Technical Note

Project Title:	Assessing the Transport Impacts of the Local Development Framework
MVA Project Number:	C37840
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Author(s):	James Blythe
Reviewer(s):	Nick Benbow
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1 Introduction

1.1 The purpose of this Note is to summarise the transport impacts in Bolton of the Local Development Frameworks (LDF). This note is one of a series of outputs from a study into the potential transport impacts of the Local Development Frameworks (LDF) in Greater Manchester.

1.2 The objective of the study was to investigate the potential impacts on transport networks of the LDF core spatial strategies for each of the districts in Greater Manchester. The approach involved using the land use and transport forecasting models that have been developed for the Greater Manchester area. The models assume levels of economic growth that are consistent with the Association of Greater Manchester Authorities' (AGMA) Accelerated Growth Scenario (AGS), along with development of the sites and allocations contained within the emerging Local Development Frameworks.

1.3 The outputs from this study will be used to inform the further development of the LDF strategies by showing how the resulting travel demand changes impose stresses on the transport network. These outputs will consider the impacts both locally and in neighbouring areas, and highlight where investment in the transport network is required to achieve the core strategy or a revision to that strategy.

1.4 The potential transport impacts of the LDFs across Greater Manchester are reported in the Final Report, along with a description of the methodology employed in analysing the transport impacts. This note focuses on the transport impacts in Bolton and should be read in conjunction with the Final Report.

2 Modelling Approach

2.1 The approach to the study has been to undertake land use and transport modelling to explore the relative impacts on land use and key transport metrics of the following:

- underlying travel demand trends;
- the land use allocations within the LDFs; and

- the potential impact of new capital investment in transport via the Transport Fund.

2.2 In order to test the impacts of these drivers, artificial test scenarios were created and run through the models. In each of these scenarios, the level of population and employment growth over time was constrained to control totals for the Fully Modelled Area (equating roughly to the City Region area). However, the location of the population and employment growth was determined by the land use model.

2.3 The employment and population control total inputs were based upon the Accelerated Growth Scenario from AGMA's economic forecasting model, the Greater Manchester Forecasting Model (GMFM), and Department for Transport's TEMPRO data. The control for the Fully Modelled Area comprised the sum of the growth implied by the AGS forecasts for Greater Manchester County and the TEMPRO forecasts for the rest of the City Region area.

2.4 The tests that are reported within this note are outlined below:

- **Do Minimum** which assumed the levels of economic and demographic growth contained within the AGS forecasts and basic transport trends (on car ownership etc) but no additional development after 2011 and no changes to the transport network beyond schemes already committed.
- **Greater Manchester Proposals Scenario** which added the LDF development proposals and a package of transport interventions that were planned for the Transport Fund to the assumptions for the Do Minimum Scenario.

2.5 The transport schemes contained within each of the scenarios are described in detail in Technical Note 1 "Transport Strategy Assumptions".

2.6 The reporting of the transport impacts of the LDFs concentrates on comparing the forecasts for 2011 with those for 2026, assuming that all of the LDF developments are built, but not necessarily occupied, and that the Greater Manchester Transport Fund schemes are constructed over this period. It should be noted that the overall level of population and employment growth is constrained to a fixed level over the fully modelled area as described above. The areas where this growth is located is determined by the land use model considering the available development space and the accessibility of those developments.

2.7 Some comparison is made with the situation where new developments and the transport schemes have not been constructed, to show the overall impact of the LDFs and the transport schemes on the demand for travel within Greater Manchester. In this case, the growth in population and employment has been catered for in already existing residential and employment buildings.

3 Land Use Inputs and Outputs

3.1 This section briefly outlines the inputs to the models in terms of the additional housing, office and industrial floorspace provided by the LDF developments, and goes on to summarise the change in population and employment in Bolton for the Greater Manchester Proposals Scenario between 2011 and 2026.

3.2 A summary of the LDF planning assumptions for Bolton are provided in Table 1, and the resulting change in population and employment is shown in Table 2. These tables show that although there is an 8% increase in the provision of housing floorspace, population only increases by 1%. Similarly, with 25% increase in office floorspace and 5% increases in industrial floorspace, employment in the district has increased by 3%.

Table 1 Bolton LDF Land Use Inputs

	2011	2026	Difference
Housing	12,321,663	13,356,100	8%
Office	399,278	498,382	25%
Industrial	2,394,508	2,514,283	5%

Table 2 Bolton Population and Employment Forecasts - Greater Manchester Proposals Scenario

	2011	2026	Difference
Population	268,472	270,259	1%
Households	118,952	133,102	12%
Jobs	112,974	116,113	3%

3.3 Figure 1 shows the distribution of population changes across the district between 2011 and 2026. This shows a change in the distribution of population, with some zones seeing increases and others decreases. The largest increases in population occur to the west of the district on the M61 corridor, and it is noticeable that there are significant increases in population around the edge of the district in Bury and Wigan. The distribution of employment change, shown in Figure 2, shows significant decreases in employment in certain zones, particularly in the town centre and the area to the south. Some zones away from the town centre, in the west and south on the M61 corridor, have seen significant increases in employment, as have some zones around the border in Bury and Wigan.

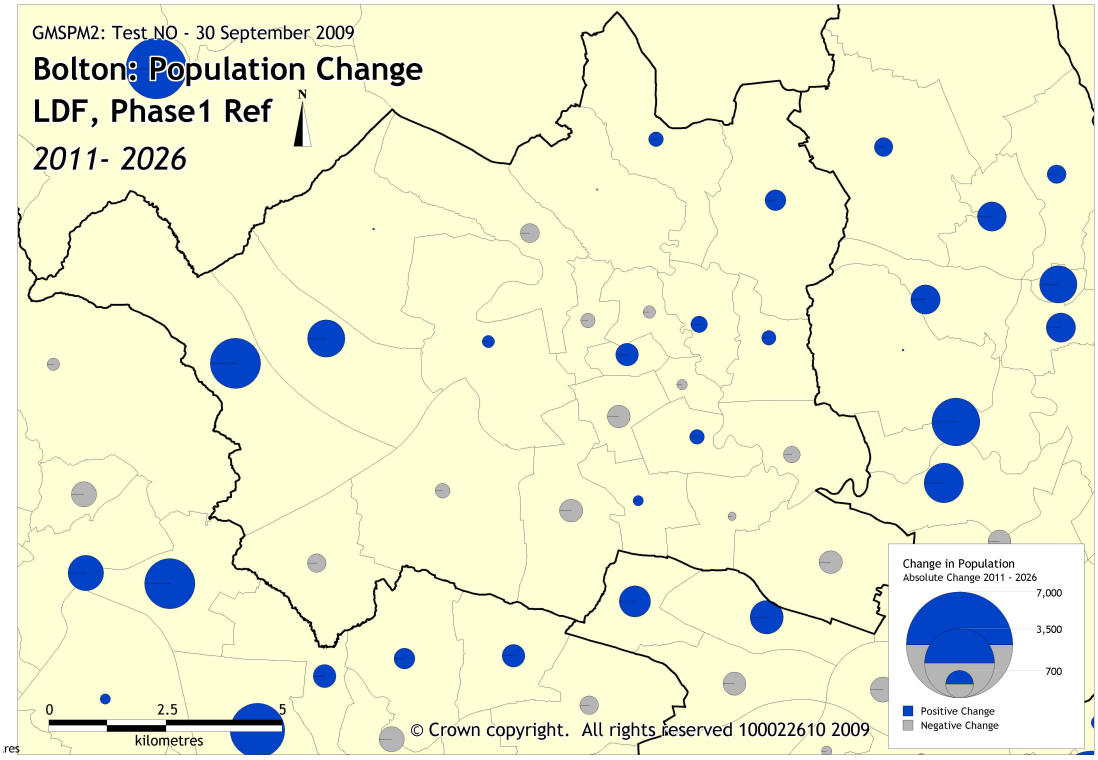

Figure 1 Bolton Population Change – Greater Manchester Proposals Scenario

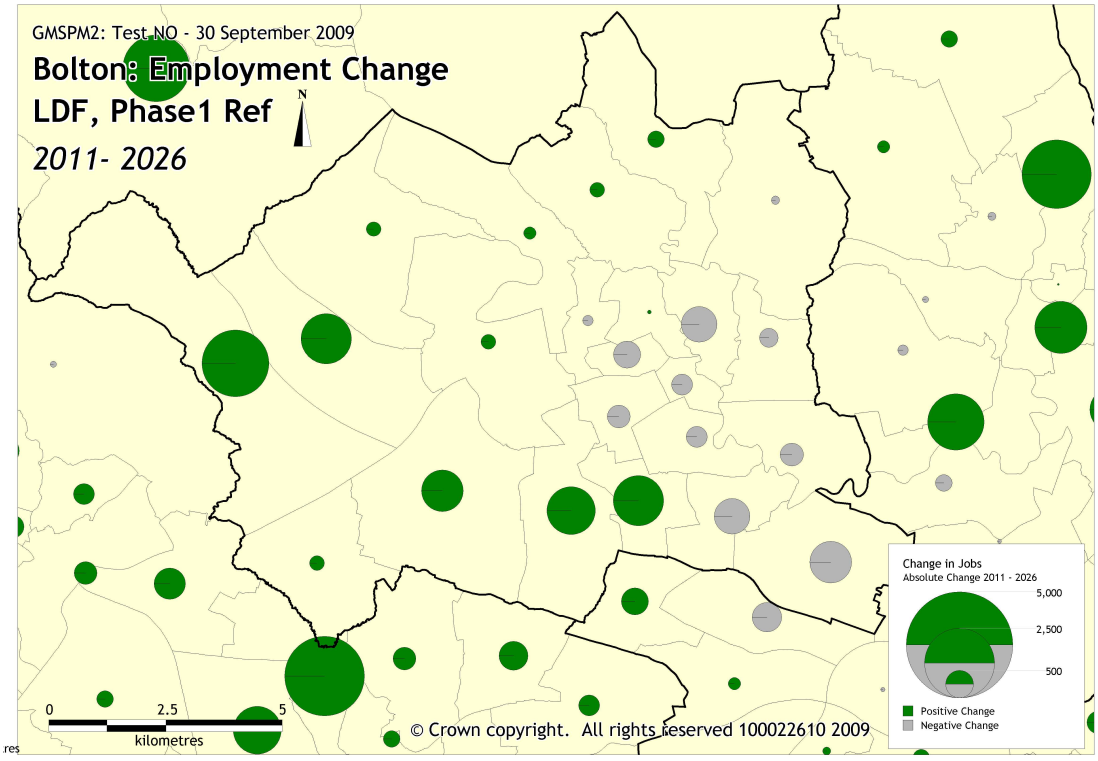

Figure 2 Bolton Employment Change - Greater Manchester Proposals Scenario

4 Transport Outputs

4.1 This Section reports on the impact of the LDFs and the Transport Scenario on the transport networks over time.

Changes in Trip Making

4.2 Table 3 shows the forecast impact on the demand for travel in the Do Minimum scenario, which reflects the changes in population and employment levels, changes in car ownership, and changes in the cost of travel over time but without considering the location of new developments. This shows that the increasing levels of population, employment income and car ownership over time, together with the declining relative affordability of public transport compared with car, are forecast to result in increasing traffic levels. The model forecasts show increases in the number of car tips of 14% between 2011 and 2026, with corresponding decreases in public transport and walk/cycle journeys. The overall increase in trip making forecast between 2011 and 2026 is 7%.

4.3 The model forecasts for the Greater Manchester Proposals Scenario are shown in Table 4, which show lower levels of trip making increases across Bolton between 2011 and 2026, which will be a result of the low levels of population and employment increases previously noted. However, car trip productions and attractions are still increasing, with productions forecast to increase by 10% over the period. There is a clear shift from public transport, walking and cycling to car over time, which is more significant for trip attractions. This is likely to be a result of the move of jobs out of Bolton Town centre to other areas of the district which are less well served by public transport, such as along the M61 corridor.

Table 3 Change in Bolton Home Based Trip Productions and Attractions – Do Minimum

	2011	2026	Difference
Productions			
Car	229,630	260,673	+14%
Public Transport	27,130	25,536	-6%
Walk/Cycle	90,589	84,404	-7%
Total	**347,348**	**370,613**	**+7%**
Attractions			
Car	226,339	258,540	+14%
Public Transport	25,552	23,575	-8%
Walk/Cycle	92,934	86,484	-7%
Total	**344,825**	**368,599**	**+7%**

Table 4 Change in Bolton Home Based Trip Productions and Attractions – Greater Manchester Proposals Scenario

	2011	2026	Difference
Productions			
Car	229,630	251,538	10%
Public Transport	27,130	25,453	-6%
Walk/Cycle	90,589	81,084	-11%
TOTAL	**347,348**	**358,074**	**3%**
Attractions			
Car	226,339	245,123	8%
Public Transport	25,552	22,672	-11%
Walk/Cycle	92,934	82,665	-11%
TOTAL	**344,825**	**350,461**	**2%**

4.4 The change in the number of trips to, from and within Bolton district between 2011 and 2026 is shown in Table 5, which again highlights the forecast increases in traffic levels across all three time periods, with corresponding decreases in public transport trip making.

Table 5 Change in Trips to/from/within Bolton – Greater Manchester Proposals Scenario

	2011	2026	Difference
Car			
Morning Peak	171,338	186,573	9%
Inter-peak	275,784	298,153	8%
Evening Peak	220,282	238,962	9%
Rest of Day	110,260	126,104	14%
TOTAL	**777,664**	**849,792**	**9%**
Public Transport			
Morning Peak	21,156	20,222	-4%
Inter-peak	29,553	26,766	-9%
Evening Peak	20,689	19,761	-5%
Rest of Day	5,667	5,540	-2%
TOTAL	**77,065**	**72,290**	**-6%**

Impact on the Highway Network

4.5 The forecast morning peak traffic flows for 2026 are shown in Figure 3, with the changes in flows from 2011 shown in Figure 4. The morning peak flows are shown to be most significant on the motorways, the A58, the A666, the A673 and the A676. The flow increases over the period are most significant on the motorways and in the west of the district, which is consistent with the changes seen in the location of population and employment. Traffic levels are forecasts to increase on much of the road network in Bolton over time.

4.6 Figure 5 shows the links in Bolton where the volume over capacity ratio is 85% or greater in 2011, and Figure 6 presents the same information in 2026. It is clear from these two figures that a significant number of links and junctions have become closer to capacity by 2026, as would be expected with the forecasts increases in traffic levels. This is particularly significant on the M60 and in the west of Bolton, where the largest population and employment increases are seen.

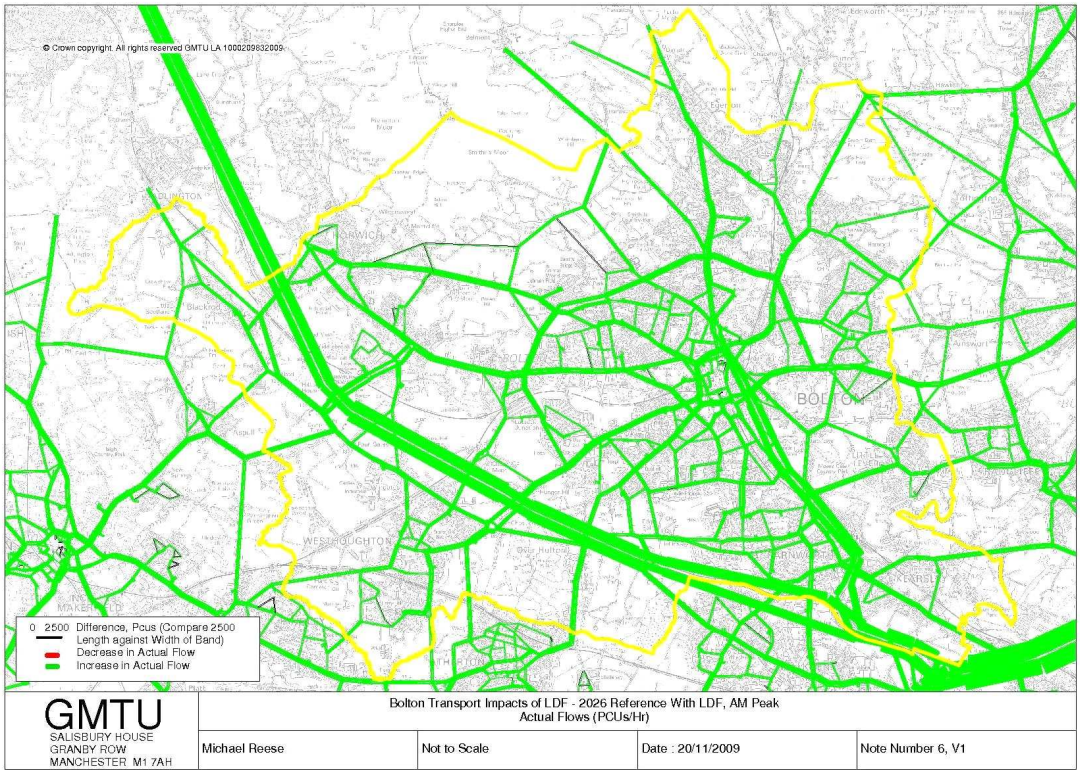

Figure 3 2026 Morning Peak Traffic Flows in Bolton - Greater Manchester Proposals Scenario

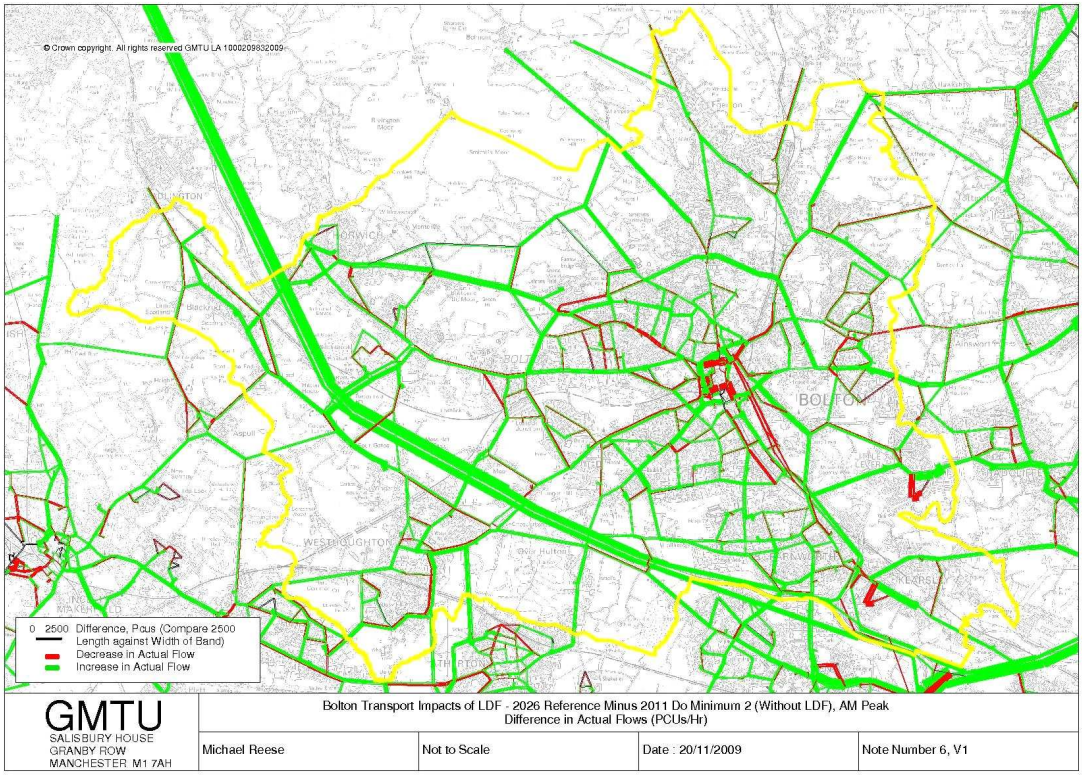

Figure 4 Change in Morning Peak Traffic Flows in Bolton between 2011 and 2026 - Greater Manchester Proposals Scenario

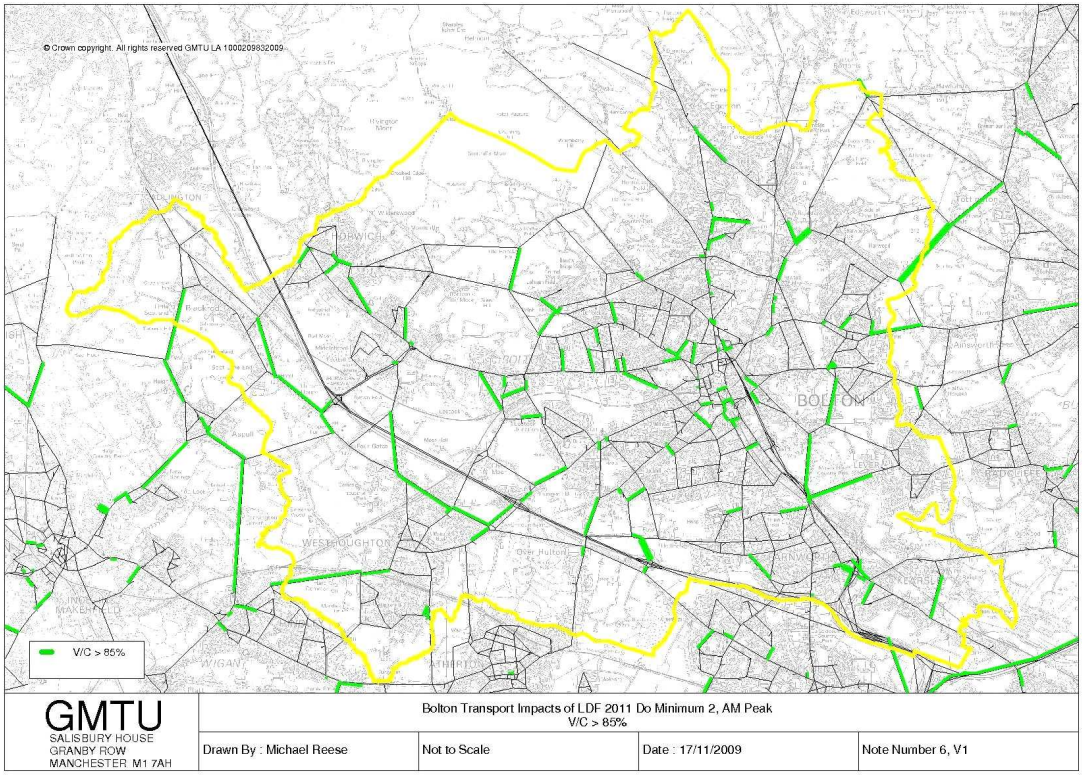

Figure 5 Road Links in Bolton with Volume/Capacity Greater than 85% in 2011 - Greater Manchester Proposals Scenario

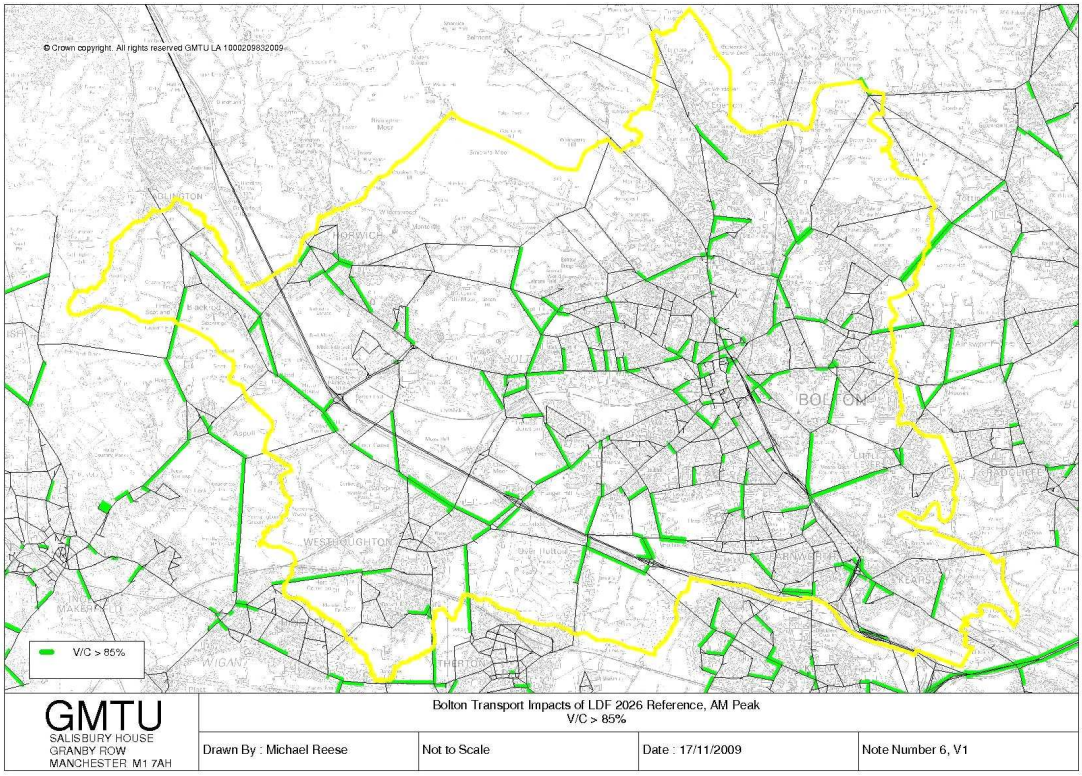

Figure 6 Road Links in Bolton with Volume/Capacity Greater than 85% in 2026 - Greater Manchester Proposals Scenario

Impact on Journey Times

4.7 The forecast changes in Motorway journey times within Bolton are shown in Table 6, which show that the section of the M61 between junction 6 and junction 3 has seen the most significant increase in journey times over the period in both directions. The other sections of the motorway have seen slight increases in journey time, but these are not forecast to be too significant. Table 7 shows the changes in journey times on the key radial routes into the Regional Centre, which show significant increases of the order of 40% inbound in the morning peak and 30% outbound in the evening peak. As these changes represent around an additional 10 minutes onto journey times, these are forecast to be of a level at which drivers will notice the impact.

4.8 The model forecasts are also suggesting significant impacts on some of the other key routes in Bolton, as shown in Table 8. Of particular note are the 30% increases in journey times in the morning peak between Bolton and Bury in both directions. There are also forecasts of significant increases on the routes in from Wigan, the M61 and Atherton in the evening peak and from Blackburn and Atherton in the morning peak.

Table 6 Change in Motorway Journey Times in Bolton - Greater Manchester Proposals Scenario

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
M61 Inbound						
M61 J6 to J3	7:10	8:09	14%	8:04	9:01	12%
M61 J2 to M60	2:15	2:18	3%	2:23	2:32	7%
M60 M61 to A666	2:43	2:46	2%	2:58	3:01	1%
Total	**12:07**	**13:13**	**9%**	**13:25**	**14:35**	**9%**
M61 Outbound						
M60 A666 to M61	4:08	4:15	3%	3:59	4:06	3%
M61 M60 to J2	1:34	1:38	4%	1:49	1:49	-1%
M61 J3 to J6	7:12	7:50	9%	8:59	9:31	6%
Total	**12:55**	**13:44**	**6%**	**14:48**	**15:26**	**4%**

Table 7 Change in Bolton to Regional Centre Journey Times - Greater Manchester Proposals Scenario (Minutes : Seconds)

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
Bolton to Regional Centre						
A666	28:30	39:32	39%	22:56	23:41	3%
A666/M61/A580	25:16	35:18	40%	18:12	18:57	4%
Regional Centre to Bolton						
A666	24:37	30:32	24%	29:04	37:56	31%
A580/M61/A666	19:33	22:03	13%	25:48	34:38	34%

Table 8 Change in Journey Times on Major Routes in Bolton - Greater Manchester Proposals Scenario

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
A58 Bolton to Bury	15:28	20:09	30%	15:21	17:57	17%
A58 Bury to Bolton	17:30	22:58	31%	18:37	18:46	1%
Bolton to Wigan A577/A58A676	28:09	33:56	21%	34:31	39:57	16%
Wigan to Bolton A577/A58A676	34:56	39:48	14%	28:41	35:57	25%
A673/A5076 Bolton to M61 J6	14:10	15:07	7%	16:21	18:08	11%
A5076/A673 M61 J6 to Bolton	13:24	13:56	4%	13:31	16:03	19%
A58 Bolton Ring Road Westbound	23:21	28:07	20%	19:16	21:14	10%
A58 Bolton Ring Road Eastbound	18:45	20:31	9%	23:25	25:26	9%
A666 Bolton to Blackburn Bdy	10:37	10:35	0%	18:58	17:32	-8%
A666 Blackburn Bdy to Bolton	21:37	27:25	27%	14:47	15:49	7%
A579 Bolton to Atherton	14:21	15:22	7%	17:01	18:27	8%
A579 Atherton to Bolton	17:53	20:55	17%	17:56	21:10	18%

Impact on Public Transport

4.9 The forecast changes in public transport boardings and alightings in Bolton are shown in Table 9 and, as would be expected with the decline in public transport patronage already noted, both boardings and alightings have decreased in each time period. The decline for morning peak boardings and evening peak alightings is much lower than the other instances, suggesting that public transport is still relatively attractive for commuting journeys travelling out of Bolton, presumably to the Regional Centre. Changing income levels, combined with increases in

congestion on the road network, have led to a clear shift to rail from bus. This will clearly have an impact on the levels of crowding on the already crowded rail services between Bolton and Manchester.

Table 9 Change in Bolton Public Transport Boardings and Alightings– Greater Manchester Proposals Scenario

	Boardings			Alightings		
	2011	2026	Diff	2011	2026	Diff
Morning Peak						
Bus	5,898	5,536	-6%	6,061	5,466	-10%
Rail	1,937	2,123	10%	736	802	9%
Tram	0	0	-	0	0	-
TOTAL	**7,835**	**7,660**	**-2%**	**6,797**	**6,269**	**-8%**
Inter-peak						
Bus	4,655	4,174	-10%	4,574	4,115	-10%
Rail	395	423	7%	285	300	6%
Tram	0	0	-	0	0	-
TOTAL	**5,050**	**4,596**	**-9%**	**4,859**	**4,415**	**-9%**
Evening Peak						
Bus	5,709	5,202	-9%	5,405	4,974	-8%
Rail	528	577	9%	1,580	1,712	8%
Tram	0	0	-	0	0	-
TOTAL	**6,238**	**5,779**	**-7%**	**6,985**	**6,686**	**-4%**

Impact on Environmental Indicators

4.10 The forecast change in the environmental indicators in Bolton are shown in Table 10. The model forecasts have included the Department for Transports guidance that fuel efficiency will improve over time and that engine standards for emissions will continue to improve. This means that, despite the increases in traffic levels, NOx emissions are forecast to reduce by 21% over the period 2011 to 2026. However, PM10 and CO_2 emissions are forecast to continue increasing, the CO_2 increase being 14%.

Table 10 Change in Environmental Indicators in Bolton – Greater Manchester Proposals Scenario

	2011	2026	Difference
NOx	1,209	961	-21%
PM10	137	144	+6%
CO_2	118,816	135,441	+14%

5 Summary

5.1 Population and employment in Bolton increases between 2011 and 2026, but the overall increases are only small, population being 1% and employment 3%. The largest increases in population occur to the west of the district on the M61 corridor, with there being significant increases in population around the edge of the district in Bury and Wigan. There are some significant decreases in employment in the district, most notably in the town centre. However, zones to the west and south of the district on the M61 corridor have seen large employment increases, as have some zones over the border in Bury and Wigan.

5.2 The forecast changes in overall trip making in Bolton over the period are low, which is consistent with the forecasts of population and employment change. The increasing levels of population and employment, changes in car ownership, and declining relative affordability of public transport compared to car have resulted in increases in traffic levels. There is a clear shift away from public transport, walking and cycling over time, which has been exaggerated by the decreases in jobs in the town centre, where employment locations are going to be better served by public transport. The dispersal of jobs to other parts of the district is contributing to this switch to car, particularly with there being increasing numbers of jobs on the M61 corridor.

5.3 A significant number of roads and junctions are forecast to become closer to capacity over the period 2011 to 2026, in particular on the M60 and in the west of the district. In addition, journey times on a number of key routes are forecast to increase, most notably the following:

- the M61 between junctions 6 and 3;
- the key radial routes into the Regional Centre; and
- the route between Bolton and Bury.

5.4 Although public transport patronage in the district is decreasing over time, it is still a relatively attractive mode for commuting to the Regional Centre. However, the changing costs of travel caused by increased congestion on the road network, combined with rising income levels are forecast to lead to a shift away from bus to rail for public transport journeys. This will have an impact on crowding levels on rail services, particularly as service between Bolton and Manchester already suffer from overcrowding in the peak periods.

5.5 The model inputs have assumed that fuel efficiency of vehicles is improving through time, and that engine standards for emissions continue to increase. Therefore, NOx emissions are

forecast to reduce by 21% between 2011 and 2026 even though traffic levels are increasing. PM10 and CO_2 emissions are forecast to increase.