000 at 6:30pm. The focus of the debate was to determine if there was a need to reduce traffic speeds in heavily urban areas from 30 mph to 20 mph. John Ellison chaired the debate and four panellists sat on the debate, including Richard Evans, Allan Branscombe, Harvi Mudhar, and John Stewart. Richard Evans, a cycling advocate and member of the European Carfree Campaign, believes that cyclists have a fear of the road, and that reducing downtown speed limits from 30 mph to 20 mph will create a friendlier environment for cyclists. Allan Branscombe, a pro-car driving instructor, also believes that 20 mph speed limits are necessary to lower the accident to driver ratio, but does not think that 20 mph limits need to be imposed city-wide. Harvi Mudhar, the Head of Merton Traffic and Parking, wants the speed limit to be lowered to 20 mph to reduce the pedestrian/driver fatality rate in London. He states that over 3500 people are killed, 40,000 people are seriously injured and 204,000 people are in accidents in London each year. John Stewart, Transport 2000, wants to reduce traffic speed to 20 mph an hour on main roads. He then pointed out that Prime Minister Tony Blair only wants a speed limit of 20 mph to be enforced in residential areas, though.

The demographics of this debate were what we expected. There were about 60 concerned citizens at the debate, and there was a 55% female and 45% male gender distribution.

The first topic of debate was over the use of speed humps versus the 20-mph speed limit. The question is, if a 20-mph speed limit were to be used, who would be in charge of the enforcement? The police cannot put any priority on traffic enforcement.

Richard Evans pointed out that reducing the speed limit to 20 mph will help reduce accident deaths. In the UK, 70 percent of the drivers on the road exceed the 30-mph speed limit. At 30 mph, a pedestrian has a 50 percent chance of dying, at 40 mph, a pedestrian has a 90 percent chance of dying, but 20 mph there is a 90 percent chance of survival.

4.4 Parking Benchmark

In order to set a benchmark to determine if implemented recommendations are successful in reduce car traffic within Wimbledon Town Centre, we conducted a parking count at the Centre Court Centre car park and the area street parking between the hours of 9:30 and 16:30. The Centre Court car park has a full capacity of 700 spaces. *Figure 6*, The Estimated Number of Cars in Centre Court Car Park, shows the approximate number of cars in the lot at each given fifteen-minute interval. Both the weekday lines show a trend of increasing users until 13:30, at which time they begin to level off and then decline at 14:15. Saturday, which we expected to be a heavier shopping day, peaks later at 15:00 and higher at 596.

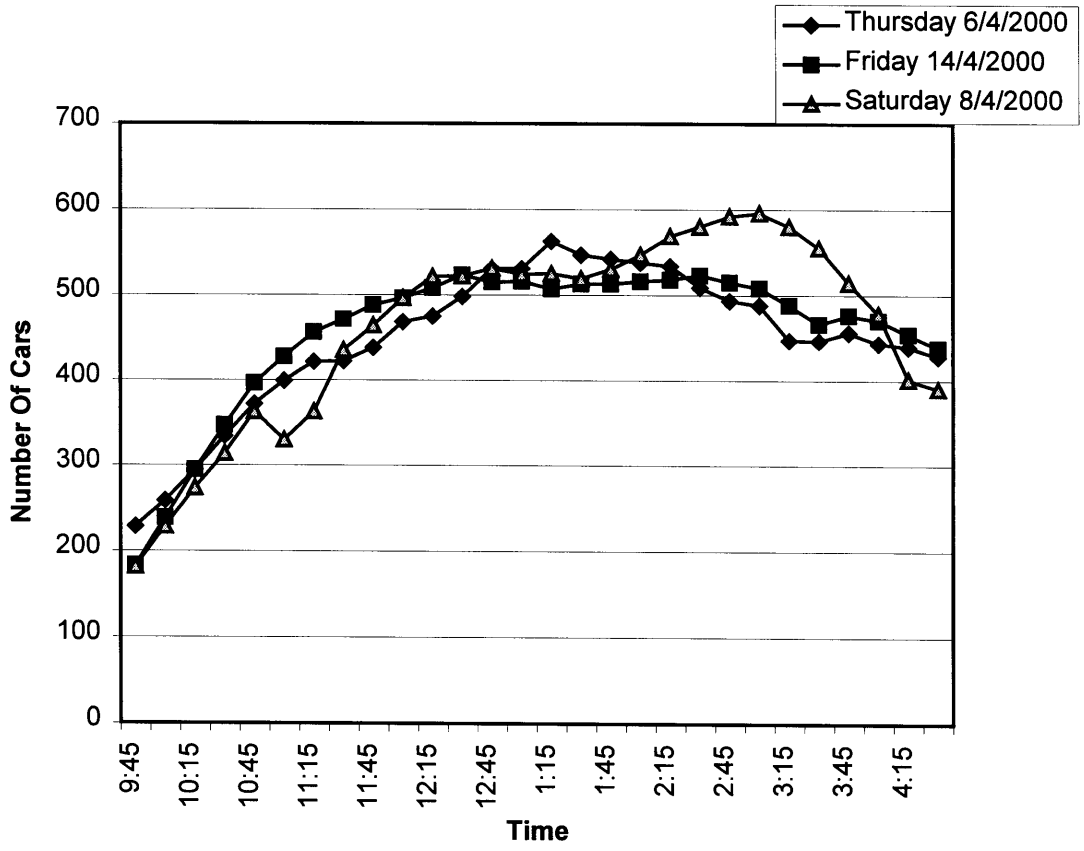

Figure 6: Estimated Number of Cars in Centre Court Car Park with a Full Capacity of 700 Cars

Since the graphs during the week, one representing a Friday and one a Thursday, both have similar shapes and peaks during the day and were consistent over a varied weather, we conclude that they accurately represent the weekday trends of shoppers using the Centre Court car park for the amount of shoppers for the season before Easter weekend. Saturday starts climbing at about the same rate as the weekday graphs but peaks higher and later showing the increased amount of car users. There was error involved in the count is not a major issue in regards to a benchmark because it was about the same for the weekdays and weekend (45 for Thursday, 40 for Friday, and 51 for Saturday).

Weather is one possible factor that could have influenced our data. Depending on if the day is cold and rainy or warm and sunny, the number of drivers could change but the trends should still be the same. Our count was taken on a variety of weather conditions. Thursday was cold, windy, damp. Saturday was sunny and warm. Friday was cold and windy. However, the trends and the numbers at various times were similar. This implies that for our parking count the weather is not as important as other considerations.

A source of possible error is missing cars that entered or left the car park. This could have occurred when we stopped to count parked cars at the beginning and end of our study, since while we were counting them cars were entering and leaving the car park. Human error is another possible source of error, not noticing a car for instance. This error was consistent for the three days. There was error of 45 on Thursday, 51 on Saturday, and 41 on Friday. Because the percentages are all approximately the same, for the purpose of a benchmark the error can be neglected

since we are comparing the data and not looking for the actual number of cars in the car park.

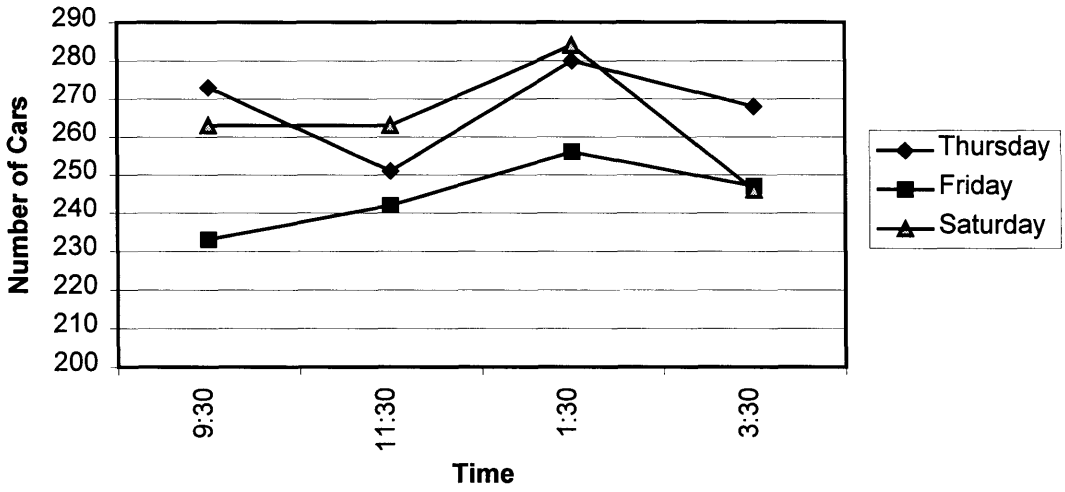

Figure 7: On Street Total Parking Values

The other method we used was on the street counting. In *Figure 7*, On Street Total Parking Values, one can see the total amount of spaces used out of 334. The values peak during the 13:30 count. These peak values are 280 on Thursday, 56 on Friday, and 284 on Saturday. This is approximately the same time the number of cars peak in Centre Court car park, showing that the shoppers, who are our target audience, most likely use both of these parking areas.

4.5. Integrative Analysis

Development of our recommendation was a process of combining all information into a measurable means. The basis for developing our recommendation was threefold. First, our recommendations needed to address the problems of those

who drove short distances without affecting the current benefits of sustainable transport. Second, our recommendations needed to be formed as to ensure that there would be no harm done to the businesses in the area. Finally, they needed to incorporate the ideas of the Borough citizens that we gathered at the forums and debates.

After analysing the opinions of shoppers and the data from the forums we developed a list of twenty-one possible recommendations. A complete list of recommendations can be found in Appendix K. *Figure 8: Recommendation Ranking Chart* depicts the rating and ranking system explained in Chapter 3.7 of the Methodology.

Possible Recommendation	Impact on Character of Town Centre (4)	Ease of Implimentation (5)	Ability to Address Concerns (7)	Expense (5)	Affects on Businesses (4)	Score	Rank
1. Install overhead bag storage on buses	4 16	2 10	5 35	3 15	4 16	92	14
2. Install underseat bag storage on buses	4 16	3 15	5 35	4 20	4 16	102	9
3. Install child seating on buses	4 16	2 10	5 35	3 15	4 16	92	13
4. Increase parking fares, use £ for promoting sustainable transport	5 20	6 30	7 49	6 30	4 16	145	1
5. Implement driving tax for residents, use £ for promoting sustainable transport	6 24	3 15	4 28	6 30	4 16	113	5
6. Enforce parking/driving regulations for bus lanes, £ goes to enforcement and promoting sustainable transport	4 16	2 10	3 21	5 25	4 16	88	16
7. Eliminate on-street parking	7 28	5 25	5 35	5 25	4 16	129	2
8. Designate roads only for bus, taxi, commercial loading/unloading	5 20	1 5	4 28	5 25	4 16	94	12
9. Install better ventillation on buses	4 16	2 10	2 14	3 15	4 16	71	20
10. Install air fresheners on buses	4 16	5 25	2 14	7 35	4 16	106	6
11. Create family fare for buses	4 16	5 25	7 49	4 20	4 16	126	3
12. Install places for strollers, buggies, wheelchairs on buses	4 16	2 10	3 21	2 10	4 16	73	19
13. Add more bus lanes	5 20	5 25	5 35	1 5	4 16	101	10
14. Add more bus stops and direct routes	4 16	4 20	6 42	2 10	4 16	104	11
15. Designate separate buses for high school children	4 16	4 20	1 7	4 20	4 16	79	18
16. Install message boards at all stops with updated information	4 16	3 15	4 28	3 15	4 16	90	15
17. Connect cycle routes	5 20	3 15	1 7	2 10	4 16	68	21
18. Decrease speed around T.C.	5 20	6 30	2 14	5 25	4 16	105	7
19. Install road humps, not in bus lane, deliveries in bus lane	2 8	4 20	4 28	2 10	4 16	82	17
20. Implement public transport tax with free travel card	4 16	5 25	4 28	6 30	4 16	115	4
21. Education on benefits of sustainable transport	4 16	7 35	1 7	6 30	4 16	104	8

Figure 8: Recommendation Ranking Chart

After each recommendation was scored and ranked, we needed to select a cut-off point that would allow the Borough of Merton to address the traffic issues with the most affective recommendations. It was necessary to reduce the number of recommendations from 21 to a smaller number because the Borough has only limited resources for implementing the changes. *Figure 9: Prioritising our Recommendations* shows the prioritisation of recommendations. The top five are the recommendations the Borough should look into accomplishing first. The reason we chose the top five was that there is a distinct cut-off that these recommendations ranked much higher than all the others.

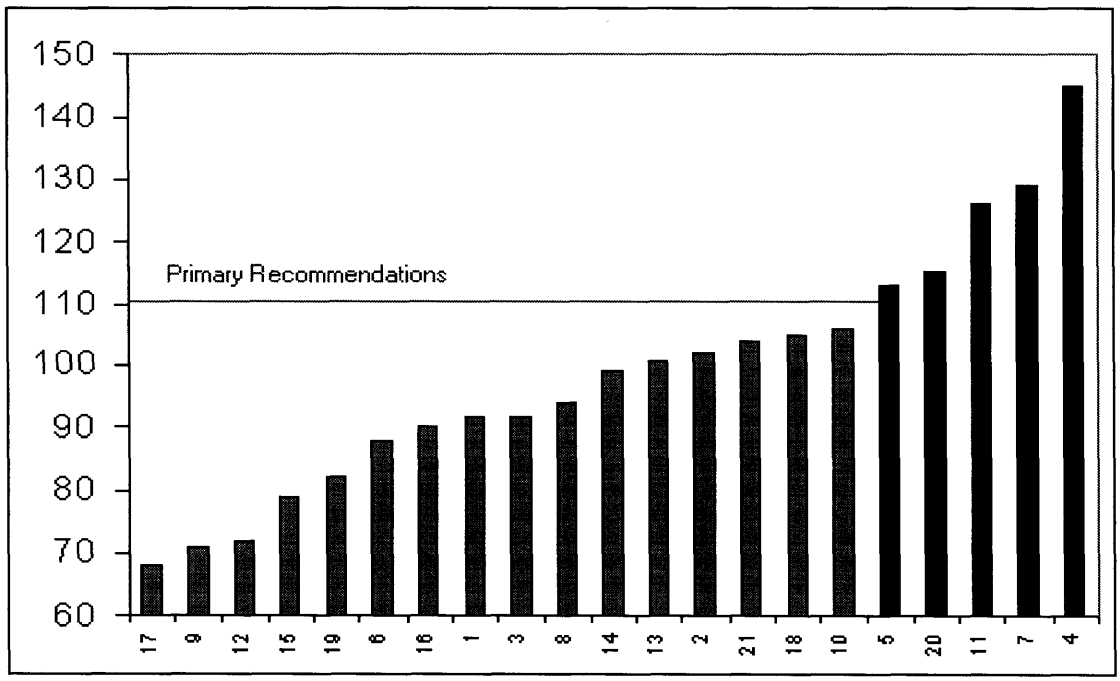

Figure 9: Prioritising our Recommendations

5. Recommendations

This chapter details our recommendations to the Borough of Merton to reduce the number of short trips made by car to Wimbledon Town Centre. All possible recommendations were evaluated as described in the previous chapter, resulting in the five final recommendations. The five recommendations are listed here in decreasing order of their expected effectiveness. Implementation of the recommendations, as well as the advantages and disadvantages of each, is explained. Also, measuring the success of our recommendation is important and we have devised a follow-up study.

1. Increase the parking fees to a point just above the fares for the bus.

Many respondents indicated that they drove because it was cheaper to park than pay a bus fare. If the minimum parking fee were always more than the fare for public transport, this would no longer be a reason to drive. In addition, the increased revenue from the parking can be put towards improving sustainable transport in the town centre.

The current bus fare for Zone 4 is 70 pence, one way. This price translates to a £1.40 round trip fare. To park in most short stay car parks is only 50 pence an hour. An example of how this recommendation could be implemented is to increase the price of parking in the car parks to £2 for the first two hours and then 50 pence an hour for each additional hour. Establishing the rate of the new parking fees would be a responsibility of the Borough and would probably require a small study. The initial cost of implementing this recommendation is very small.

2. Eliminate metered on-street parking within Wimbledon Town Centre.

By eliminating the availability of on street parking within the town centre, the convenience of driving is decreased because drivers are no longer able to park near their destination. In addition, not having cars parked on the streets would reduce congestion on the streets and improve the look and character of Wimbledon Town Centre.

The road space once utilised by the parking spaces can be used in many ways. This free space could be converted into bus lanes, more pedestrian walkways to increase pedestrian traffic, or the space could be used for residential parking. Most importantly, the Borough of Merton should display the fact that the spaces were eliminated so that people know not to park there. Again, the costs for this are relatively small especially when compared to the costs of major construction projects.

Businesses could be affected by eliminating parking. Most business managers believed that a reduction of cars would have little or no effect on their establishment. Those businesses on the outskirts of town centre said that business would not be affected by the reduction of cars because people are not willing to pay for an hour of on-street parking. They believe a reduction in car traffic may actually increase the amount of business because if more sustainable modes of transport were promoted, people maybe more likely to walk by their stores. The business closer to the town would not be negatively affected by this change in on-street parking because they believe most of the people using their shops are going to park in a car park. A few businesses stated that they thought that eliminating on-street parking would be

beneficial since people would be forced to park in car parks and walk past their businesses. If more people would stroll past their businesses, more people might stop and shop.

3. Evaluate the "family discount" options available for use on public transport and make the bus an ideal financial choice for the entire family.

In many cases it is substantially cheaper to pay for parking than to pay for the entire family's bus fare. London Transport has no family pass specifically for the bus. London Transport, which allows access to the Underground, London Transport buses, the Tramlink, and National Rail Services within Greater London, does have a family plan with their Travelcards, but are quite expensive if the family wishes to purchase one to use just for the bus. To address this problem, a day bus family pass should be developed for all family trips. For example, the card could be for one or two adults travelling with between one and four children. The fares could be £1 for an adult and 50 pence for children. This fare for an average family of two adults and two children is cheaper than buying the separate tickets for a round trip. As with the parking charges in Recommendation 3, the actual fare would be the focus of a further study.

In addition to encouraging public transport use in the short-term, adults using the public transport system will familiarise the younger family members with the transport system and demonstrate to the children that it is a favourable mode. When they grow up they will then hopefully continue to use public transport.

This recommendation does have disadvantages. One is the power of and the ability Merton has to change fares, London Transport may be the only organisation that is able to set the fares of the buses. This process might also be time consuming.

4. Implement a Borough wide public transport tax.

The Borough should implement a public transport tax. The money from this tax would be used to provide everyone within the Borough a year round Travelcard. This would be equivalent to making everyone buy a Travelcard. If everybody possessed a Travelcard, they would feel more inclined to use the public transport system instead of their cars, because the cost of taking public transport has already been paid for. The tax could come from an income tax or property tax, however more research must be done to determine the best way to obtain this tax.

From our data on what people like about modes of transport other than cars, we determined that the Freedom Pass, a free pass given to the elderly and the disabled, is a beneficial aspect of public transport that it should not be eliminated. To accomplish this, the elderly and disabled who already receive a free travel pass should be exempt from this tax. Implementing this recommendation would not be expensive. This process may be time consuming and politically difficult. Also it would need to be approved by London Transport.

5. Implement a tax for Borough residents and use the revenue for promoting sustainable transport

Since the focus of this project is to help reduce the use of cars, implementing a car tax on Borough residence would deter citizens from using or purchasing a car. Two ways that the tax could be placed are on an odometer reading or an ownership tax. The odometer tax would be based on the number of miles the car is driven. The odometer reading would be taken at the time of inspection and the tax would be issued based on the amount of miles driven. This is the responsibility of the Borough and the Borough would handle the initial cost of setting up the tax. There be public and political resistance to the tax from all those who drive great distances to work or to shop. A further study would have to be conducted to determine the best way to implement this tax.

Another means of implementing this tax is to tax cars bought in the Borough. With the price of a car, a tax would be imposed before buying and the consumer would pay the tax. This is also the responsibility of the Borough, and the Borough would handle the initial cost of the tax. There would be a political resistance to this tax from those businesses that sell cars and from frequent buyers of cars. Further research would be needed to determine the best way to implement this tax and overcome some obstacles such as people going to other Boroughs to buy their car. A tax such as this would be more affective if it were implemented London wide.

The revenue from this tax could in turn be used to promote sustainable transport. Some options for the use of this money are to lower public transport charges, to improve public transport and pedestrian areas, and to connect and develop cycling lanes.

Our final recommendation is that the Borough of Merton conducts a follow-up parking study to measure the success of the previously mentioned recommendations. This follow-up parking study should be conducted after any implemented recommendations have had time to take effect.

All the car parks, including the on street parking, tended to follow the same capacity characteristics, such as reaching maximum capacity at about the same time of day. This similarity allows a follow-up car count to focus on just one of the car park areas rather then all of them, expecting the others to have the same trends. The Centre Court car park was counted the most accurately and is the most commonly used car park for shoppers within Wimbledon Town Centre. This makes Centre Court car park a good location for a follow-up study. For these reasons, we recommend that the count be conducted at the Centre Court car park.

This count will involve counting the number of cars in the car park. The count should take place on a weekday and at any fifteen-minute interval between the times of 09:30 and 16:30. For example, the count could be conducted Wednesday at 10:30, 12:30, and 14:30. The count needs to be conducted multiple times during this time frame in order to assure accuracy. The number of cars within the car park is then compared to the number of cars from our parking study, which can be found in *Figure 6: Estimate Number of Cars in Centre Court Car Park with a Full Capacity of 700*

Cars. If the number of cars within the car park is less then our estimated total minus 51, which was our maximum error, at the same time of day, then this may indicate that the number of cars taking short trips to Wimbledon Town Centre has decreased. If the number cars have remained the same or have increased then the results are inconclusive, requiring a method to determine if the people using the car park are still mostly people taking short trips to the town centre. Some example of possible data collection methods are surveying to see where people arrived from, or checking the licence plate to determine the cars origin.

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Appendix A

Parking Lot Interview

1. Does the parking lot fill up? If so, at what times?

2. About what percentage of the lot users are:

   Shoppers

   Employees

3. About what percentage of the lot users:

   Carpool

   Drive in Alone

4. Do you think an increase in parking fee deter people from driving?

Appendix B

Car Park Results

Location	Wimbledon Bridge		Centre Court	Queen's Road	Hartfield Road	St George's
Type of Lot	Long Stay		Short Stay	Long Stay	Short Stay	Long Stay
Lot Service	Attendant		Attendant	Machine Pay	Machine Pay	Machine Pay
Number of Spaces	250		746	173	115	190
Time the lot is full	10-6:30pm	Week	1-6pm	N/A	N/A	N/A
		Weekend	1PM	N/A	N/A	N/A
Types of people who use the lot						
Shoppers	50%		90%	N/A	N/A	N/A
Employers	50%		10%	N/A	N/A	N/A
Percentage of:						
People share cars	25%		10%	N/A	N/A	N/A
People who drive alone	75%		90%	N/A	N/A	N/A
If fares increased, would parking decrease	NO		No			
Fares per Hour	50p/hr					
	no charge after 6:30					
1	max 5 pound charge		50p	50p	50p	
2			1	1	1	
3			1.5	1.5	1.5	
4			2	2	2	
5			3	2.5	3	
6				3	5	
7				3.5	6	
8			8	4.5	8	
12			12	6	12	
over 12			15			

Appendix C

Shopper Interview Questions

Location: Date:____ / April / 2000

SEX: M F

AGE: 0—16 17—25 26—45 46—65 66 +

1. In what part of London do you live?

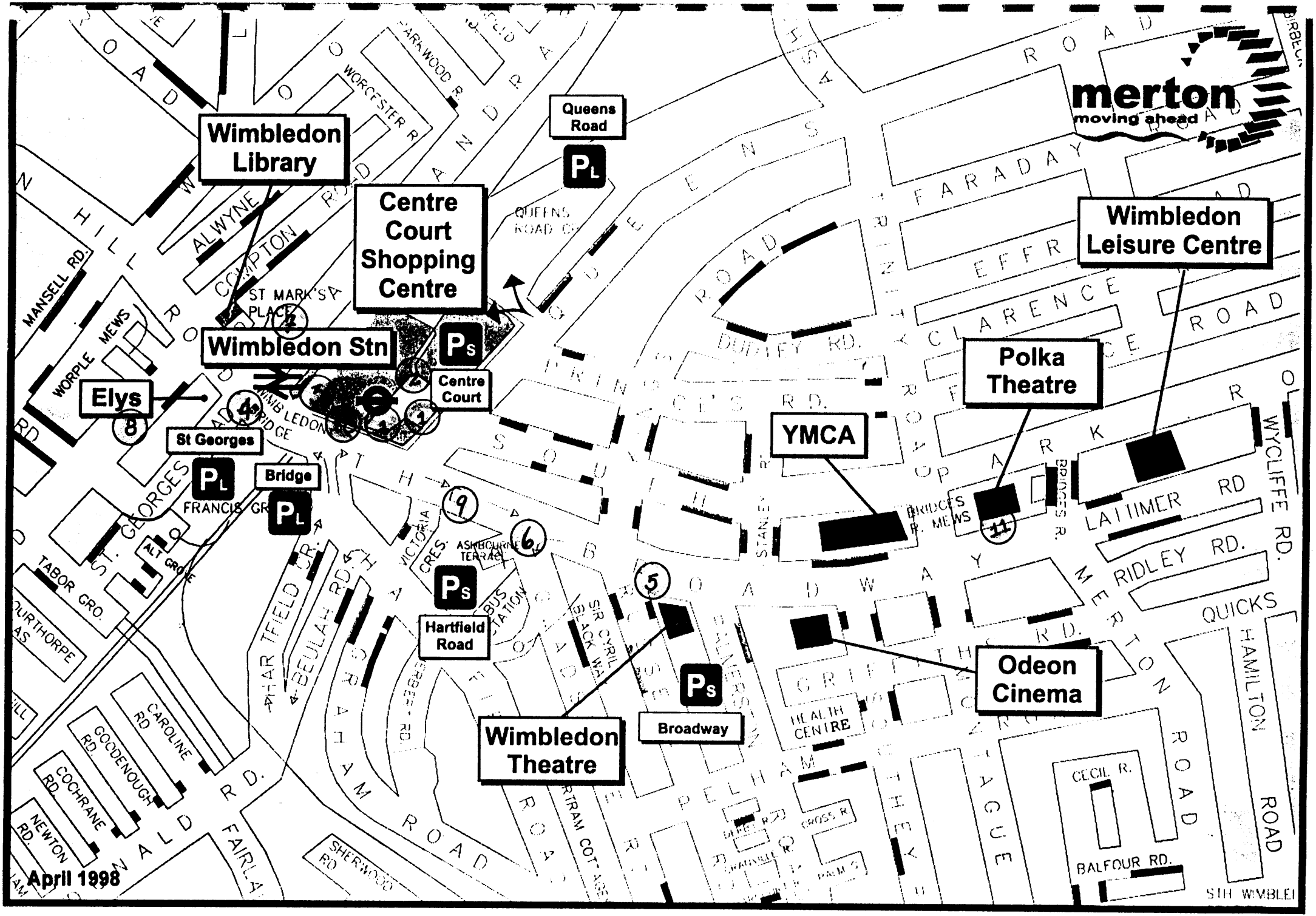
2. What mode of transport did you take to the town centre?

   Car Bus Cycle Rail Tube Walking

3.a. If car: What would encourage you take an alternative mode of transport to the town centre?

3.b. If not car: Why did you use _____? (use answer from 2)

Appendix D


merton
moving ahead
Wimbledon Library
Centre Court Shopping Centre
Queens Road
Wimbledon Leisure Centre
Polka Theatre
Wimbledon Stn
Centre Court
Elys
St Georges
Bridge
YMCA
Hartfield Road
Broadway
Wimbledon Theatre
Odeon Cinema
April 1998

Appendix E

Statistical Formula

For a 95% Confidence that a repeated survey will lie within the given interval:

$$S.E. = \sqrt{((P*(1-P))/N)}$$

Where SE is the sample error, P is the percentage of the population that chose that option, and N is the sample size.

2 * S.E. is the confidence interval

Example:

50% of a population of 75 chose option X.

S.E. = ((.85*(1-.85))/75) = .04123 or 4.123%

2*S.E.= .08246 or 8.246%

There is a 95% confidence that if the experiment is repeated, 85% +/- 8.246% would chose option X again

Appendix F

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
1	1	M	17	MITCHAM	BUS	TIME,UNR,COMFORT	
2	1	F	26	WIMBLEDON	CAR	GROCERY	
3	1	F	26	MITCHAM	CAR	NOTHING	
4	1	F	46	WIMBLEDON	BUS	FREQ,RESTRICT	FREE PASS
5	1	F	26	WIMBLEDON	CAR	CLEAN,UNR,SAFE	
6	1	F	66	WIMBLEDON	CAR	TOO OLD,GROCERY	
7	1	F	26	MERTON	CAR	CHILD,STROLLER	
8	1	F	26	SUTTON	CAR	PEOPLE,WORK	
9	1	M	46		BUS		
10	1	M	26	RAYNES PARK	WALK	RESTRICT,PTR,PEOPLE	
11	1	F	26	WIMBLEDON	CAR	GROCERY	WEATHER
12	1	M	46	MERTON PARK	BUS		HAVE TO USE IT
13	1	M	26	NORTH LONDON	CAR	DIST	
14	1	F	66	RAYNES PARK	CAR	FREQ,INSP	
15	1	F	26	WANDSWORTH	BUS		HAVE TO USE IT
16	1	F	26	NEW MALDEN	CAR	CHILD,BIKE	
17	1	F	26	WIMBLEDON	CYCLE	LESS CARS	ENV
18	1	F	26	SOUTH WEST LONDON	BUS	TRAIN,LINE	CONV
19	1	F	26	SOUTH WEST LONDON	BUS	TRAIN,LINE	CONV
20	1	F	26	WANDSWORTH	CAR	DIRECT,GROCERY	
21	1	M	66	CENTRAL LONDON	TUBE	TRAM SEEMS UNSAFE	EASY
22	1	F	17	MORDEN	CAR	CHILD	
23	1	F	46	MITCHAM	BUS		CHEAP
24	1	M	66	MORDEN	BUS		SPEED,CONV
25	1	F	26	WIMBLEDON	CAR	FREQ	
26	1	M	46	WIMBLEDON	TUBE		CHEAP
27	1	F	46	WIMBLEDON	BUS		UTOPIA
28	1	F	46	WIMBLEDON	CAR	WEATHER	
29	1	F	66	SOUTHFIELD	RAIL		CONV
30	1	M	66	SW 18	BUS,TUBE		EASY
31	1	F	46	WIMBLEDON	CAR	CHILD,WEATHER	
32	1	F	17	WIMBLEDON	BUS	FREQ	
33	1	M	26	WIMBLEDON	CAR	WEATHER	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
34	1	F	26	WIMBLEDON	WALK		EASY,WEATHER
35	1	M	26	WIMBLEDON	CYCLE	PRICE,FREQ	
36	1	M	46	WORCESTER PARK	CAR	CHILD	
37	1	M	17	WIMBLEDON	CAR	FREQ,WEATHER	
38	2	M	26	CHESINGTON	CAR	CHILD,STROLLER	
39	2	M	46	MITCHAM	CAR	PEOPLE,CONV,SPEED	
40	2	F	17	WIMBLEDON	CAR	CHILD,STROLLER	
41	2	F	26	WIMBLEDON	CAR	GROCERY,PRICE(FAMILY)	PARKING
42	2	F	46	WIMBLEDON	CAR	SPEED	
43	2	M	46	WORCESTER PARK	CAR	SPEED	
44	2	F	26	WIMBLEDON	CAR	CHILD	
45	3	M	66	WIMBLEDON	BUS	STOP	
46	3	F	66	WIMBLEDON	BUS	STOP	
47	3	M	17	WIMBLEDON	CYCLE	PRICE	
48	3	M	26		WALK	USA	
49	3	F	46	MORDEN	CAR	CHILD,GROCERY	
50	3	M	66	WIMBLEDON	CAR	GROCERY	
51	3	M	66	SOUTH EAST LONDON	BUS	FREE PASS	
52	3	M	17	SW 18	CAR		PRICE
53	1	M	26		TRAIN		
54	1	M	26		TRAIN		
55	1	F	26		TRAIN		
56	9	M	17	WIMBLEDON	WALK		ARMS
57	BK	F	46	WIMBLEDON	WALK		WEATHER
58	9	M	17	WIMBLEDON	CAR	MUSIC, LAZY, CAR	
59	9	M	17	WIMBLEDON	CAR	MUSIC, LAZY, CAR	
60	9	M	17	WIMBLEDON	CAR	MUSIC, LAZY, CAR	
61	9	M	17	WIMBLEDON	CAR	MUSIC, LAZY, CAR	
62	9	M	26	WIMBLEDON	WALK		WEATHER, CHILD, EXE
63	9	F	46	WIMBLEDON	WALK		CLOSE
64	S	F	26	WIMBLEDON	CAR	BAGS	
65	S	F	17	WIMBLEDON	CAR	CHEAP	
66	S	M	26	WIMBLEDON	CAR	BAGS, CHILD	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
67	S	M	66	WIMBLEDON	CAR	CHILD	
68	WB	M	66	WIMBLEDON	CAR	FASTEST	FREEPASS
69	WB	M	26	WIMBLEDON	CAR	PEOPLE, PRICE	
70	8	F	17	WIMBLEDON	CAR	DADDY'S PRINCESS	
71	8	F	26	WIMBLEDON	CAR	CHILD, GROCERY, FREQ	
72	8	F	17	WIMBLEDON	CAR	DANGER, CHILD,BAGS, ST	
73	8	F	66	WIMBLEDON	CAR	DANGER	
74	WB	F	17	WIMBLEDON	CAR	CHILD	
75	WB	F	66	SW18	BUS	BAGS	
76	WB	M	46	WIMBLEDON PARK	CAR	FREQ	
77	WB	M	46	MITCHAM	CAR	FREQ, PEOPLE	
78	WB	M	26	MORDEN	CAR	CONVOY	
79	WB	M	46	PUTNEY	CAR	EFFICIENT	
80	WB	M	26	PARSONS	CAR	TOO FAR	
81	WB	M	26	CENTRAL LONDON	BUS/TUBE	SWITCH	
82	WB	F	46	WIMBLEDON	BUS		CLOSE
83	WB	F	26	PARK	CYCLE	INFREQ,BUSLANE	
84	WB	M	26	PARSON'S GREEN	CAR	TUBE BROKEN	
85	8	F	46	MORDEN	CAR	FREQ, CLEAN, MORE	
86	8	M	17	MORDEN	CYCLE	BIKELANE	EXER, ENV
87	8	M	17	PUTNEY	CAR	TUBE, FREQ, TIME	
88	8	M	17	TOURIST	RAIL	PRICE	
89	8	F	17	TOURIST	RAIL	PRICE	
90	8	F	26	PUTNEY	BUS	TUBE	
91	8	M	46	LONDON	CAR	TUBE, BUSES	PRICE
92	8	M	46	MITCHAM	BUS/WALK	FAR	HUMPS
93	8	M	26	USA	BUS	TUBE	
94	8	F	26	USA	BUS	TUBE	
95	S	M	26	WIMBLEDON	BUS		DRINKING
96	S	F	17	WIMBLEDON	WALK		WEATHER
97	S	F	17	WIMBLEDON	WALK		WEATHER
98	S	F	17	WIMBLEDON	WALK		WEATHER
99	S	M	0	WIMBLEDON	SKATEBOARD		FASTER THAN WALKIN

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
100	WB	F	17	WIMBLEDON	RUN		EXER, WEATHER
101	8	F	46	WIMBLEDON	BUS		AGE, FREEPASS, SPEE
102	8	F	17	WIMBLEDON	WALK	CHILD, STROLLER, BAGS	EXER, CHILD
103	8	M	66	WIMBLEDON	BUS	BAN CARS	FREE PASS, HATES CA
104	8	F	0	WIMBLEDON	WALK	B. DANGER	
105	8	F	26	WIMBLEDON	WALK		EXER, CHILD, WEATHE
106	8	F	17	RAYNES PARK	WALK		NO CAR, WEATHER
107	M	M	26	WIMBLEDON	WALK	NO STOP, FREQ	FASTEST, PUB
108	8	M	66	WIMBLEDON	BUS	FREQ	AGE, FREE PASS
109	8	M	16	WIMBLEDON	ROLLERBLADES		AGE, EXER, TRAFFIC
110	WB	F	46	WIMBLEDON	WALK		WEATHER, CHILD
111	WB	F	66	WIMBLEDON	BUS		AGE, WEATHER, FREE
112	PT	F	26	WIMBLEDON	WALK		CLOSE, EXER
113	PT	F	66	WIMBLEDON	BUS	FREQ	LAZY
114	PT	F	17	WIMBLEDON	WALK	FREQ	
115	T	M	66	WIMBLEDON	WALK		EXER, LIFE
116	HRP	M	66	MORDEN	BUS	TRUCKS, TIME	
117	HRP	F	66	WIMBLEDON	WALK/BUS		AGE, FREEPASS, EXE
118	HRP	F	17	WIMBLEDON	WALKING		WEATHER
119	HRP	F	66	MITCHAM	CAR	DRIVE AND PARK	
120	HRP	M	17	CLAPHAM JTC	CAR	FAR	
121	HRP	F	17	MORDEN	CAR	CHILD, CRYING	
122	HRP	F	26	MORDEN	CAR	CHILD, CRYING	
123	HRP	F	26	COLLIERS WOOD	WALK		CHILD, EXER, WEATHE
124	HRP	F	26	MORDEN	CAR	PICK, SHOP	
125	HRP	F	17	TOOTING	BUS		NO HURRY
126	HRP	F	46	TOOTING	BUS		NO HURRY
127	HRP	F	26	WANDSWORTH	CAR	BUS TOO FAR	
128	HRP	F	46	WIMBLEDON	BUS		WIND
129	HRP	M	66	TOOTING	BUS		FREEPASS
130	HRP	F	66	TOOTING	BUS		FREEPASS
131	T	M	17	ESSEX	BUS/RAIL/TUBE		NO PROB
132	PT	F	66	OUTSIDE LONDON	CAR	VISITING	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
133	PT	M	0	TOOTING	TUBE		FASTEST
134	HRP	F	66	SOUTHFIELD	BUS		AGE, FREEPASS
135	HRP	F	26	TOOTING	CAR		WORK
136	HRP	F	17	WIMBLEDON	WALK	CAR FOR A LOT	EASE, NOT MUCH
137	HRP	F	17	WIMBLEDON	WALK	CAR FOR A LOT	EASE, NOT MUCH
138	HRP	F	26	SOUTH HILL	CAR	EASE FOR DISABLED	
139	HRP	F	66	SOUTH HILL	CAR	EASE	
140	HRP	M	26	NORBITON	CAR	PEOPLE, PRICE	
141	HRP	F	26	NORBITON	CAR	PEOPLE, PRICE	
142	T	M	17	PUTNEY	TUBE		FASTEST
143	T	F	66	SOUTH WIMBLEDON	BUS		FREE, AGE,HATE CAR
144	T	F	66	SOUTH WIMBLEDON	BUS		FREE, AGE, HATE CAR
145	T	F	66	SOUTH WIMBLEDON	BUS		FREE, AGE, HATES CA
146	T	M	66	NEW MALDEN	BUS	IMPROVE, DRIVE/BULANE	FREEPASS
147	T	F	26	KINGSTON	CAR	FREQ	CONV., CHEAP
148	T	M	66	WANDSWORTH	BUS		FREEPASS
149	T	M	46	TOOTING	BUS/ TUBE	IMPROVE	FREEPASS, AGE
150	T	F	26	WIMBLEDON	WALK	LESS CARS, SAFER CYCLI	WEATHER, EXER, HUR
151	T	M	0	WIMBLEDON	SKATEBOARD	WEATHER	WEATHER, AGE
152	T	M	26	RAYNES PARK	BUS	MESSAGE, FREQ	CAR $$$
153	T	F	26	RAYNES PARK	BUS	MESSAGE, FREQ	CAR$$$$
154	T	M	66	KINGSTON	BUS	BAGS, FREQ, TIME	FREEPASS, CLOSE
155	T	F	66	KINGSTON	BUS	BAGS, FREQ, TIME	FREEPASS, CLOSE
156	TUBE	M	26	WIMBLEDON	TAXI	LESS CARS, LESS PARKIN	
157	HRP	F	26	MITCHAM	BUS	FREQ, BAGS	ONLY CHOICE
158	STATION	M	46	MERTON PARK	BUS	TIME	ELIMINATE CARS
159	STATION	F	17	WIMBLEDON	TUBE		NO NEED FOR CAR
160	STATION	F	17	WIMBLEDON	TUBE		NO NEED FOR CAR
161	STATION	F	17	WIMBLEDON	TUBE		NO NEED FOR CAR
162	T	M	66	WIMBLEDON	BUS	RELIABE	FREEPASS
163	HRP	F	46	MORDEN	BUS	GOOD	FAR, ONLY
164	T	F	66	WIMBLEDON	CYCLE	CAN'T CHANGE PEOPLE	FASTEST
165	HRP	M	26	WANDSWORTH	CAR	CHILD,CLEAN, STROLLER,	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
166	HRP	F	46	COLLIERS WOOD	CAR	BAGS, LONG	
167	HRP	M	26	WIMBLEDON	CAR	MANLY, AGES	
168	T	M	26	WIMBLEDON	CAR		CHEAP, SHOP
169	T	F	26	WIMBLEDON	CAR		CHEAP, SHOP
170	HRP	F	26	WIMBLEDON	CAR		CHILD, SAFETY
171	HRP	M	46	WIMBLEDON	CAR	DRIVER, 2ACC/1DAY	
172	HRP	F	26	WIMBLEDON	CAR	CHILD, BAGS, SAFETY	
173	HRP	F	26	WIMBLEDON	CAR	CHILD, BAGS	
174	HRP	M	17	WIMBLEDON	CAR	LAZY	
175	HRP	M	46	WIMBLEDON	CAR	PRICE	CHEAP TO PARK
176	HRP	F	26	WIMBLEDON	CAR	FAR	EASE
177	HRP	F	46	WIMBLEDON	CAR	BAGS, WAIT	
178	HRP	F	66	WIMBLEDON	CAR	DISABLE BADGE AWAY	MIGHT SWITCH
179	HRP	M	66	WIMBLEDON	CAR	DISABLE BADGE	SWITCH
180	HRP	F	46	WIMBLEDON	CAR	BAGS, HASSLE	
181	HRP	M	26	RAYNES PARK	CAR	BAGS,	DROPS BAGS OFF
182	HRP	F	26	WIMBLEDON	CAR	CHILD	PRICE
183	HRP	M	17	WIMBLEDON	CAR	CHILD, STROLLER	CHEAP TO PARK
184	HRP	M	46	WIMBLEDON	CAR	ELDERLY	
185	HRP	M	66	WIMBLEDON	CAR	BAGS, AGE, FREQ	FREEPASS
186	HRP	M	26	RAYNES PARK	CAR	CHILD, BAGS	
187	HRP	M	26	WIMBLEDON	CAR	CHILD, BAGS	
188	HRP	F	26	WIMBLEDON	CAR	CHILD, BAGS	
189	PT	M	26	WIMBLEDON	CAR	CONV, NO PATH, CHANGE	WANTS TO CYCLE
190	PT	F	26	WIMBLEDON	CAR	CHILD, LATE, FREQ, FAR,	
191	HRP	M	46	WIMBLEDON	CAR		PAID FOR PARKING
192	HRP	F	46	WIMBLEDON	CAR	NOT LIKE THE BUS	CAME FOR FREE PARK
193	HRP	F	26	WIMBLEDON	CAR	CHILD, BAGS, STROLLER	CHEAPER TO PARK
194	HRP	F	26	WIMBLEDON	CAR	CHILD, BAGS, STROLLER	CHEAPER TO PARK
195	HRP	F	26	RAYNES PARK	CAR	NEVER THOUGHT, STATI	
196	T	F	26	MITCHAM	BUS	BAGS, FREQ	
197	PT	F	26	WIMBLEDON PARK	CAR	WAIT	
198	PT	F	46	WIMBLEDON	CAR	BAGS	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
199	PT	F	26	COLLIERS WOOD	CAR	TOO FAR, PEOPLE	
200	PT	F	46	WIMBLEDON	CAR	CHILD	
201	PT	M	17	WIMBLEDON	CAR	CHILD, NO OTHER WAY	
202	PT	M	66	WIMBLEDON	WALK		CLOSE, FREEPASS, NI
203	PT	F	26	CENTRAL LONDON	TUBE	ZONING PRICE	ONLY WAY
204	PT	F	66	WIMBLEDON	BUS		AGE
205	PT	F	26	WIMBLEDON	CAR	BAGS	
206	PT	M	46	WIMBLEDON	CAR/BUS	FREQ	
207	GC	F	26	MERTON	CAR	HOUR BY BUS,	HASSLE, OBJECTS, CH
208	ZED	M	66	WIMBLEDON PARK	TUBE		AVOID TRAFFIC, CHEA
209	ZED	F	17	CLAPHAM JUNCTION	CAR/BUS		LONG WALK/NO PETR
210	ZED	F	17	CLAPHAM JUNCTION	CAR/BUS		LONG WALK/NO PETR
211	Q	M	17	CENTRAL LONDON	BUS/TUBE	TIME	CHEAP NO CAR
212	Q	F	26	TOOTING	CAR	BUS NORMALLY	DROP OF HUSBAND
213	Q	M	46	WORCESTER PARK	CAR		QUICKER
214	Q	F	46	WORCESTER PARK	CAR		QUICKER
215	Q	F	26	WIMBLEDON	CAR	CHILD	
216	1	F	26	WIMBLEDON	CAR	BAGS	USUALLY WALKS
217	8	M	26	WIMBLEDON	WALK	NO STOP, FREQ	PUB
218	S	M	66	WIMBLEDON	CAR	BAGS	
219	HRP	M	66	WIMBLEDON	CAR	GRANDKID BUS	
220	S	M	46	MITCHAM	CAR	PEOPLE, LINE	
221	HRP	M	46	PUTNEY	CAR	EFFE, TOO TRAFFIC	
222	WB	M	0	WIMBLEDON	SKATEBOARD		FAST THAN WALKING
223	8	F	17	RAYNES PARK	WALK		NO CAR, WEATHER
224	1	F	66	WIMBLEDON	CAR	WEATHER	WALK OTHERWISE
225	1	F	66	WIMBLEDON	CAR	WEATHER	WALK OTHERWISE
226	HRP	M	46	WIMBLEDON	CAR	PRICE	CHEAP TO PARK
227	SF	M	46	WIMBLEDON	WALK		EXER, HEALTH, SOCIA
228	SF	M	17	MORDEN	CAR	NEW CAR	
229	BF	F	17	WIMBLEDON	WALK	STROLLER, BAGS, IMP. B	NO CAR
230	BF	F	66	MORDEN	BUS		FREEPASS
231	BF	F	66	WIMBLEDON	BUS	FREQ	FREEPASS

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
232	BF	M	26	WIMBLEDON	WALK		FAST, POOR PARKING
233	BF	M	26	WIMBLEDON	WALK		FAST, POOR PARKING
234	BF	M	26	WIMBLEDON	WALK		FAST, POOR PARKING
235	SF	F	46	WIMBLEDON	BUS		BUS, CHEAP, NO CAR
236	SF	F	46	WIMBLEDON	BUS		BUS, CHEAP, NO CAR
237	T	F	17	MORDEN	BUS	PRICE, KIDS	DIRECT
238	T	M	46	MITCHAM	CAR		HABIT TO DRIVE
240	T	M	26	LONDON	CAR		
241	S	M	66	WIMBLEDON COMMON	BUS	U,L	FP
242	SF	M	66	WIMBLEDON	BUS		SP
243	S	F	46	WIMBLEDON	CAR	A,CONVE	
244	S	F	66	WIMBLEDON	CAR	A,CONVE	
245	S	F	46	WIMBLEDON	CAR	CONVE,AC	
246	T	F	26	RAYNES PARK	CAR	B	
247	HRCP	F	66	WIMBLEDON	CAR	W,A,AC	
248	HRCP	F	66	WIMBLEDON	CAR	W,A,AC	
249	HRCP	M	26	WIMBLEDON	CAR	LV	
250	HRCP	M	26	RAYNES PARK	CAR	$,CONVE	
251	HRCP	F	26	RAYNES PARK	CAR	$,CONVE	
252	HRCP	M	26	WIMBLEDON	CAR	B,$	
253	S	M	17	COLLIERS WOOD	TUBE		SP,AC
254	T	M	26	RAYNES PARK	CAR	B	
255	3	F	46	WIMBLEDON PARK	CAR	B,FPS	
256	3	M	26	WIMBLEDON VILLAGE	CAR	P,$,FPS,U	
257	3	F	26	WIMBLEDON VILLAGE	CAR	P,$,FPS,U	
258	3	F	26	WIMBLEDON VILLAGE	CAR	P,$,FPS,U	
259	3	F	17	WIMBLEDON	CAR	FPS,NC	
260	3	M	66	WIMBLEDON PARK	CAR	HATESKIDS,FPS	
261	3	F	66	WIMBLEDON PARK	CAR	HATESKIDS, FPS	
262	3	M	46	TOOTING	CAR	HATESKIDS, FPS	
263	3	F	17	MITCHAM	CAR	SP,FPS	
264	3	M	46	WIMBLEDON	CAR	P	
265	3	F	26	WIMBLEDON	CAR	I,L	

PERSON	LOCATION OF INTV	SEX	AGE	PLACE OF RESIDENCE	MODE OF TRANS	PROBS WITH PUB TRANS	GOOD ON PUB TRANS
266	2	F	17	WIMBLEDON	CAR	FPS,$	
267	2	F	17	WIBLEDON	CAR	FPS,$	
268	WT	M	46	WIMBLEDON	WALKING		NICE DAY
269	WT	F	17	WIMBLEDON	WALKING		
270	WT	F	26	WIMBLEDON	WALKING		TAKING TIME
271	WT	F	26	WIMBLEDON	WALKING		FRESH AIR
272	WT	M	46	MORDEN	CAR	CONVE,SP	
273	WT	M	46	RAYNES PARK	CAR	P	
274	WT	F	17	WIMBLEDON	CAR	MU,P	
275	1	M	46	WIMBLEDON	WALKING		
276	1	F	46	WIMBLEDON	WALKING		NICE DAY
277	1	F	26	WIMBLEDON	WALKING		NICE DAY
278	1	F	26	WIMBLEDON	WALKING		KILLING TIME
279	1	M	46	WIMBLEDON	WALKING		NICE DAY
280	1	F	17	WIMBLEDON	WALKING		SP
281	1	M	46	WIMBLEDON PARK	CAR	K	
282	1	F	46	MORDEN	CAR	P	
283	1	M	65	COLLIERS WOOD	CAR	CONVE	
284	1	M	26	RAYNES PARK	CAR	K,S	
285	1	F	46	WORCESTER PARK	CAR	B,K,CONVE	
286	S	F	26	WIMBLEDON	CAR	B	
287	S	M	26	WIMBLEDON	CAR	B	
288	S	M	46	RAYNES PARK	CAR	B	
289	S	F	17	WIMBLEDON	CAR	B,$	
290	S	F	26	MITCHAM	CAR	B,AC	
291	S	F	26	MITCHAM	CAR	B,AC	
292	S	F	17	MORDEN	CAR	POLD	
293	S	M	46	WIMBLEDON	WALKING		AC
294	S	F	46	WIMBLEDON	WALKING		AC
295	S	F	17	WIMBLEDON	WALKING		
296	S	M	47	WIMBLEDON	WALKING		EXCERSIZE

Appendix G

Store Owner / Manager Interview Questions

1. How do you feel your business would be affected if car usage were to be reduced in Wimbledon?

   Short term?

   Long term?

2. If negative, do you have any suggestions on how to promote alternate modes of transport without negatively affecting your business?

3. Would you be willing to participate in an incentive program?

4. Do you have any ideas for incentive programs?

Appendix H

Wimbledon Speed and Traffic Debate
Chairman: John Ellison
Friday April 7th, 2000
6:30pm

Panelists:

Richard Evans—European Carfree Campaign, cycling advocate
Beliefs: Cyclist have a fear of the roads, 20 mph speed limit will make road a friendlier cycling environment

Allan Branscombe—Driving Instructor
Beliefs: 20 mph speed limits in certain areas
Lower accident/driver ratio

Harvi Mudhar—Merton Traffic and Parking
Facts: 3500 killed, 40000 serious injuries, 204000 accidents in London each year

John Stewart—Transport 2000
Fact: Tony Blair want to enforce 20mph in residential areas and not on main roads

20 mph vs Humps
- 20 mph needs to be effectively enforced
- Police can't put priority on traffic enforcement
- Other method of reducing speed without "going around and humping all of London"

70% of drivers exceed the 30 mph speed limits
50% chance to die at 30mph
90% chance to die at 40mph
while at 20mph there is a 90% survival rate

Amestredam
Traffic calming methods
Trail about speed limits to nationally enforced speed
Variable speed limits---should tried in London

Funding
Poor only 300000 pounds per year to do traffic related studies
Prioritising roads through accident reduction areas
Only 80000 pound budget for cycling a year

Changing attitudes of people especially politicians to use alternative modes of transport

NOTES: Merton Forum
Sustainable Transport
Transport and the Environment
March 29th, 2000
7:30 pm

Sustainable Transport

- Promoting walking and cycling
- Traffic reduction but at the same time economic regeneration
- Raising awareness and promoting education

Business Aspects
Goods need to be imported and exported out of the borough
Bus lanes also with commercial transport

Need for:

Parallel routes between walk and Public Transport
Cycle lanes to be connected—(target date to fix problem by 2005)
Cleaner vehicles
Policy for working at home
E-commerce is adding to traffic and truck population

Transport and the Environment

67% of borough residence support road pricing if money was to go to the town or into the public transport system

Transport tax which will provide free transport for all

Elimination of petrol/diesel engines in London and people are forced to use alternatives modes or solar/electric cars

The borough is working towards carfree developments with no residential parking

No office in Wimbledon should have private employee parking
Charge for parking everywhere & money can be usedfor deterring traffic from entering the borough

People in Wimbledon seem happy with the construction which has lead to the decresse of parking spaces—Wimbledon is UNIQUE

THREE KEY ISSUES FROM EACH WORKSHOP

Sustainable Transport

1. Business
2. Legislation resources and enforcement
3. Integration

Transport and Environment

1. Dealing with volumes, best practice, prioritising action
2. Clean vehicles
3. Road Users changing in London

NOTES: Merton Transport Forum
Bus Transport
Wednesday March 28th, 2000
7:30 pm

Population of people attending: 40 people
Demographics
Women 50+, men 50+, and business men

Focus: help develop the Interim Transport Plan---Merton's Transport Policy & Objectives

Overview of the what is wrong with the buses
Greenplan—out of cars & into buses money for Merton from Central Government

People who help decide the placement of a bus stop: London Transport, London Transport Bus System, Merton Council, London General, residences, police, all help make the decision about where a bus stop goes.

Criteria: No written criteria, communication, danger, no more than 400-600m away from any place

Bus service to tramlink

How to better regulate buses due to the increase of traffic?
Time people wait outside, having buses run on time
People parking in buslanes and driving in the bus lanes
Enforcing the violations of parking in the bus lane
Can't enforce a moving violation but Merton is looking into changing the law
Speed cameras on bus lanes
Cameras on bus to trap people all the time KEEP CARS OUT OF THE BUS LANES
Money for fines to be put into promoting more sustainable transport and the bus system

THREE ISSUE FROM THE WORKSHOPS THAT NIGHT

Buses
1. Better Enforcement
2. Interchange
3. Serve the People

Rail and Intermediate Transport

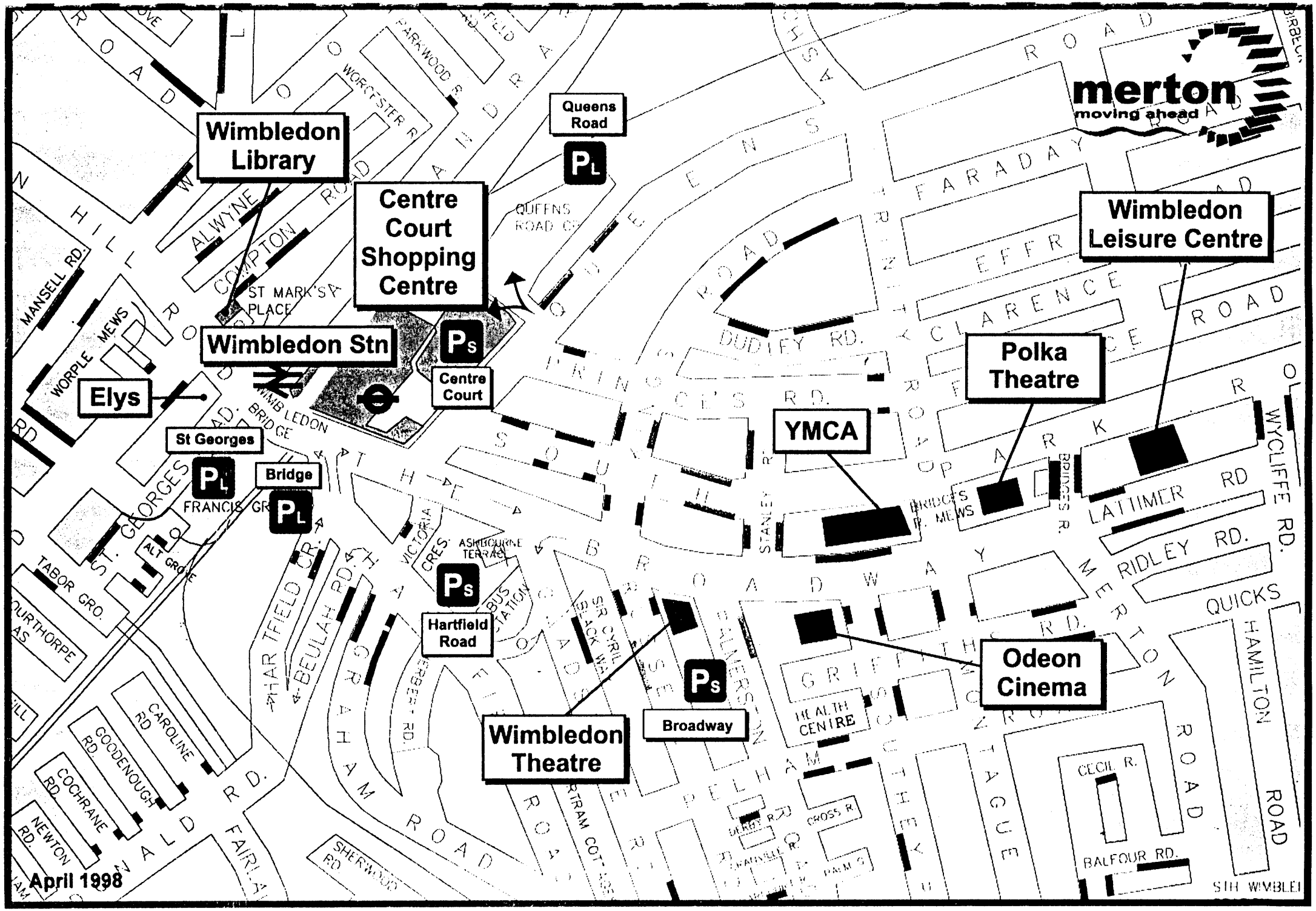
Tramlink will open early May
1. Access for all (physically getting around)

2. Rail Capacity—late at night, expansion of the Northern Line
3. Feasibility

Integration

1. Without it we will not reduce the use of cars
2. Need to change people's attitudes
3. Better access between modes
4. Information Systems
    a. Easy to use
    b. Easy to understand
    c. Accessible to all

Appendix I


merton
moving ahead
Wimbledon Library
Centre Court Shopping Centre
Queens Road
Wimbledon Leisure Centre
Polka Theatre
Wimbledon Stn
Centre Court
Elys
St Georges
Bridge
YMCA
Hartfield Road
Broadway
Wimbledon Theatre
Odeon Cinema
April 1998

Appendix J

ID Number	Business	Interviewee	Position	Short term effect of car reduction	Long term effects	Suggestion of alt modes	any ideas of incentives	Participation
1	McDonald's	Andy Gray	Asst. Manager	Bad, LOSS BUSINESS	good, people adapt	BUSES, FREQ	CONTACT	TRUE
2	Centre Court Centre	Graham Webb	Building Manager	bad,potential threat	bad, lose businesss	employee loans	cheap	TRUE
3	London Pottery Co.	??	Owner	bad, breakables	bad	people do, what people do	people do what people do	FALSE
5	Blockbuster		Asst. manager	bad, attract from long dist.	bad	something everywhere at same time so somebody wont benefit while others suffer		
6	Dixon's	J. Nash	Manager	none, most customers use PT	none	make it cheap	no	
7	Safeway		Asst. Manager	bad, matter of convience	bad	make pt cheap		
8	Woolworths		Supervisor	bad, broadway car park, business is through traffic	bad			
9	Clarks		Manager	none	people will adjust	no, good bus stops	who would sponsor	
10	HMV		Manager	none	none	tramlink		
11	Wimbledon Book		Manager	good, more beneficial	good	car tax	car tax	TRUE
12	Hogs Head		Manager	none	none	cycling access, better access		
13	Wimbledon Cycles		Manager	none, unless more cycle	none, unless more cycle	connect bike lanes, wide enough, clean	large price for gas, car, insurance not enough?	
14	GAME		Manager	good, centre court parking helps	good	none	no	TRUE
15	Guitar City		worker	bad, no way to move merchandise and buy big, expensive guitars	bad	none	no	
16	Broadway Wine		Manager	none, good PT location	none	none	no	
17	Snappy Snaps		Supervisor	good, people might stroll in	good	more pedestrianization		
18	Bob's Flower Stand		owner	none, good PT location	none			
19	Maskim		Manager	good, not near car park, more might stroll in	good	make it difficult to own/operate car	if borough sponsored	
20	The Photo Store		Asst. Manager	good, people might stroll in	good	no	borough sponsored	
21	Cash Converters	Mark Newton	Asst. Manager	good, except large items	good	cheap/more accessible		
22	Bakers Oven		Baker	good, people might stroll in	good, supplies	no		TRUE
23	Walls		Manager	none, people might stroll in	good	tramlink	borough sponsored	FALSE
	Rejected by: Outdoor Store, Pet Store, Debenhams							

REDUCTION GOOD IN SHORT TERM	REDUCTION DOES NOT MATTER IN SHORT TERM	REDUCTION BAD IN SHORT TERM	REDUCTION GOOD IN LONG TERM	REDUCTION DOES NOT MATTER LONG TERM	REDUCTION BAD IN LONG TERM
30.43478	34.782609	30.4347826	34.782609	34.7826087	26.08695652

Good for R Does not M Bad for Retail Sales

Appendix K

List of Recommendations

1. Install overhead bag storage on bus
2. Install under seat bag storage on bus
3. Install child seating on bus
4. Increase parking fares and use money to promote sustainable transport
5. Implement a driving tax for residents and use money to promote sustainable transport
6. Enforce parking and driving regulations in bus lanes and use money to promote sustainable transport
7. Eliminate on-street parking
8. Close roads and allow only buses, taxis and commercial vehicles
9. Install better ventilation on the bus
10. Install air fresheners on public transport
11. Create a family fare for the bus
12. Install places for buggies and wheelchairs on bus
13. Add more bus lanes
14. Add more bus stops and direct bus routes
15. Separate buses for high school students
16. Make sure electronic message board updates the information
17. Connect cycle routes
18. Decrease speed around town centre
19. Add humps to roads except bus lanes
20. Implement a public transport tax and use the money for free Travelcards
21. Create an educational program on benefits of sustainable transport