

Getting Huddersfield to Work

Economic Appraisal

The appraisal of the Queensgate scheme has been undertaken using a spreadsheet approach aligned to that in TUBA. It takes in estimates of benefits / dis benefits in terms of time etc and converts these into monetary values and discounts these over the standard 60 year appraisal period. This spreadsheet makes the following assumptions:

- Users will be split by journey purposes in line with values in WebTAG.
- Vehicle occupancy will be in line with values provided in WebTAG.

The Queensgate scheme was judged to have three main sources of benefit:

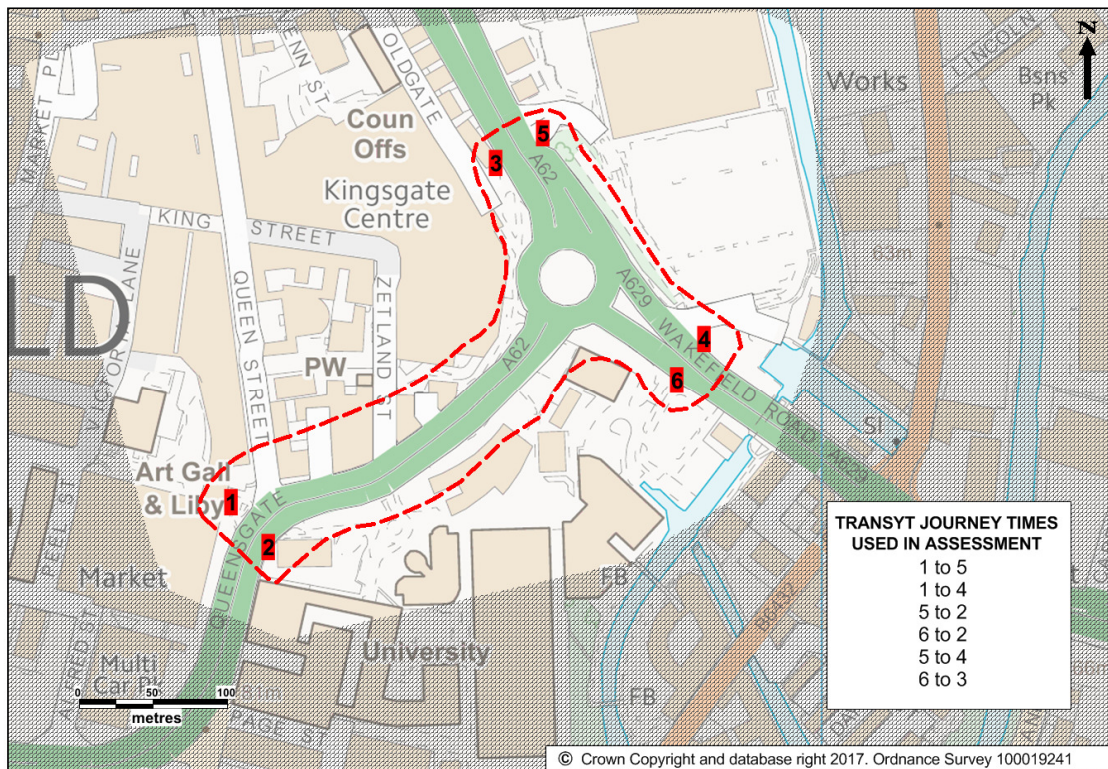
- Journey time savings for vehicles
- Journey time savings for pedestrians crossing Queensgate (at the Zetland Street junction)
- Accident Savings

The following sections detail how the savings have been calculated:

Vehicle Journey Time Savings

Base Model, data sources and calibration

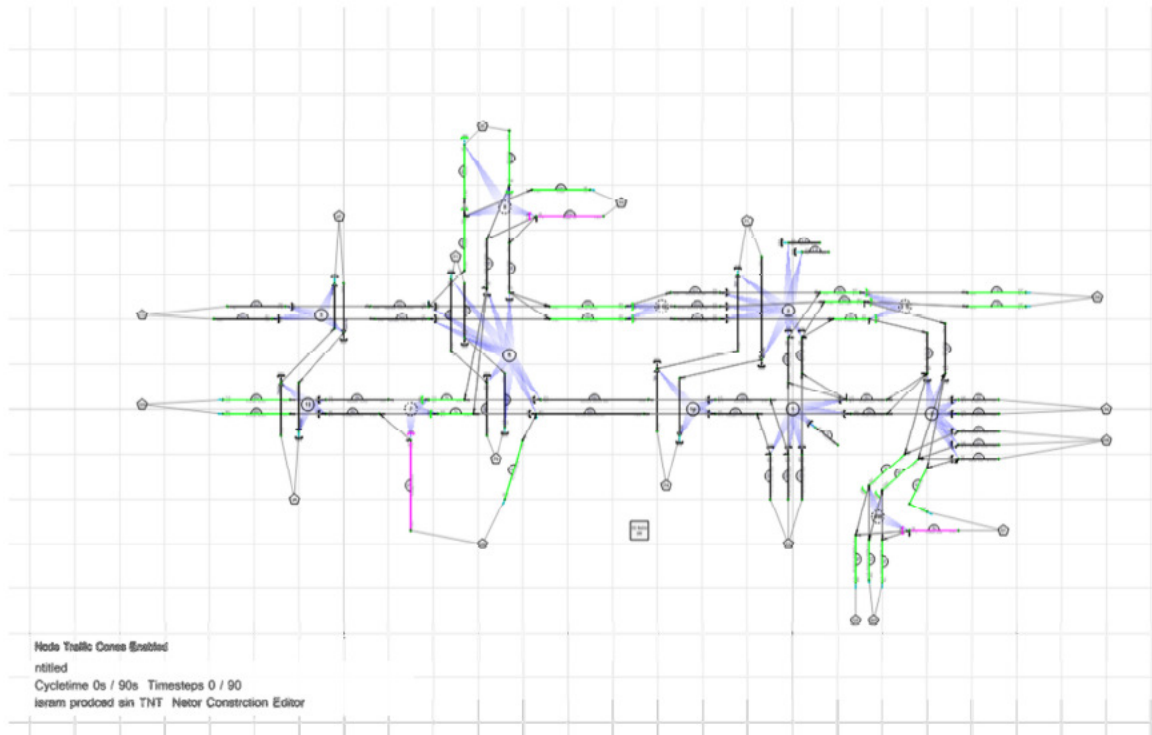
Due to the fact the scheme is on one of Kirklees' busiest roads, it was felt important that benefit on strategic routes impacted by the scheme were measured. The following plan shows the location of the scheme and the journey time routes measured:



A base year 2015 PM Transyt 13 traffic model was built to assess vehicular journey time benefits for the scheme. The diagram below shows the base Transyt network:

Overall Queensgate section of Transyt model.

Base model



Traffic flow checks undertaken during model build show that vehicle flows along the modelled sections are very similar to present day. “Strat-e-gis Congestion data” has been used to validate the cruise speed values in the model. Cruise Speeds have been set based on the mean speeds for the period 10pm and 6am provided by Strat-e-gis.

The following table shows the validation of Strta-e-gis data against the Transyt modelled travel times over the afore-mentioned journey times:

from / to	Route	Transyt Annotation	Strat-e-gis PM (sec)	Transyt PM all at 90 (sec)	%-age difference
1->3	Queensgate-Southgate	CG-SN	113	96	15
1->4	Queensgate - Wakefield Rd	CG-WR	171	182	6
5->2	Southgate – Queensgate	SQ-QG	84	120	43
6->2	Wakefield Rd – Queensgate	FS-QG	97	133	37
5->4	Southgate - Wakefield Rd	CG-WR	95	49	48
6->3	Wakefield Road – Southgate	FS-SN	76	85	12
	Total seconds for selected routes		636	665	5

Whilst it is accepted that there are some notable deviations, within the network as a whole, there is only a 5% difference between the Strat-e-gis data and the Transyt modelled data

The following assumptions were made to extrapolate the PM peak benefits to the rest of the weekday and weekends using factors derived from a traffic count on Queensgate. These are set out in the following two tables.

2 Way Traffic Flows on Queensgate – Flows highlighted Yellow are included in the estimation of benefits.

Hour	Mon - Fri	Sat	Sun
00:00	176	347	423
01:00	102	286	319
02:00	70	186	272
03:00	68	172	230
04:00	93	132	177
05:00	273	171	160
06:00	766	341	210
07:00	1535	576	295
08:00	1868	1102	456
09:00	1778	1517	833
10:00	1658	1874	1427
11:00	1784	2074	1695
12:00	1804	2135	1824
13:00	1786	2075	1751
14:00	1828	2016	1727
15:00	1875	1887	1576
16:00	2053	1869	1386
17:00	2080	1703	1091
18:00	1627	1371	1003
19:00	1312	1130	845
20:00	960	878	707
21:00	796	740	515
22:00	600	667	368
23:00	337	531	280
Total	27231	25773	19566

Source – Automatic Traffic count on Queensgate March 2015

Factors

PM(17) to PM (16-19)	2.77
PM (16-19) to AM (07-10)	0.90
PM (17) to IP (10-16)	5.16
PM (17) to Sat (10-18)	7.51
PM (17) to Sun (11-16)	4.12

It is expected that the time savings per vehicle will be constant over the range of flows used in the assessment of the benefits. While this may be a slight over estimation it will be more than compensated by not considering the benefits in the hours that have not been included in the assessment.

Annualisation – a total of 253 weekdays have been assumed and 52 Saturdays and Sundays. No benefits have been assessed for bank holidays.

Do Something Model

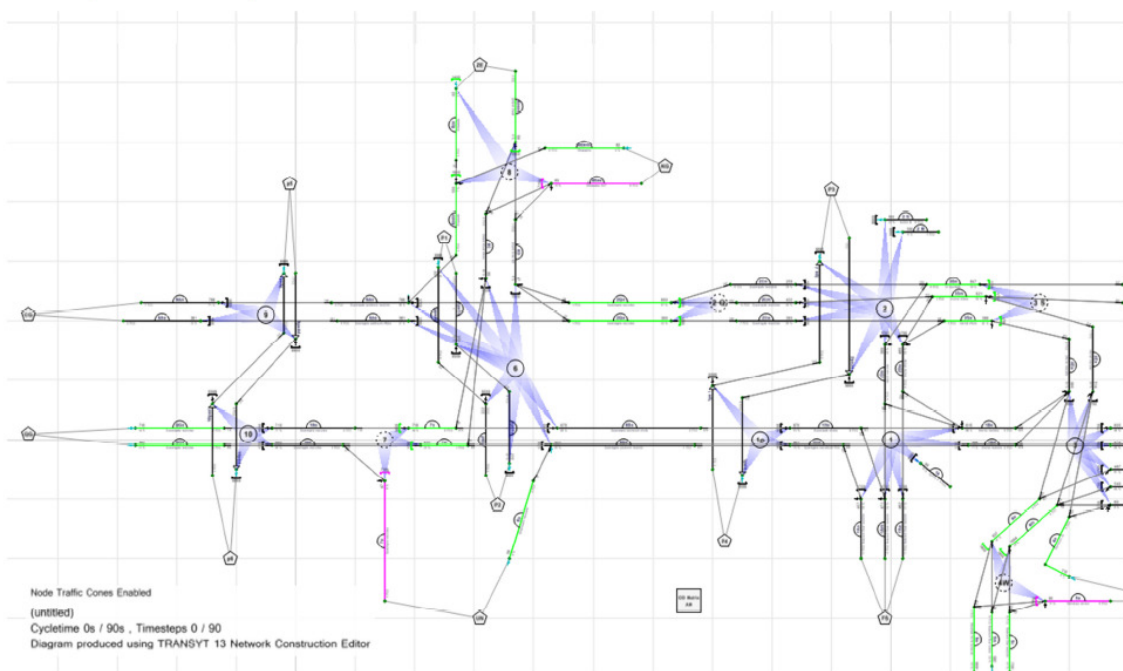
To assess the scheme the following alterations have been made to the Transyt Do Something network:

- **Zetland Street exit**
 - In the base both left and right traffic is catered for, while the future scheme ALL traffic leaving is turned left
- **Queensgate / Zetland Street pedestrian crossing.**
 - In the existing situation the crossing of Queensgate is split into two separate crossings, phases E and F. These occur in different stages and make crossing Queensgate time consuming.
 - In the future scheme a single crossing spans Queensgate allowing pedestrians to cross in one go.
 - During the time the crossing is showing green man (red to Queensgate traffic) Zetland Street left turn is showing green.
- **Shorehead roundabout**
 - Currently the four conflicts run under fixed time UTC.
 - In the future situation the fixed time theme is preserved, as stream to stream linking is important. Three seconds have been moved from the roundabout internal to the Queensgate external approach. This reduces the degree of saturation.
 - The critical link on the network changes from Queensgate centre lane to be Wakefield Road offside lane.

The Do Something Transyt Network is shown in the diagram below:

Overall Queensgate section of Transyt model.

Amended model



The time savings have been estimated by Transyt to be 8.3 seconds per vehicle by comparing the journey time on the routes through the modelled network. These are set out in the table below.

Route	Existing JT (s)	Scheme JT (s)	Time Saving (s)
Queensgate to Southgate	96	85	11
Queensgate to Wakefield Road	182	135	47
Southgate to Queensgate	120	112	8
Wakefield Road to Queensgate	133	137	-4
Southgate to Wakefield Road	49	50	-1
Wakefield Road to Southgate	85	96	-11
Average			8.3

Pedestrian Time Savings

In the current situation the pedestrian crossing over Queensgate at the Zetland Street junction is staggered and most pedestrians making this movement are delayed in the middle of the road for the second stage. The proposed scheme will remove this stagger therefore all the pedestrians who currently have a delay will have no delay.

A survey of pedestrians showed the following numbers per hour who were delayed in the middle of the road. The average delay was 20 seconds.

Time	Pedestrians
0700-0800	308
0800-0900	497
0900-1000	399
1000-1100	585
1100-1200	789
1200-1300	784
1300-1400	787
1400-1500	610
1500-1600	785
1600-1700	590
1700-1800	488
1800-1900	320
Total	6942

We have assumed that this level of pedestrian activity will occur on 150 days per year of University Term Time. Outside term time (215 days) it is estimated that pedestrian volumes will be half this level. Therefore over a whole year it is estimated that 1,793,800 pedestrians currently suffer 20 seconds of delay (almost 10,000 hours per year in total) that would be removed by the scheme.

Accident Benefits

A total of 17 people were involved in injury accidents over the past 5 years. Two of these (both slight) were on Cross Church Street. This street is to be closed to general traffic as part of the scheme and therefore it is reasonable to assume that these two accidents will be saved. In addition we have assumed that the simplification of the junctions as part of the scheme will result in 10% of other accidents being removed. This results in the removal of 3.5 accidents over a 5 year period. The benefits of these have been assessed using the WebTAG values for different accident severity.

Results

The economic benefits arising from the above scheme impacts are as follows:

Highway journey Time Savings	£4,630,000
Pedestrian Time Savings	£1,950,000
Accident Savings	£808,000
Total Benefits (PVB)	£7,388,000
PVC	£2,620,000
NPV	£4,768,000
BCR	2.8