

General Information - background

How big is the city?

We have chosen to focus in on a 2km² area around Glasgow city centre. This boundary runs along Cathedral Street, past Port Dundas towards Charing Cross, down and along Clyde Street before heading back up High Street.

How many people live in the city?

The city has a population of around 612,000 and many others come into Glasgow from surrounding districts to work. Glasgow also attracts a large number of visitors for leisure, retail and commercial purposes and is a thriving conference and tourist centre.

How many people own a car?

Derek has figures for car ownership in Glasgow.

There are 32 million legal drivers in the UK. There are approximately 25 million vehicles on the UK's roads.

Scotland alone is home to around 2.1million cars, with 160,000 of these owned from Glasgow residents.

What is the level of air pollution in the city centre?

There is a heavy amount of traffic flooding the city centre every day. These vehicles emit many harmful pollutants including Nitrogen Dioxide, Particles, Carbon Monoxide, Volatile Organic Compounds, Lead and Heavy Metals and produces Ozone as a secondary pollutant.

Nitrogen Dioxide and Particles are the two pollutants of greatest concern within the city, and indeed throughout the UK, as they are at the most risk of breaking specified limits set by the Government to be achieved by the end of next year.

We have monitored the hourly concentration of nitrogen dioxide throughout the city centre over the past weeks. The limit outlined from the government objectives has been exceeded an astonishing 19times within the last week alone (4 – 10 March '04). Similarly, we have monitored the 24hour mean particle concentration throughout past weeks. The 18micro gram/m³, yearly average, Government target was greatly exceeded for 3 out of the 7 days last week (4 – 10 March '04).

It is evident that drastic action must be taken to reduce these figures in order to satisfy the Government objectives.

What is the budget for all transport related matters in the city?

The Government outlined in the Budget 2003 report that they were going to spend £1 billion on improving bus services throughout the UK.

What is the public transport infrastructure like compared to other cities?

In terms of road infrastructure Glasgow is pretty unique. Its plentiful one-way systems and extreme closeness to the major M8 motorway contrast this cities infrastructure greatly with that of Edinburgh's.

Glasgow's train service is thought to be the cities most prestigious form of public transport. With its upper and lower ground services, plentiful 16 platforms offering frequent departures and covering routes from the city centre to the far North past

Gourock, down South past London and Eastwards past Edinburgh it is one of the easiest and most comfortable ways to travel.

Glasgow city centre is also home to a busy underground service. It comprises of two circles, one inner and one outer, to transport passengers below street level to their various destinations throughout the city, whither it be from the centre's St.Enoch to the westend's Hillhead or the cities Cowcaddens to Kinning Park. With trains leaving every few minutes during peak hours, this is a way to travel around the city avoiding the street level congestion.

Does the city have any ITS systems in operation?

There is, and has been for a number of years, developments in Intelligent Transport Systems within Glasgow City Centre. There has been coordinated traffic control system for over 30 years (the objective of which is to minimise delay). This is currently developing from a fixed time system to a responsive system to improve public transport reliability.

The city also makes use of the NADICS online system and CIRACS and also BIAS..

How much does it cost to purchase a parking permit in Glasgow?

Parking permits may be purchased from many of the cities car parks. These permits are normally purchased quarterly and vary greatly in price from £141 for High Street car Park to £458 for some of the cities more central NCP's (e.g. Montrose street). Some car parks do offer special discounts to certain businesses. For example, the NCP on Montrose Street offers the University of Strathclyde an attractive discount for its staff.

How much does it cost to use public transport?

Rail season tickets can be purchased monthly to save up to 40% on journey costs. The price of the ticket varies depending on where you travel. E.g. from Mary Hill to Glasgow a monthly pass would cost £30.40, a saving of 41.54% compared to individual journeys costing £52.00 for 20.

Zone cards can also be purchased and offer unlimited travel on trains, buses and some ferries. The cost again depends on which areas, zones, you travel.

Bus passes can be purchased from as little as £9.50 per week allowing up to 10 journeys to be made or £2.20 for a first bus all day ticket.

Underground day tickets can be purchased from as little as £1.70.

What is the average cost of petrol in the city?

The average cost of petrol is slightly higher in the city centre, at 77.9p/litre (Woodlands Road, Charing Cross) for unleaded, compared with prices further out in smaller towns at as little as 72.9p/litre (Bellshill 5 March '04).

Target area

Where is the target area?

We have chosen to target Glasgow city, particularly in and around the city centre. We have divided the area we are looking at into two zones, one inner and one outer. For our first, inner zone we have chosen to focus in on a 2km² area around Glasgow city centre. This boundary runs along Cathedral Street, past Port Dundas towards Charing Cross, down and along Clyde Street before heading back up High Street. We have chosen our outer zone that circles the inner zone at just over 4 km².

Why have we chosen this area?

There is a heavy amount of traffic flooding this area every day. These vehicles emit many harmful pollutants including Nitrogen Dioxide, Particles, Carbon Monoxide, Volatile Organic Compounds, Lead and Heavy Metals and produces Ozone as a secondary pollutant.

Nitrogen Dioxide and Particles are the two pollutants of greatest concern within the city, and indeed throughout the UK, as they are at the most risk of breaking specified limits set by the Government to be achieved by the end of next year.

What is the air quality like in this area?

In January 2002, Glasgow City declared itself an Air Quality Management Area. This meant they had exceeded Government set Objectives for safe pollution levels. To date, no action has been taken to rectify this situation and the air pollution levels remain high.

What are the road conditions like i.e. road types, road surface?

Glasgow is rather unique in terms of road structure. Unlike Edinburgh its old narrow city streets could not accommodate the likes of trams. It would be far too costly and most probably almost impossible to change the road structure.

How many traffic lights, public crossings, bus stops?

There are 700 traffic signals throughout the whole of Glasgow, a large proportion of these are located in the centre.

What are the congestion problems specific to this area?

As a group we observed the flows of traffic entering and leaving the city centre. Congestion occurs most in the morning, between 7.45 and 9am, and evening, between 5 and 6pm, rush hours. The traffic entering and leaving the M8 motorway causes most tailbacks or jams into the centre. The Charing Cross and Port Dundas junctions were two of the worst areas for congestion build-up.

How many cars use this area and at what time?

For Cathedral Street, East bound to M8, we recorded 562 cars between 17:00 and 18:00. The average number of passengers was 1.59. The average speed was 9.26metres/second.

For Port Dundas Junction on the M8, East bound, we recorded 240 cars between 17:00 and 18:00. The average number of passengers was 1.26. The average speed of

cars was 1.05metres/second. West bound, we recorded 327 cars. The average number of passengers was 1.38. The speed of cars was 1.05metres/second.

For High Street, South bound to M8, we recorded 1260 cars between 17:00 and 18:00. The average number of passengers was 1.3. The average speed was 2.59metres/second. North bound, to city centre, we recorded 592 cars. The average number of passengers was 1.47. There was no congestion on this road. The speed limit here is 30m.p.h.

For Charing Cross, east bound to M8, we recorded 980 cars between 17:00 and 18:00. The average number of passengers was 1.32. The average speed was 2.5metres/second. East bound, to city centre, we recorded 640cars between 17:00 and 18:00. The average number of passengers was 1.46. There was little congestion here to measure.

For Clyde Street, running past St.Enoch square, North/west we recorded 1110 cars. Travelling South/East we recorded 1056 cars. The speed varied between 20 and 30 mph in both directions.

The average number of passengers in a car for the city centre was recorded as 1.38. Port Dundas was surprising in that the lowest number of cars travelled on this road yet the average travelling speed was very low. The filter lane onto the motorway appeared to be the cause of this tailing back traffic into the centre. The filter lane was very short and had a set of traffic lights allowing only one or two cars to join every few seconds. The lane was constantly jammed.

The traffic in and around the city was difficult to measure an average speed for as the multiple traffic lights only allowed for short distances to be travelled before cars were ordered to stop. Traffic slowed during rush hours, but did flow slowly when signalled to do so.

At present there are around 2million cars on Scotland's roads. Only 160,000, (8%), of these are owned by the people living in Glasgow City.

Everyday 150,000 vehicles pass over the Kingston Bridge, 25,000 vehicles travel up and down Hope Street and 20,000 vehicles travel along Clyde Street.

Air pollution levels are highest at the under pass at Charing Cross, just before the M8 passes over the Kingston Bridge.

How many accidents occur in this area?

In 2002, there were a total of 92 deaths on Strathclyde's Roads and 1273 victims were seriously injured. Glasgow city police do not keep league tables of accident black spots so we could not obtain site-specific figures. However, they did inform us that if there is a particularly dangerous area they try to place a speed camera in this area. There are now over 50 cameras citywide.

What are the public transport links like in this area?

Glasgow has one of the largest train networks operating throughout the UK. Frequent services to many destinations.

The underground covers a small area of the city centre and can be cramped, especially during rush hours. However, it is cheap and fairly quick.

The bus service in Glasgow could greatly be improved. Wider routes and busses out with the basic 9 to 5 travel are required.

When is the congestion at its worst?

Congestion peaks during the rush hour times mentioned previously.

How much does it cost to park on the street or in a car park in the target area?

The price of street parking in Glasgow City Centre varies from £0.80/hr to £2.40/hr.

What difference will our ITS scheme have in this area?

The variable zone charging aims to cut traffic by 22.5% in the first year and between 20-40% in the next 5 years.

After the first year this will reduce road traffic enough to have a significant drop on pollution levels, increasing the air quality allowing Government Objectives to be made.

Meeting Government Objectives

What are the Government Objectives on Air Quality?

These are some of the government objectives for air quality:

Carbon Monoxide levels in Scotland must now not be higher than 10.0 mg/m³, running 8hour mean measurements, from Dec. 2003. This target must drop to 0.5micro grams/m³ for an annual mean by the end of this year, 2004.

Lead should not exceed 0.25 micro grams/m³ for an annual mean by Dec. 2008.

Nitrogen Dioxide should not exceed 40micro grams/m³ as an annual mean by Dec. 2005. Also, hourly means should not exceed 200micro grams/m³ and this figure should not be exceeded more than 18 times per year.

Ozone should not exceed 100micro grams/m³ running 8hour mean measurements, from Dec. 2005. This must not be exceeded any more than 10 times per year.

Particles (PM₁₀) should not exceed 50micro grams/m³ measured as 24hour mean, not to be exceeded more than 7 times per year, by Dec. 2010. Annual mean of 18micro grams/m³ should be achieved.

Sulphur dioxide should not exceed 266micro grams/m³, not to be exceeded more than 35 times per year, measured on a fifteen-minute basis, By Dec. 2005.

By the end of this year it should not exceed 125micro grams/m³, not to be exceeded more than 3 times per year, measured as a 24hour mean.

All of these can have significant health problems if values are exceeded certain 'safe' levels. These are all closely monitored within the city and only two really raise cause for concerns as the rest are below their hazardous limits. The two pollutants outlined as being worthy of concern are particles PM₁₀ and nitrogen dioxide.

The main source of both these pollutants in Glasgow, and indeed of most UK cities, is road traffic. Monitoring stations around the city have shown that these levels are on the increase and in past weeks have in fact exceeded yearly limits in one week alone. Drastic action will be required to reduce these levels to below the set standards by the end of 2005.

What are the health concerns for the people living in Glasgow and cities like this?

Every year up to 24, 000 early deaths result from poor air quality in Britain's cities, and there are a similar number of hospitalisations – almost wholly as a result of vehicle emissions.

A study carried out in 2000 showed that in Glasgow alone a yearly average of 90% Nitrogen Dioxide emissions come from traffic.

Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections such as influenza. Continued or frequent exposure to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children.

The principal source of airborne PM₁₀ (the fraction of particles < 10microm) is road traffic emissions, particularly from diesel vehicles. Fine particles are small enough to penetrate deep into the lungs where they can cause inflammation and worsening of the condition of people with heart and lung disease. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs.

In past weeks the levels of these two pollutants have been as follows:

On the week beginning 04/03/04 the hourly concentration of nitrogen dioxide throughout the city centre exceeded 200micrograms/m³, the limit outlined from the government objectives, 19times within this period. The objective stated that this limit was not to be exceeded more than 18 times throughout the whole year. Clearly something has to be done to reduce these figures.

In the same week the levels of PM₁₀ City Levels throughout the city were recorded and the 24hour mean particle concentration showed that for 3 out of the 7 days, the mean daily limit exceeded the 18microgram/m³ annual mean Government target.

Again something must be done to reduce these figures in order to satisfy the Government's objective.

What is the road safety like in Glasgow?

We have also considered the issue of improving road safety throughout this project. In 2002, there were a total of 92 deaths on Strathclyde's Roads and 1273 victims were seriously injured.

A two-year pilot scheme – 'Cameras cut Crashes' was run throughout the City of Glasgow where there are now over 50 cameras citywide.

The outcome of this resulted in the average speed of vehicles was down by 8% citywide, that's a 4.2mph reduction and a decrease of fatal and serious casualties by 14%.

Government Objectives

By 2010 the Government hope to achieve

A 40% reduction in fatal and serious casualties

A 50% reduction in fatal and serious child casualties

A 10% reduction in 'slight' casualties

We hope that our proposal could help achieve some of these targets.