

<b>Public Inquiry into <i>Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</i></b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
<b>Norwich Green Party <i>Paper on Carbon Emissions for SW (without NDR) against NE</i></b>	

**Author**

This Norwich Green Party *Paper of Carbon Emissions* is authored by Norfolk County Councillor and Norwich City Councillor Andrew Boswell. I make this statement as local politician first elected in 2005 to represent residents in the Norwich Nelson division, an area to the West of the City Centre. The Green Party holds 19 council seats [15 City Council, 4 County Council] within the Norwich urban area and is the main opposition group on the City Council. Norwich Green Party has a written constitution and over 1100 active members and supporters within the City and outlying areas of Norfolk.

Prior to being elected to Norfolk County Council, I pursued a career in scientific research and computing support for scientific research. My doctorate was in protein molecular structure and dynamics (Oxford, 1981). I worked for 10 years (1984-1994) in the design of the Very Large Scale Integrated (VLSI) circuits that have made the current digital revolution possible, and from 1995-2006 I managed the High Performance Computing (HPC) Research infrastructure at the University of East Anglia (UEA, Norwich) and worked with scientific research groups across the campus including those modelling the global climate system.

**Endorsement**

The submission is endorsed by Councillor Richard Bearman, Leader of the Green Party group on Norfolk County Council, and Councillor Claire Stephenson, Leader of the Green Party group on Norwich City Council.

**Definitions**

*BAFB - Best and Final Funding Bid to the Local Authority Major Schemes Development Pool for a “Norwich Northern Distributor Route” (2011)*

*FBC – Community Infrastructure Fund 2 (CIF2) Postwick Hub Full Business Case (2008)*

*LTP3 – Local Transport Plan 3 (2011)*

*MSBC - NDR Major Scheme Business Case (2008)*

*NCC – Norfolk County Council*

*NDR - Norwich Northern Distributor Road*

**1 Introduction**

- 1 In a letter of May 24<sup>th</sup> 2013, Inspector Vickery requested that we present a paper on carbon emissions to the reconvened Public Inquiry. This is our response.
- 2 We have previously stated our major concern about the Proposed Submission Alternative 1: that the Climate Change implications of developing a growth triangle of 7,000 to 10,000 dwellings around a Norwich Northern Distributor Road have never been properly considered.

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## 2 Background

- 3 Various stakeholders and opponents of the Joint Core Strategy have consistently and repeatedly requested carbon footprinting, carbon auditing and other exercises to be carried out on the Core Strategy. Carbon footprinting of different options is necessary to evaluate different policies and options against the strategic objective of cutting emissions.
- 4 For example, in November 2007, Denise Carlo of the Norfolk and Norwich Transport Action Group (NNTAG) requested to GNDP for Carbon Audit data on then JCS options. GNDP replied that “*Minimising carbon emissions arising from the development will be something for masterplanning stages.*”
- 5 We have always argued that deferring consideration of carbon footprints until after the strategic planning stage is flawed because if the strategy plan embodies a high carbon model of transport and housing distribution it will be impossible to ‘fix it later’ by masterplanning.
- 6 My submission to the Autumn 2010 Examination into the submitted JCS addresses these points in detail (full text is at <http://www.gndp.org.uk/content/wp-content/uploads/downloads/2010/10/Matter-1-35-and-8-8018-Green-Party.pdf> )
- 7 We note that the National Planning Policy Framework ("NPPF"), published on 27 March 2012, is clear (paragraph 94) that local planning authorities “should adopt proactive strategies to mitigate and adapt to climate change” *in line with the objectives and provisions of the Climate Change Act 2008 (footnote 16).*
- 8 Broadland District Council has recently undertaken a public consultation into the draft Area Action Plan for the North East Growth Triangle that finished 10<sup>th</sup> June 2013 (see [http://www.broadland.gov.uk/housing\\_and\\_planning/3765.asp](http://www.broadland.gov.uk/housing_and_planning/3765.asp)). Despite the GNDP position in December 2007 that “*Minimising carbon emissions arising from the development will be something for masterplanning stages*”, we see no evidence for this actually being done.

## 3 A model for evaluating carbon emissions in different JCS housing distribution models

### 3.1 Background to model development

- 9 Our brief from Inspector Vickery is to provide further carbon footprint evidence between two models of housing distribution:
  - JCS Option 1 leading to up to 10,000 new houses in the NEGTT and with the NDR as a major transport element
  - The NNTAG proposal for housing to be capped in NE Norwich quadrant to 5000 new houses in the plan period with 2000 homes (additional to JCS) in the SW quadrant, and no NDR and small-scale extensions to Postwick junction

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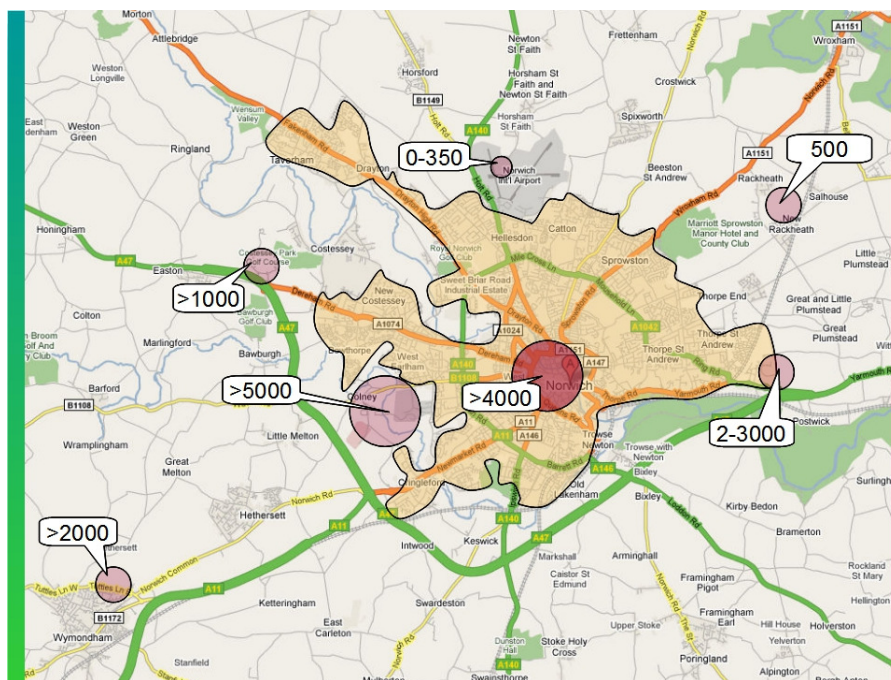
- 10 Such a carbon footprinting exercise should ideally be an integrated part of traffic models for the NPA area. As objectors, with very modest resources, we do have access to the necessary modelling facilities.
- 11 We have found in the past that liaison with the ‘owners’ of such models and facilities, Norfolk County Council and their commissioned consultants, has not been satisfactory. We have been ‘drip-fed’ small chunks of information. The modelling exercise necessary cannot be done by relying on such data.
- 12 Also to perform the modelling correctly, one would need to know all the assumptions built into the model and this is not possible without direct access to it. On this point, we have recently noted that a “carbon emissions” calculation made by a consultant for the Highways Agency for the forthcoming Postwick Hub Inquiry is completely flawed and unreliable. This is because it relies on data output from a traffic model which used a misleading “spatial context” and unrealistic constraints to the traffic network. (A summary of our submission to this Inquiry is reproduced in Appendix D that elaborates these issues).
- 13 Given these constraints, and constraints in time, we develop here an “a priori” model<sup>1</sup>: that is a model that is built up from first principles and is independent of traffic model computation. Such a simple model, necessarily, can only produce a low resolution carbon footprint.
- 14 In order to increase confidence in our results, we have embedded our simple, low resolution model within *an ensemble framework*. That is, we make multiple calculations of the carbon footprint across a range of different values of the main variables. In all, we produce 16 carbon footprints for the JCS distribution of housing, and 32 carbon footprints for the NNTAG distribution of housing. This gives our model more statistical validity, and also enables us to more easily see the influence of varying different variables.
- 15 We note that this is only a starting place, and it does not answer Inspector Vickery’s request in full. The promoters of the JCS, the GNDDP, are the only stakeholder who can provide a full, high resolution carbon footprint, and we argue that they have been remiss in not doing this from the outset, and also in not providing it at the Area Action Plan level more recently.

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<sup>1</sup> [Galen Strawson](https://en.wikipedia.org/wiki/A_priori_argument) wrote that an *a priori* argument is one in which "you can see that it is [true](#) just lying on your couch. You don't have to get up off your couch and go outside and examine the way things are in the physical world. You don't have to do any science."; for this JCS Carbon footprints substitute “science” for “detailed traffic model computation”.  
[https://en.wikipedia.org/wiki/A\\_priori\\_argument](https://en.wikipedia.org/wiki/A_priori_argument)

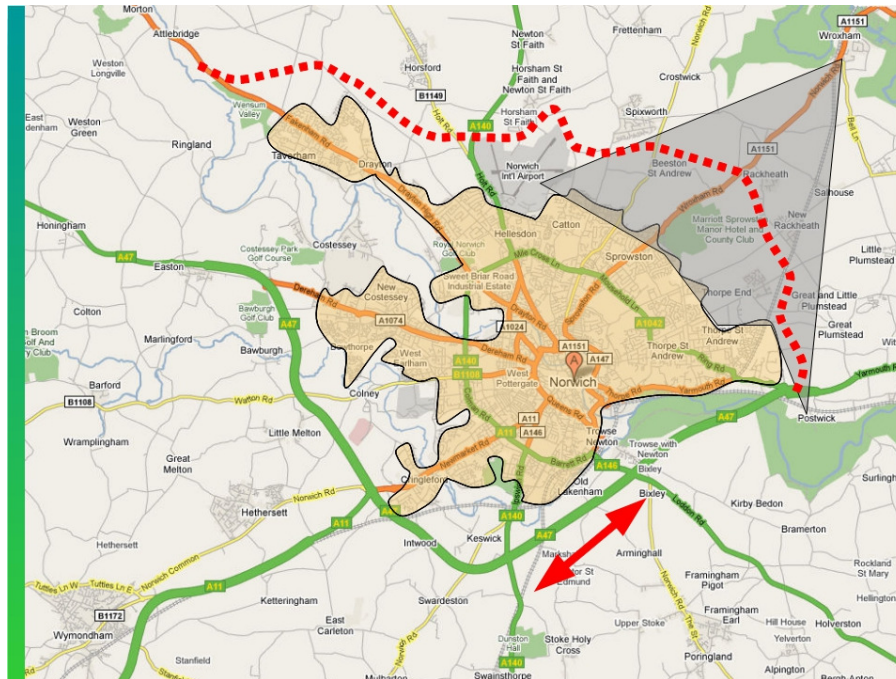
### 3.2 Mapping the Model area

- 16 The maps below are high level illustrations and are not intending to indicate any specific sites, the JCS being non-site specific in any case. They are provided only to show the main elements of transport carbon emissions in each housing distribution, and the distribution of planned additional employment around Norwich.
- 17 The first map below shows Norwich and hinterlands with major employment sites marked. We have not been able to find a figure for the number of jobs at the Rackheath site and we have guesstimated it at 500 for this purpose.



- 18 It is important to note that a criticism that we have always made of the JCS is that the main employment areas developing are to the South West of the City whilst the JCS places a large amount of housing in the North East. This defies the proximity principle in planning. Recently, announcements have been made to expand the Norwich Research Park up to 5000 jobs.
- 19 The South West quadrant of the City is amendable to development with integrated sustainable transport. The MTRU report (see Appendix A) identifies that there is a much lower car/public transport modal split in the South West compare to the North East.
- 20 In April, a £5m for cycle route in the SW Quadrant was announced (see Appendix B).

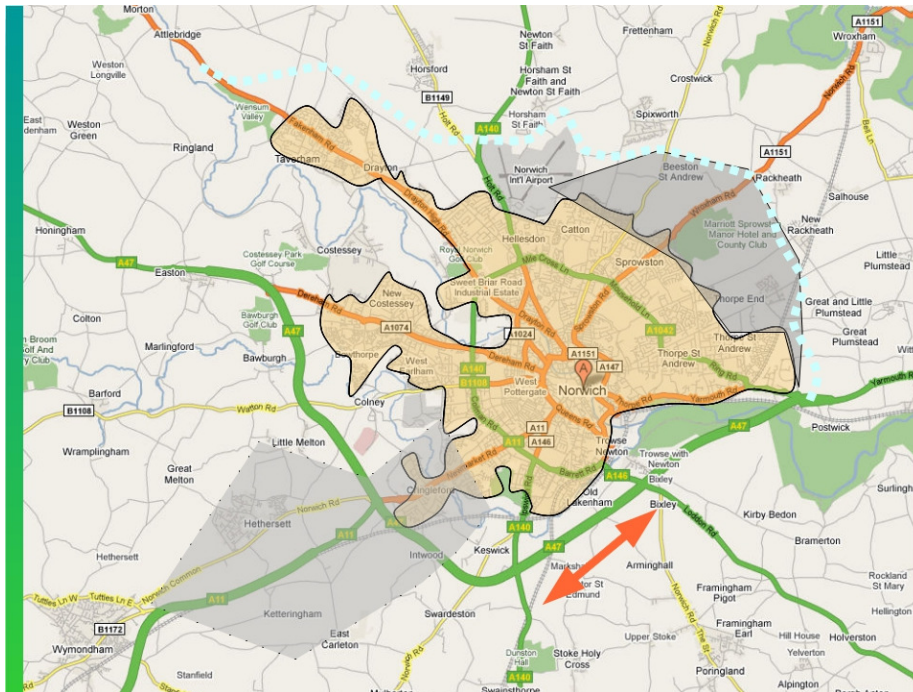
21 The map below shows the JCS Option 1 housing distribution.



Traffic related carbon emissions arise from these bulk sources:  
[Model variable : Source]

- i  $B^{NEGT10}$  : Background generation from 10000 homes in NEGT area
- ii  $C^{NDR}$  : The carbon footprint of the NDR
- iii  $C^{PH}$  : The carbon footprint of Postwick Hub
- iv  $C^{NESW(JCS10)}$  : The carbon footprint of additional traffic generated from NE-SW (and SW-NE return) commuting due to homes being built in North East and more employment being created in South West.

22 The map below shows alternative Option promoted by NNTAG



Traffic related carbon emissions arise from these bulk sources:

- i  $B^{NEGT5}$  : Background generation from 5000 homes in NEGT
- ii  $B^{SW2}$  : Background generation from 2000 homes in SW quadrant
- iii  $C^{NESW(NNTAG)}$  : The carbon footprint of additional traffic generated from NE-SW (and SW-NE return) commuting. We posit that this footprint would be positive but would be considerably less than in the JCS Option 1 model (hence lighter shading of the arrow).

In this housing distribution, the NDR (and Postwick Hub) would not be built and its route is only marked to show the boundary of NEGT.

### 3.3 Numerical Definition of the model

23 We now define top-level equations for the two models JCS Option 1 and NNTAG Options

$$C^{JCS} = B^{NEGT10} + (C^{NDR} + C^{PH}) + C^{NESW(JCS10)}$$

$$C^{NNTAG} = B^{NEGT5} + B^{SW2} + C^{NESW(NNTAG)}$$

### 3.4 Background household related carbon emissions

24 Norwich Green Party commissioned Keith Buchan of Metropolitan Transport Research Unit (MTRU) to investigate the potential difference in transport carbon arising from

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housing development in different areas of Norwich. MTRU’s report is reproduced in Appendix A.

25 MTRU developed a spreadsheet model that calculates carbon footprint (and its Wehtag spreadsheet monetised cost) depending on the car share percentage of the local area. baseline is the data supplied for the Postwick development<sup>2</sup>, this consists of average journey length (in distance bands), trips generated by the new housing<sup>3</sup>, and mode split between car driver and all public transport (bus and rail combined). The trip distances are for all purposes, the generation and mode split are by time of day.

26 We have used this data to generate background generation of carbon at different levels of mode split, the  $B^{NEGT10}$ ,  $B^{NEGT5}$  and  $B^{SW2}$  variables above.

### 3.5 Evaluating variables and Eliminating double counting

27 In our model, we add to the background level, the additional transport carbon generated from:

- major transport infrastructure in the JCS plan : the NDR and Postwick Hub ; the  $C^{NDR}$  and  $C^{PH}$  variables. To provide values for these, we use data from existing funding submissions by the Norfolk County Council on the carbon footprint of the NDR and Postwick Hub.
- traffic increases of circular journeys on the Southern by-pass; the  $C^{NESW(JCS10)}$  and  $C^{NESW(NNTAG)}$  variables. To calculate these, we apply a multiplier to the combined NDR and Postwick Hub footprint. In the case of the JCS case, we apply a multiplier of either 25% or 50%. That is the additional carbon footprint on the Southern by-pass will be 25% or 50% of the NDR and Postwick Hub footprint.
- In the case of the NNTAG distribution, we apply the same multiplier for increases of Southern by-pass journeys with an additional multiplier factor of 10% applied to each. The rationale here is building housing in the NNTAG distribution will only create 10% of the circular commuting journeys compared to the JCS distribution that forces significant NE->SW commutes (and SW->NE return journeys) due to the inherent imbalance of housing and employment in the JCS distribution.

28 Some of the background level journeys will be journeys that are included in the carbon footprint. This would lead to double counting in the model. To eliminate the double counting, we introduce a double counting factor that is applied to the  $B^{NEGT10}$ ,  $B^{NEGT5}$  and  $B^{SW2}$  variables:

- The double count factor is actually those background journeys that we include in the total. In the case of the JCS, the double count factor is set to 70%. This means that we take 30% of journeys out of the background generation figures as we assume they are already in the NDR footprint.

<sup>2</sup> Norfolk modelling consultants’ email to Keith Buchan of MTRU

<sup>3</sup> From the TRICS database, these are shown in Annex T2. To create the pm peak hours required, we have simply reversed the am peak. This is an area for further development.

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- In the case of the NNTAG distribution, the double count factor is set at 95% for both the NEGT area (5000 houses) and the SW area (2000 houses). There is no NDR in this distribution, but this means that we assume that additional 5% of journeys are on the Southern by-pass (which is still calculated separately as above for this distribution) from these households.

### 3.6 *Creating an ensemble of results*

29 We have designed our spreadsheet so that we can calculate an ensemble of carbon footprints for each housing distribution. This allows the variables and factors above to be varied so that a set of calculations is created for each distribution. Each of these:

- Generates a carbon footprint calculated over a Wehtag 60 year period
- Generate the carbon footprint in tonnes of carbon dioxide over the appraisal period
- Has a unique identified from which the variation and parameterisation of the basic parameters may be decoded.

30 Ensemble computing is a technique used in scientific applications like weather forecasting where a large number of runs of a model are made with different parameters. It enables a better statistical result to be obtained where there is uncertainty in some of the data. We have merely applied this technique on a microscopic scale with a small number of variables and parameters.

31 Our spreadsheet has been supplied electronically with our submission. All the above parameters are accessible and may be altered to different values. Effectively, it is a generic model and could be expanded to test a much larger ensemble of runs. We have set the variables to values which make sense for the purposes of the current exercise.

### 3.7 *The NDR carbon footprint*

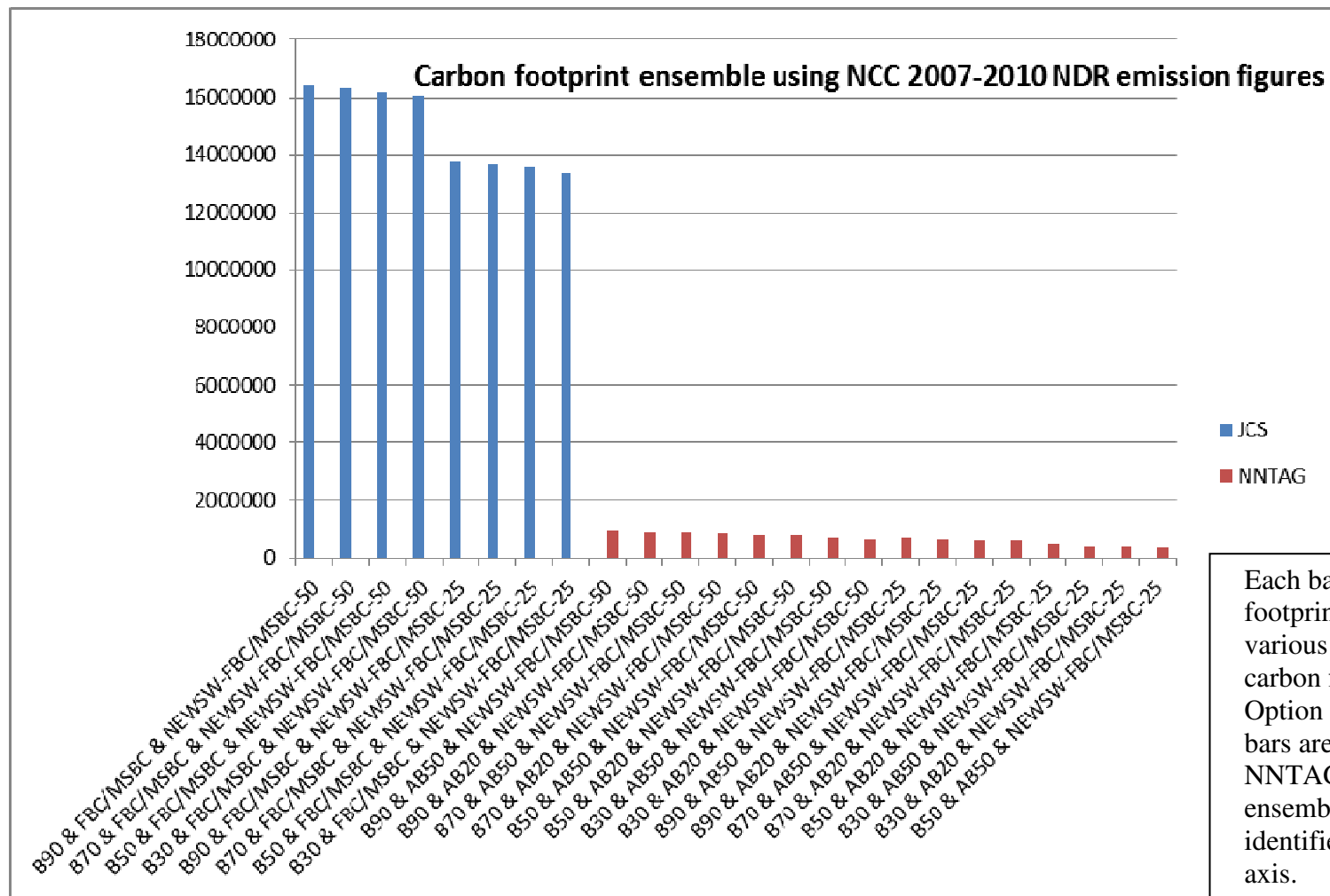
32 It is important to note that we have two quite different values for the NDR footprint. This is because the funding submissions from the Norfolk County Council to Government have provided very different figures. The figures are so different that they cannot be explained by changes to the modelling method. No explanation of the variance has ever been given. The more recent estimates of carbon emissions in the 2011 Best and Final Funding Bid (BAFB) for the integrated Postwick Hub and NDR have shown significant downward divergence from the previous figures submitted to the Department for Transport.

33 To be fair to each set of figures, we have applied our ensemble model to both sets of figures. In effect, the different NDR (and Postwick) footprint is treated as variable that may take two very different values.

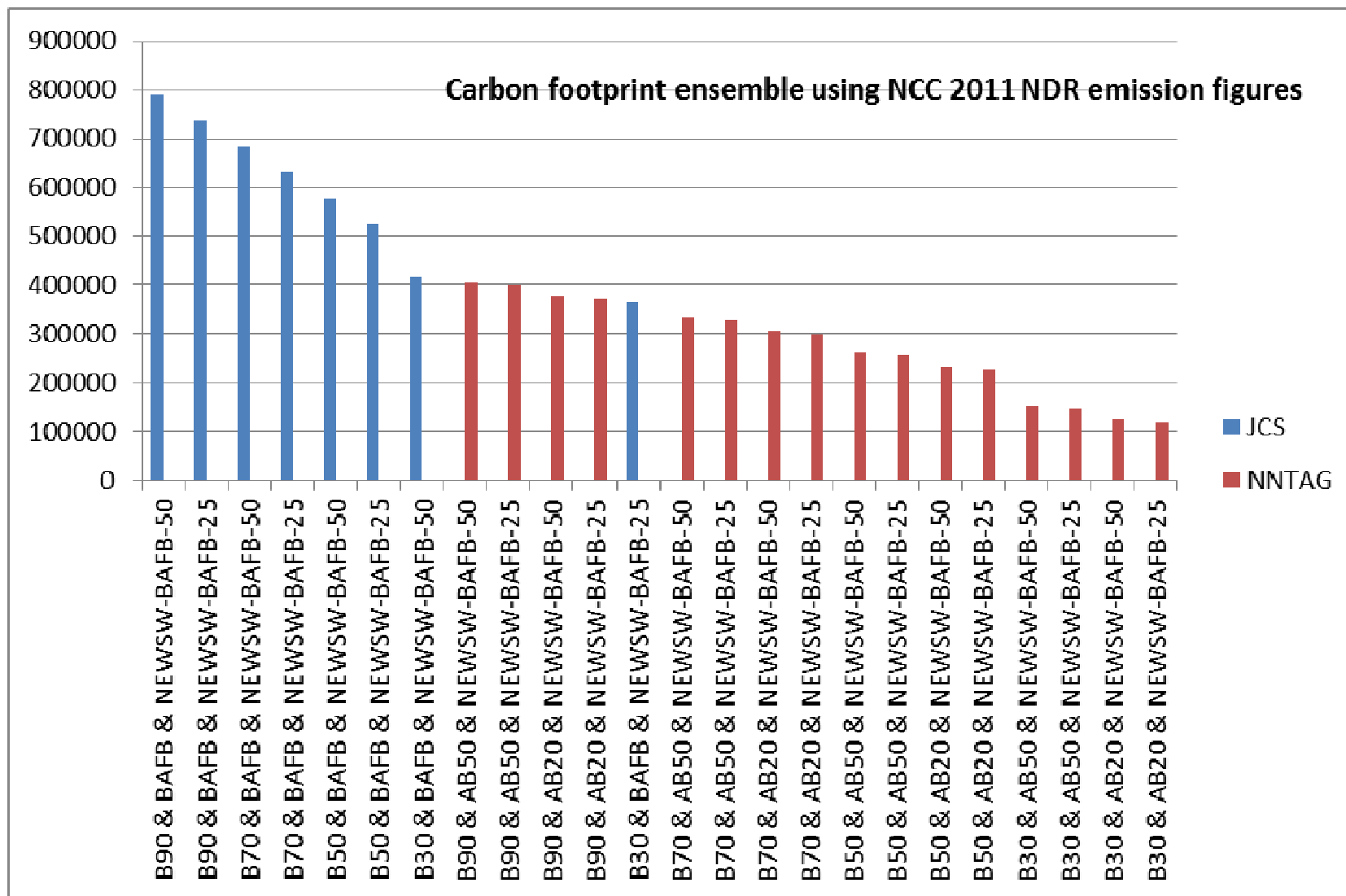
34 More is given on this issue in Appendix C.



3.8 Ensemble run results



Each bar on the graph is a carbon footprint as calculated in the model with various parameters. The blue bars are carbon footprints generated under the JCS Option 1 housing distribution and the red bars are those generated under the NNTAG housing distribution. Each ensemble run is labelled with a code that identifies its parameters on the bottom axis.



### 3.9 Interpretation of results

- 35 For the first graph which uses higher value NDR carbon footprint figures as per the 2007-2010 figures submitted to Department for Transport, the JCS housing distribution creates a much larger carbon footprint than the NNTAG housing distribution in all ensemble runs.
- 36 In the second graph where the lower value NDR carbon footprint has been used as per the 2011 Best and Final Business (BAFB) case submitted to Department for Transport, the JCS housing distribution creates a larger carbon footprint than the NNTAG housing distribution in all ensemble runs except one.
- 37 The relevant model runs are:  
[Housing Distribution : Ensemble run : 60 year carbon footprint (tCO<sub>2</sub>e)]
- i NNTAG : B90 & AB50 & NEWSW-BAFB-50 : 406109
  - ii NNTAG : B90 & AB50 & NEWSW-BAFB-25 : 400902
  - iii NNTAG : B90 & AB20 & NEWSW-BAFB-50 : 377331
  - iv NNTAG : B90 & AB20 & NEWSW-BAFB-25 : 372125
  - v JCS : B30 & BAFB & NEWSW-BAFB-25 : 366339
- 38 Four NNTAG distribution runs are higher than the JCS one. However, the ‘low’ JCS run (v) has the  $B^{NEG10}$  variable, the background level set with 30% modal shift (B30). The County Council calculate the car/public transport split for this area to be 91% car driver. This JCS distribution run assumes 30% car/public transport split, and so is an unrealistic set of input parameters. The result may be discounted.
- 39 If we use the NCC modal split figures (ie 90% in the NEG10 area), then the most realistic JCS runs to compare with are:
- vi JCS : B90 & BAFB & NEWSW-BAFB-50 : 789485
  - vii JCS : B90 & BAFB & NEWSW-BAFB-25 : 737422
- Both these are more than 80% greater than the highest NNTAG carbon footprint using the BAFB NDR footprint (v).
- 40 We conclude that the JCS housing distribution has a very much higher carbon footprint on all ensemble runs when using 2007-2010 NCC NDR footprint. The smallest JCS footprint is 14 times greater than the largest NNTAG footprint in this case.
- 41 When the NCC car/public transport split is taken into account, the JCS footprint is at least 80% greater than the NNTAG footprint when using 2011 NCC NDR footprint.

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#### 4 CONCLUSIONS

- 42 Our model is limited and low-resolution. We make no bones about the fact that higher resolution models are needed to be run by the Promoters of the JCS. We have said that carbon auditing should be carried out on JCS options since 2007.
- 43 However, our models have usefully shown that given their assumptions, we find that the NNTAG distribution of housing has a smaller carbon footprint than the JCS distribution. The only exception can be explained by a very low modal split parameter for the NEG T area where the NCC actually publish a high car use modal split in this area. Otherwise, the carbon footprint of the JCS housing distribution is always greater than the NNTAG distribution.
- 44 Our evidence presented above shows that the NNTAG distribution of housing has a smaller carbon footprint than the JCS distribution.
- 45 The planning system is charged with producing reductions in CO2 emissions (NPPF, para 94). We posit that this should be applied in the strategic planning system so that carbon emissions can be designed out at an early stage of development plans. Any singular decision in favour of a plan that increments carbon emissions, or increments them more than alternative options, is contrary to the NPPF.
- 46 Such increases in carbon emissions are also contrary to direction of travel of the UK Climate Change Act, and may contribute to the UK not meeting its budgets in future years.
- 47 On the basis of all these arguments, we posit that the GNDP JCS plan is environmentally unsustainable, introduces additional carbon emissions that are not offset in other ways and will add to the global accumulation of greenhouse gases, damaging the potential for future generations. The plan is not sound and should not pass this Public Inquiry on this basis.
- 48 We believe that there should be a new appraisal of alternatives options with different housing distributions that allow significant sustainable development around Norwich.
- Alternative housing distribution in the South West can be developed with a lower car/public transport modal shift, with the potential to link to new cycling facilities in the future.
  - A smaller scale extension to Postwick junction with a Postwick Hub or NDR can allow significant environmental sustainable growth on the timescale of the plan.

These options produce a truly sustainable plan to the GNDP area until 2027.

Councillor Andrew Boswell  
Norwich Green Party  
June 21<sup>st</sup> 2013

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## 1 Introduction

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**2 APPENDIX A : MTRU PAPER : Comparison of the carbon footprint from new development proposed in JCS Option 1 and more sustainable locations in SW Norwich**

**Comparison of the  
carbon footprint from  
new development  
proposed in JCS  
Option 1 and more  
sustainable locations  
in SW Norwich**

**MTRU for  
The Norfolk Green  
Party**

**June 2013**



## CARBON EMISSIONS FROM DIFFERENT DEVELOPMENT LOCATIONS IN NORWICH

### 1 Introduction

#### **Context**

MTRU has been asked to undertake an estimate of the potential difference in the carbon arising from housing development distributions around Norwich. A full transport model run specified by ourselves was not available, nor have we found any current work comparing CO2 emissions from different locations. This is of critical importance because the relationship between development, the city centre, other employment centres, and the provision of alternatives to the car (including walking and cycling) is key to the share of travel by sustainable modes.

What we have available is more detailed analysis for the proposed development at Postwick as part of the Public Inquiry which is about to take place. We also have 2011 Census data for mode choice for journey to work<sup>1</sup>, for residents of Norwich and its neighbouring districts at a very detailed level. This shows clear evidence of the Western areas of Norwich becoming integrated with the urban centre and replicating the high levels of sustainable travel (walk, cycle, bus) found in that centre. The University of East Anglia and the Norwich Research Park are in this area. This is clear on the Census data map, Figure A1 in the Annex. There are also fully funded plans which are now being implemented to improve two public transport corridors to the West. These are also shown in the Annex as Figure A2.

This detailed analysis shows the wide variation in mode share at a more detailed level, but the central urban area results altogether are very positive in terms of sustainable modes. In fact, Norwich has the 3<sup>rd</sup> highest share for walking to work in the country. This is not so in all areas outside the centre, but some have been very successful in terms of bus, cycle and walking, mainly to the West and to a slightly lesser extent to the North. The variations are set out in more detail in Annex Figure 1, but the overall mode shares for the Norwich urban area are shown in Table 1 and Figure 1 below.

**Table 1 Journey to Work mode share by trips**

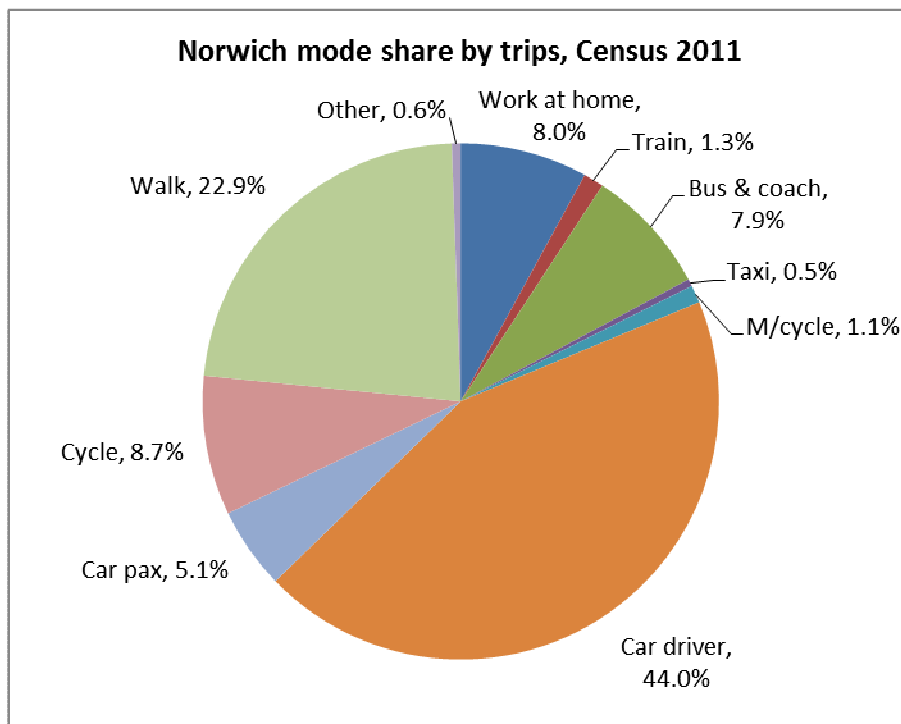
Wk at Home	Train	Bus	Taxi	Mcycle	Car Driver	Car Pass	Bicycle	Foot	Other
<b>8.0%</b>	<b>1.3%</b>	<b>7.9%</b>	<b>0.5%</b>	<b>1.1%</b>	<b>44.0%</b>	<b>5.1%</b>	<b>8.7%</b>	<b>22.9%</b>	<b>0.6%</b>

*Source: Table CT15 2011 Census*

<sup>1</sup> The journey length data is not yet available, but should be by the end of the year. We have undertaken an analysis of the 2001 journey lengths which is discussed later.



**Figure 1**



***Approach for this report***

We have made the assumption that development in Norwich, embodied in the Joint Core Strategy, will meet sustainability objectives in general, but in particular in relation to the National Planning Policy Framework (NPPF). We therefore conclude that a policy which did not meet the carbon reduction targets for transport nationally is extremely unlikely to meet the NPPF sustainability test.

In *The Carbon Plan: Delivering our low carbon future* the Government states that transport will reduce its emissions from 137 million tonnes of CO<sub>2</sub> (MtCO<sub>2</sub>) in 2009 to 116 MtCO<sub>2</sub> by 2030, a fall of 15%. The Postwick Inquiry has received a table setting out the changes in CO<sub>2</sub> between 2012 and 2030, which show a rise of 4%.

Because of a fall in traffic as a result of the recession, the improvement in vehicle efficiency has in fact resulted in net reductions in CO<sub>2</sub> since 2009. The Government target uses 2009, thus I have increased the 2012 figure by 5.4% to reflect the lower vehicle efficiency in that year (based on the Webtag table). The result is that the total for CO<sub>2</sub> emissions in the regional model area decreases by 1% between 2009 and 2030, not the 15% target. This is shown in Table 1 in the Appendix. This means that an excess over target of over 190 thousand tonnes of CO<sub>2</sub> would be created in 2030 alone. It should also be noted that this is an underestimate of the contribution which needs to be made by car kilometres, because goods vehicles are not improving their efficiency as quickly as cars, and the totals include their emissions. Thus we have clear evidence that the JCS NEG T developments (for

example, the Postwick development) do not meet the sustainability test. The question then is whether other areas might do so.

## 2 Understanding carbon impacts

Before setting out the methodology and results of this study we wish to draw attention to the real impact of carbon emissions and how that impact is translated into money values for use in transport appraisal. The latter do not represent the damage which is predicted for each tonne of CO<sub>2</sub> emissions. They reflect the estimated cost of reducing CO<sub>2</sub> emissions by one tonne during the year in which it is emitted (the “abatement cost”). This was thought to be more predictable than the previous “shadow price” of carbon<sup>2</sup>.

Thus if there are low cost ways of reducing carbon, the cost of carbon will be lower.

Of course the abatement cost does not reflect the climate impact, and indeed is not used for climate modelling. Most climate modelling and policymaking (including EU and global targets) uses the date of 2050 as a point of reference at which the impacts of emissions and different levels of emissions, can be assessed. It is the amount of carbon emitted by this date which matters, but also how long it is in the atmosphere, and thus how near to the present day it is emitted.

It is useful to think of the measurement for climate change purposes as carbon years between now and 2050, remembering that CO<sub>2</sub> lasts in the atmosphere for the equivalent of around 100 years. Thus the tonne emitted in 2015 has an impact of 35 carbon years. One emitted in 2025 has an impact in climate models of 25 carbon years. Any money valuations produced for this report (and all most other transport appraisals) need to be placed in the context of this crucial qualification.

Thus the current transport appraisal system assumes that if carbon emissions continue to rise, but other monetised benefits exceed the abatement cost, it is acceptable for the emissions to continue and fail to meet the transport carbon targets. The reason for this is that some economists argue that this will be compensated for by the cost of abatement rising more strongly as more and more reductions are needed to achieve the target, or savings found elsewhere. Eventually the costs will reach a level at which they will be so high they will begin to influence decisions.

Of course this is not an approach which leads to the most sustainable outcome, nor is it clear that the catch up in carbon price will occur in time to achieve the target. However, the

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<sup>2</sup> See *A brief guide to the carbon valuation methodology for UK policy appraisal*, Department of Energy & Climate Change, October 2011, para 3, page 2.

“Government concluded a major review of the carbon valuation approach to be used in UK policy appraisal in July 2009. The revised approach moves away from a valuation based on the damages associated with impacts, instead using as its basis the cost of mitigation. The new approach set the valuation of carbon over the 2008-2050 period at a level that is consistent with the UK Government’s targets in the short and long term. In June 2010, Government set out an interim carbon value profile over the 2050-2100 period to be used for economic appraisal consistent with the agreed carbon values up to 2050.”

National Planning Policy Framework (NPPF) puts sustainability at its centre and we consider that for planning purposes a sustainability analysis is required as well as the monetised appraisal used by the DfT. We have nevertheless produced a net present value of the extra carbon in line with DfT guidance in Webtag, using their published spreadsheet. We nevertheless wish it to be seen in the context of it representing very much a technical monetisation rather than a true impact analysis.

### **3 Estimating carbon emissions from alternative development sites**

#### ***Which carbon reductions?***

Returning to the key issue of whether other areas would perform better in terms of carbon reduction there are two main points. First is how much carbon could be saved if the poor performance of the Postwick site caused a move to more sustainable locations. The second is whether the reduction of development at Postwick would remove the need for the new junction, which of itself causes an increase in carbon because of the large scale and long routes through the system, and of the larger scale northern ring road (NDR), which is also likely to increase average journey lengths and orbital car use and thus carbon. The estimates for the NDR carbon increase vary between sources very significantly. These increases are outside the remit of this study, which focusses on the first.

#### ***Detailed methodology***

In order to be able to enter different assumptions and test them, we have produced a spreadsheet model using standard inputs. Since this was purpose built it does not yet have a simple front end, but it is capable of running under several different assumptions or data inputs. The approach we have used is as follows.

The baseline is the data supplied for the Postwick development<sup>3</sup>, an integral part of the JCS NEG; this consists of average journey length (in distance bands), trips generated by the new housing<sup>4</sup>, and mode split between car driver and all public transport (bus and rail combined). The trip distances are for all purposes, the generation and mode split are by time of day. It is not completely clear what assumptions are made about walking and cycling, but no figures are given<sup>5</sup>. The car/public transport split is 91% car driver.

To compare with this we have benchmarked the levels of sustainable travel already achieved in the Norwich area using 2011 Census data. These can be applied to estimates of the trips generated by new housing development, but in locations which perform as well as

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<sup>3</sup> Norfolk modelling consultants' email to the author

<sup>4</sup> From the TRICS database, these are shown in Annex T2. To create the pm peak hours required, we have simply reversed the am peak. This is an area for further development.

<sup>5</sup> There are a small number of very short distance trips which we have removed – it actually reduces the carbon impacts slightly. It also appears that there may be underestimation of longer trips at Postwick and the NEG.

the Norwich urban average. This seems both a reasonable assumption and in tune with local and national policies. We do not have trip distance data from the 2011 Census yet – it should be ready in the Autumn. We have looked at the 2001 Census to compare trip lengths for the journey to work and, as might be expected, these are much shorter in the urban area, for example Broadland is 39% longer, South Norfolk 69% longer. This is an area where we would recommend more detailed work after the 2011 Census data is available, or using a multi-modal transport and land use model for the wider Norwich area. Unfortunately the latter does not currently exist.

In order to show differences on a like for like basis we have used the same trip rates per dwelling as used for Postwick<sup>6</sup>, but allocated fewer of them to car driver mode. We then use average trip lengths in four distance bands to produce vehicle kilometres and cross check using the weighted average. We have also increased traffic (vehicle kilometres) by 1% per year which closely reproduces the traffic in to the Postwick model.

We have been able to cross check the latter’s average trip lengths with National Travel Survey (NTS) and Census 2001 figures although they are not for the same population group. However, they are reasonably compatible, as is shown in the table below. Ideally we would have used 2011 trip lengths for Norwich, but these will not be available until late this year.

**Table 2 Average trip lengths different sources**

	NTS 2011	Postwick Inquiry	2001 Census
Average trip length km	11.4	10.8	11.8
Notes	<i>All of GB, all purposes all day</i>	<i>New development Inbound all day 2030</i>	<i>Norwich residents Outbound JTW</i>

The Postwick Inquiry has the shortest, and although it is for inbound not outbound trips. It is also the furthest into the future and therefore should be higher. For the sole purpose of providing a conservative estimate, this shorter distance which is in fact for outbound journeys, has been used to estimate the carbon emissions.

The next step is to predict the average efficiency, as emissions per kilometre, of all the cars in the UK (often referred to as the “parc”) between 2015 (when development will begin to open) and the normal time horizon for major transport schemes (60 years). These can be applied to the vehicle (car) kilometres to predict carbon emissions now and in the future. Light and heavy goods vehicles have been excluded since their mode split is assumed to be constant (i.e. almost exclusively road). The Society of Motor Manufacturers and Traders (SMMT) provide annual estimates of emissions for new cars and for the existing parc, the most recent of which is for 2012. The DfT Webtag guidance provides annual rates of improvement for efficiency of the vehicle parc from 2010 to 2035 which we have used to

<sup>6</sup> Postwick Inquiry document DD336

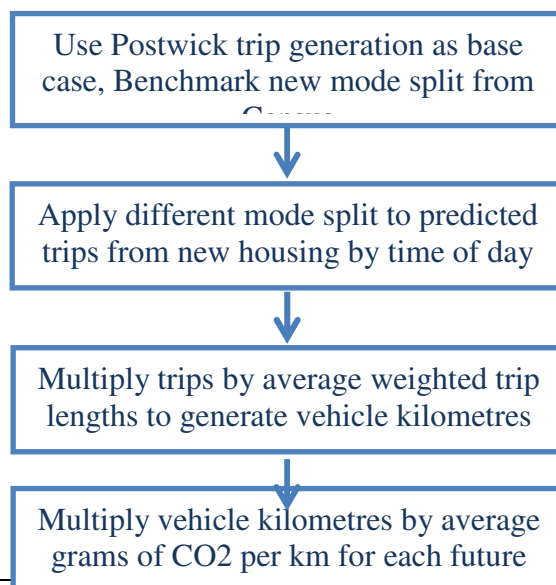
calculate a figure for each future year. In order to do this we have drawn on the SMMT annual CO2 emissions report<sup>7</sup>, and DfT Webtag guidance estimates for changes in fuel efficiency over time (Annex T2). In passing we consider that the Webtag figures may cause an overestimate of carbon emissions after 2050.

Of course this does take account of variations in vehicle speed or congestion, as a transport model would. However, this is less of a problem than it may at first appear. Much of the improvement in new vehicle efficiency is the result of improvement at low and in congested conditions. This includes the use of stop/start on a conventional engine, and regenerative braking (not to power the vehicle but to run air conditioning, electrical equipment otherwise using the engine to generate power). Hybrids and plug in hybrids are more efficient at low speed because they use the battery, and the power requirements of electric cars are similar. The US Environmental Protection Agency publishes<sup>8</sup> one of the largest databases of hybrid and electric cars and, for example, the Prius hybrid claims 53 mpg for city driving, but 43 mpg for highway. The all electric Nissan Leaf claims 106 mpg (equivalent) for the city, and 92 mpg for the highway while the heavier RAV4 claims 78 and 74 mpg respectively.

We consider that any inaccuracy caused by using averages will be small by about 2020 (five years into the appraisal period) and gone by about 2025. After this, there will be a compensating small overestimate. In any case, all the comparisons will contain pretty much the same bias in the same direction and thus the comparative performance will not be affected. If a traffic model was available it could produce the congestion data, but even this is approximate.

The overall process is shown in the flow chart below.

**Figure 2: Study methodology**



<sup>7</sup> *New Car CO2 Report 2013: The 12th report: The Society of Motor Manufacturers and Traders (SMMT)*

<sup>8</sup> <http://www.fueleconomy.gov/>

#### 4 What is sustainable?

The next question is how far the development proposals meet the NPPF criterion of “sustainable development”. While there may be arguments about what is sustainable in absolute terms, we use two criteria.

The first is that if there are two locations available, one of which is more sustainable than another, then the more sustainable location is to be preferred. In this case the predictions for the new developments are less sustainable than the existing average. In fact it should be the case that the future would be more sustainable than the current situation.

The second is that a development proposal which has a carbon estimate showing that it cannot meet the national target for carbon reduction (in this case transport) it cannot be claimed to be sustainable and fails the NPPF test.

The results of the model comparisons are shown in the chart below. It is clear that the potential for reducing carbon emissions from more sustainable development locations, as recommended in the National Planning Policy Framework, is very substantial.

**Table 3 Carbon reductions from more sustainable locations: cumulative by 2050 and over standard appraisal period**

<b>Four scenarios</b>					
<i>Trip rates and journey distance constant</i>	Car driver mode share		Carbon saved: as tonnes CO2		Webtag spreadsheet net present value
	Base	New	By 2050	60 years	
<i>7000 homes</i>	90%	46.6%	139050	230072	£10,802,452
	70%	46.6%	74971	124048	£5,824,364
<i>10000 homes</i>	90%	46.6%	198642	328674	£15,432,075
	70%	46.6%	107102	177211	£8,320,519

*Source: MTRU model*

If the Postwick estimates are correct in their mode share predictions, there are places in Norwich which are already much more accessible by sustainable modes and are in areas where further improvements are planned, for example the Better Bus Area (BBA) schemes which are being implemented which were referred to earlier. What is clear is that a high quality, high frequency, bus corridor is being developed on the Western side of the urban area, connected to the central business district, and to places such as the University of East Anglia and its associated Norwich Research Park.

## Conclusions

It is clear that the case put for new development to the East of the existing Norwich urban area does not include any comparison of the relative sustainability of alternative sites.

However, there is detailed evidence available for Postwick, that put to the Public Inquiry into the new junction layout. The model suggests a 91% mode share for car driver, and does not appear to include walking or cycling.

The model also suggests that, with the Postwick developments in place, the region would fail to meet the national target for carbon reduction from transport by a considerable margin.

There is clear evidence that significantly more sustainable outcomes for the journey to work are already being achieved in other areas, than the areas proposed for new development. The average car driver share for the Norwich urban area as a whole (2011 Census) is 46.6%.

Norwich has in fact achieved much in terms of sustainable travel, currently implementing a bus rapid transit route, and supporting walking and cycling. The latter could be further expanded, given the existing base, and there are plans to do so. It is the 3<sup>rd</sup> best urban area in Britain for walking to work.

Improvements to the West of the central area show that sustainable travel corridors are being developed along two radial routes into the centre. There is also clear evidence of a coherent urban extension to the West (and a possible corridor to the North) with the associated economic benefits (the Wider Impacts as described in webtag, for example from agglomeration).

The averages for Norwich already show that it is realistic to expect that a public transport network led, higher density development (this increases walking and cycling) would be a viable alternative to the car led development being proposed and this would lead to significantly less CO<sub>2</sub>.

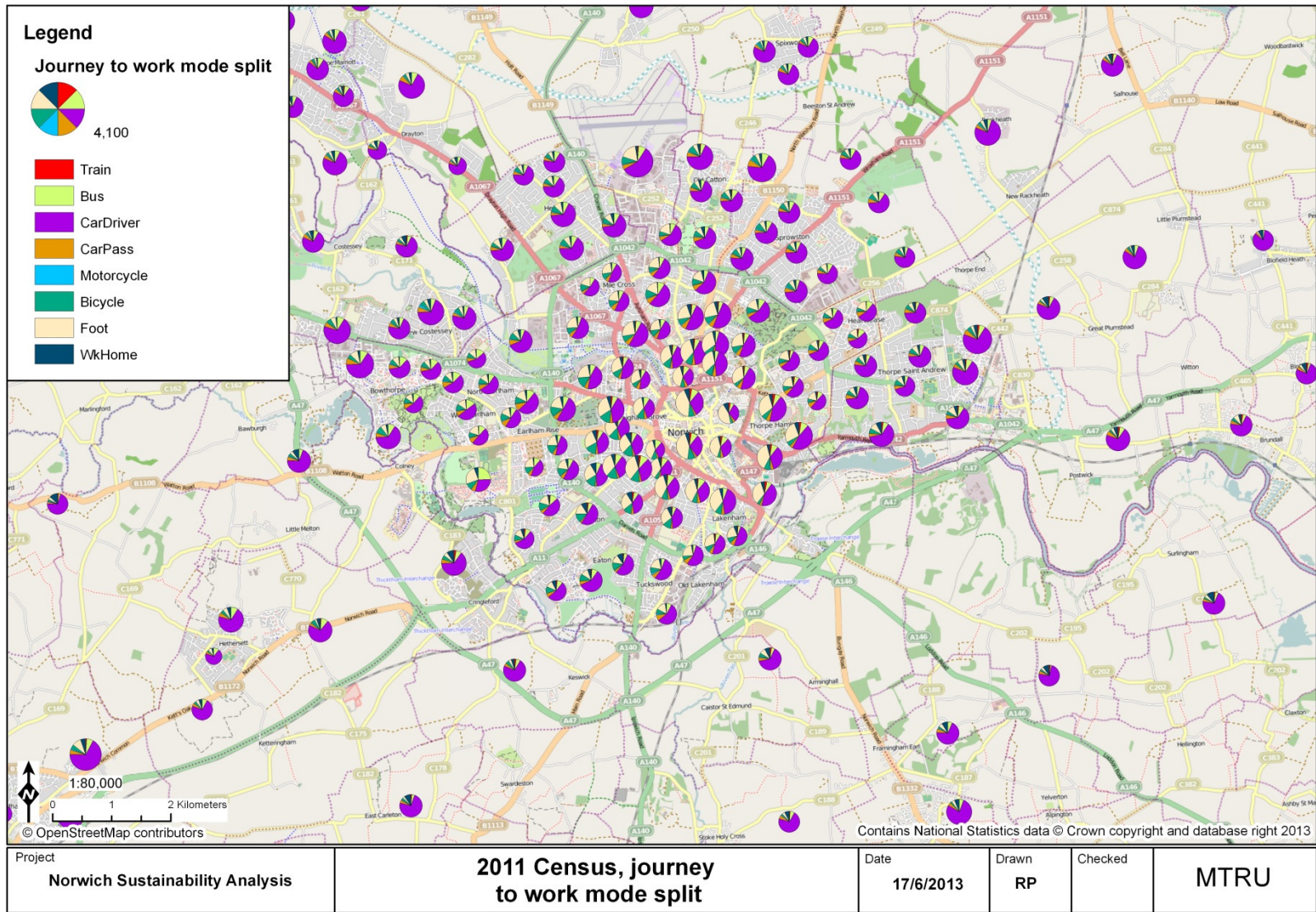
The spreadsheet model builds on this conclusion from the Census data, and shows that even using a range of assumptions for car use there would be significantly more emissions than the Norwich average from development in the Postwick area.

The question therefore becomes whether alternative sites can meet this criteria. This is a piece of work that should have been done at a much earlier stage. Indeed, if they did not, the aim should have been to create conditions where the Norwich area as a whole would not become less sustainable in transport terms.

The development at Postwick does not meet the NPPF criterion of sustainability and there is reasonable evidence to suggest that other sites could.

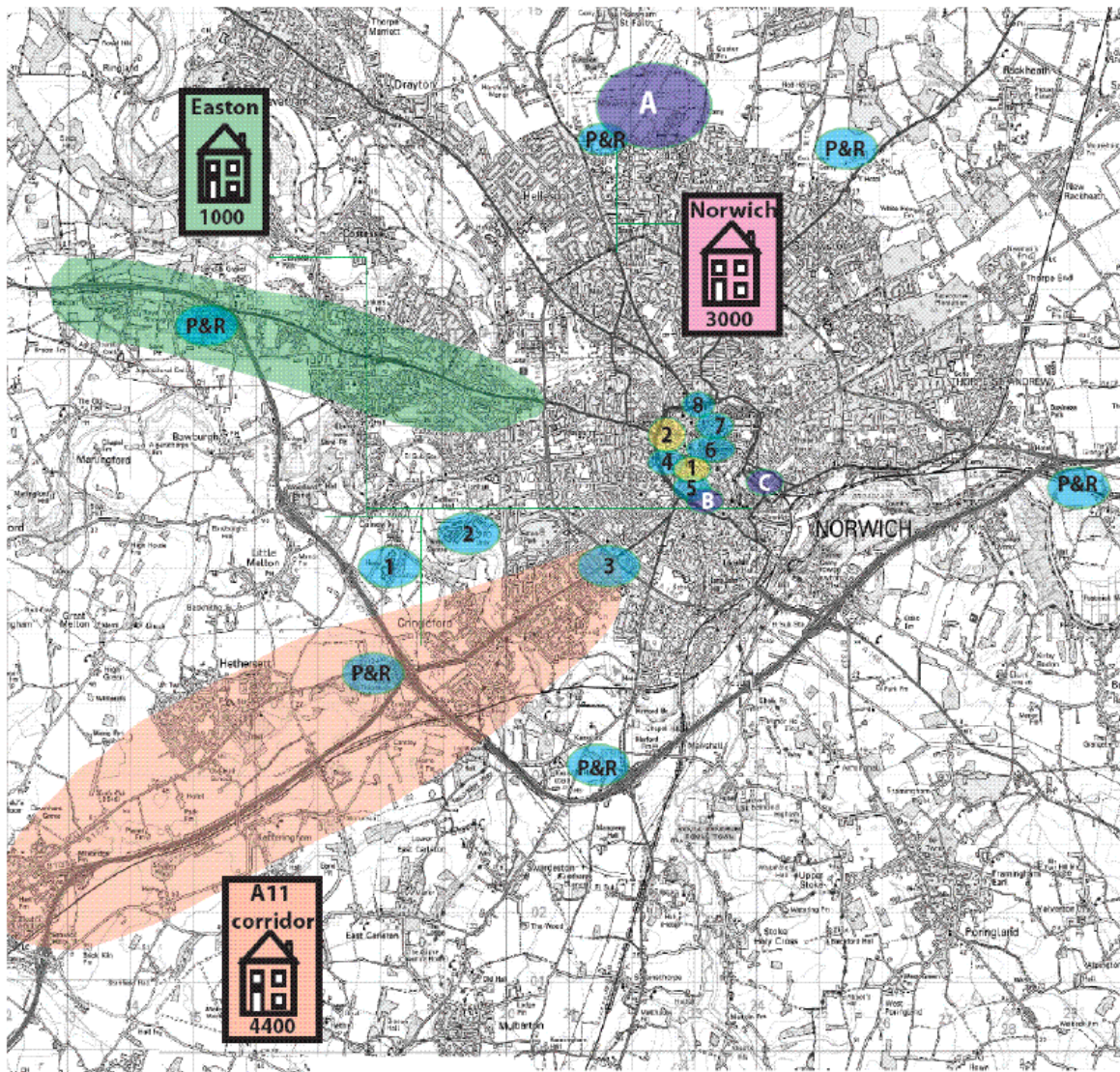


Annex Figure A 1








## Annex Figure A2

Extract from the Norwich Better Bus Bid



**A11 corridor BRT**  
 > Voluntary quality partnership  
 > New high quality shelters  
 > Smarter choices  
 > Bus stop upgrades  
 > Real time information

**Dereham Road BRT**  
 > Voluntary quality partnership  
 > New high quality shelters  
 > Smarter choices  
 > Bus stop upgrades  
 > Real time information

-  Major transport hubs
-  Intermediate transport hubs
-  Physical bus priority schemes
-  A11 corridor Bus Rapid Transit
-  Dereham Road Bus Rapid Transit

- Major transport hubs:**  
**A** Norwich International Airport  
**B** Norwich Bus Station  
**C** Norwich Rail Station  
**Intermediate transport hubs:**  
**P&R** 6 x Park and Ride sites  
**1** Norfolk and Norwich University Hospital  
**2** University of East Anglia  
**3** Newmarket Road  
**4** Theatre Street  
**5** St Stephens Street  
**6** Castle Meadow  
**7** Tombland  
**8** Anglia Square  
**Physical Bus Priority Schemes**  
**1** St Stephens Street / Surrey Street  
**2** Grapes Hill

Annex T1

TAG Unit 3.5.6  
Values of Time and Vehicle Operating Costs

<b>Table 13 Assumed Vehicle Fuel Efficiency Improvements</b>								
Year	Change in Vehicle Efficiency (% pa)							
	Petrol Car	Diesel Car	Electric Car	Petrol LGV	Diesel LGV	OGV1	OGV2	PSV
2006-2007	-0.42 (actual)	-0.49 (actual)		-0.01	0.00	-1.23	-1.23	0.00
2007-2008 <sup>2</sup>	-1.05 (actual)	-1.07 (actual)		-0.01	0.00	-1.23	-1.23	0.00
2008 - 2009	-1.78 (actual)	-0.92 (actual)		-1.35 (actual)	-1.23 (actual)	-1.23	-1.23	0.00
2009-2010	-1.43 (actual)	-1.63 (actual)		-0.34 (actual)	-1.80 (actual)	-1.23	-1.23	0.00
2010-2015	-2.09	-1.71	0.11	-0.66	-2.07	0.00	0.00	0.00
2015-2020	-3.72	-2.22	-0.31	-1.38	-2.34	0.00	0.00	0.00
2020-2025	-3.63	-2.62	-0.71	-3.07	-2.19	0.00	0.00	0.00
2025-2030	-2.10	-2.10	-1.19	-2.95	-1.30	0.00	0.00	0.00
2030-2035	-0.74	-0.96	-0.26	-0.86	-0.57	0.00	0.00	0.00

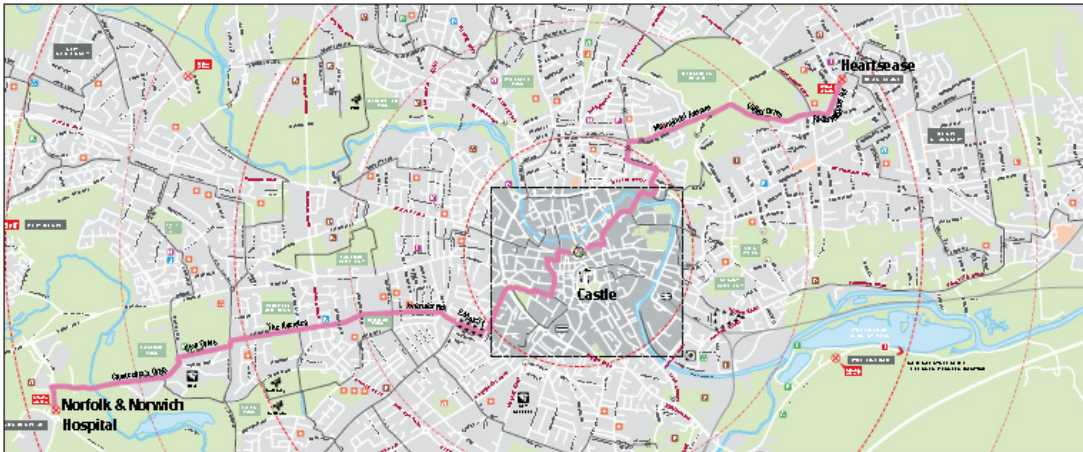
Annex T2

Table 4.5: TRICS Residential Trip Rates (Vehicle Trips Per Dwelling)

Vehicle type	AM Peak (8:00-9:00)		Inter Peak (10:00-16:00)		PM Peak (17:00-18:00)		12 Hour (07:00-19:00)	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Car	0.102	0.267	0.127	0.126	0.273	0.143	1.727	1.784
LGV	0.012	0.031	0.015	0.015	0.032	0.017	0.203	0.210
HGV	0.001	0.003	0.001	0.001	0.003	0.001	0.016	0.017
PT	0.010	0.027	0.013	0.013	0.028	0.015	0.177	0.183



3 APPENDIX B : Eastern Daily Press article, 16<sup>th</sup> April 2013



CITY CROSSING: How the proposed route could look.

NORWICH

# £5m boost hope for cross-city cycle route

Up to £5m could be pumped into improving a cycle route through Norwich, after the city council was invited to bid for a pot of government cash to encourage people to get on their bikes.

If the city council succeeds with its bid, it would see major improvements to the cycle route which connects Heartsease to the Norwich Research Park via the city centre.

Norwich has been invited by the Department for Transport to bid for a share of £42m made available by the government through Cycle City Ambition Grants.

If Norwich successfully gets one of those grants, the government would provide about £3.4m in capital funding for cycling improvements.

A further £1.6m would come from city council budgets which have already been earmarked for cycling improvements, local transport plan cash allocated to Norwich by Norfolk County Council, growth point funding and cash from other partners.

The city is one of just 28 cities

By DAN GRIMMER  
Public affairs correspondent

invited to bid for the cash. Norwich has been invited because it is part of the City Deals process – which could see Greater Norwich take on powers and budgets previously controlled in London.

The City Deal that Norwich leaders want to negotiate with central government is focused on turbo-charging success at Norwich Research Park to help create up to 40,000 new jobs over the next 20 years.

And that is also why the route from Heartsease to Norwich Research Park, known as the pink pedal way on the recently produced Norwich Cycling Map, would be in line for improvements.

As City Hall officers state in a report to councillors: “This route has been chosen because it connects local communities to both the city centre and Norwich Research Park, thus supporting the ambition of the City Deal to improve infrastructure links.”

But with just a handful of grants available and a number of cities expected to bid for them, councillors urged caution over the possibility of getting the cash.

Bert Bremner, cabinet member for planning and transportation at the city council, said: “There is potential here to do something quite major and we are keen to get our bid in.

“But we don’t want to raise expectations too much, as we will be up against a number of other cities. There’s only two or three of these grants available.

“And if we get the money we would want to know people’s opinions.

“We would want to consult with people and talk about what people want.”

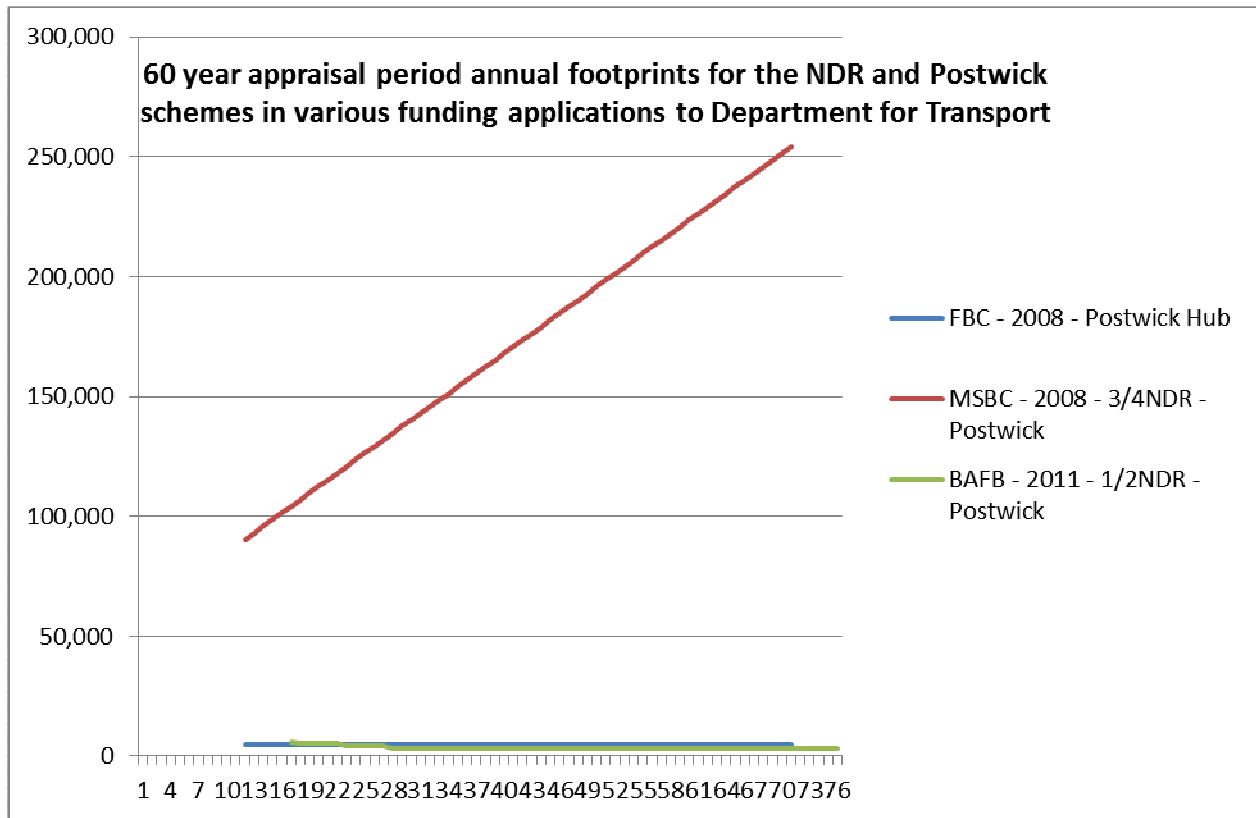
Norwich City Council’s controlling Labour cabinet will decide tomorrow whether to delegate authority to council officers to submit the application for the grant.

The application needs to be submitted by April 30, with a decision expected a month later

■ dan.grimmer@archant.co.uk

**4 APPENDIX C : The different and highly varied carbon footprints of the NDR and Postwick Hub in NCC submissions to Department for Transport**

- 1 The *CIF 2 Postwick Hub Full Business Case* (FBC, October 2008) estimated the increase in carbon emissions arising from the Postwick Hub as 81,262 tonnes of carbon (not CO<sub>2</sub>) over the 60 year appraisal period. This equates to 297,961 tonnes of CO<sub>2</sub> (tCO<sub>2</sub>eq) or an average around 5000 tCO<sub>2</sub>eq/year.
- 2 The *NDR Major Scheme Business Case* (MSBC, July 2008) estimate the road to increasing carbon emissions by 2,182,592 tonnes over the 60 year appraisal period. This equates to 8,002,837 tonnes of CO<sub>2</sub> (tCO<sub>2</sub>eq) or an average around 133,000 tCO<sub>2</sub>eq/year.
- 3 Further, it is noted that more recent estimates of carbon emissions in the 2011 Best and Final Funding Bid (BAFB) for the integrated Postwick Hub and NDR have shown significant downward divergence from the previous figures.
- 4 We put the 60 year appraisal figures for the 3 calculations into a spreadsheet. The graph below shows the difference.



<b>Public Inquiry into Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
<b>Norwich Green Party Paper on Carbon Emissions for SW (without NDR) against NE APPENDICES</b>	

*4.1 Issues relating to data quality and consistency of GHG emission modelling*

- 5 Although, the NDR and Postwick schemes are known to increase GHG emissions, it is clear from the above that the relevant data has not yet been made available by the promoters in a clear, realistic and consistent way, either for this Inquiry or historically.
- 6 Further, it is noted that the promoter’s estimates of carbon emissions have altered over time. Recent figures have shown a significant downward divergence from the previously published figures, both on the Scheme in a local context and over the region. The figures at the local level are so different that they cannot be explained by changes to the underlying modelling methods.
- 7 No explanation of such variances has ever been given, including in the Highways Agency Climate Change submission to the forthcoming Postwick Hub Inquiry.
- 8 The accumulative effect of GHG emissions relating to the Scheme from completing the Postwick Hub and NDR, and any further planned developments within the area have also not been made available.
- 9 Previous inconsistencies and variances should be fully explained. The data for accumulative traffic growth effects, including traffic flows from future planned development, should also be available to the Inquiry in a transparent, consistent and clear form.
- 10 The next Appendix describes problems with the Highways Agency Climate Change submission to the forthcoming Postwick Hub Inquiry in more detail.

<b>Public Inquiry into Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
<b>Norwich Green Party Paper on Carbon Emissions for SW (without NDR) against NE APPENDICES</b>	

## 5 APPENDIX D : Summary of submission to Postwick Hub Inquiry, June 2013

### SUMMARY

#### Author

This Norwich Green Party *Proofs of Evidence* is authored by Norfolk County Councillor Andrew Boswell. I make this statement as local politician elected in 2005 to represent residents in the Norwich Nelson division, an area to the West of the City Centre. The Green Party holds 19 council seats [15 City Council, 4 County Council] within the Norwich urban area and is the main opposition group on the City Council. Norwich Green Party has a written constitution and over 1100 active members and supporters within the City and outlying areas of Norfolk.

Prior to being elected to Norfolk County Council, I pursued a career in scientific research and computing support for scientific research. My doctorate was in protein molecular structure and dynamics (Oxford, 1981). I worked for 10 years (1984-1994) in the design of the Very Large Scale Integrated (VLSI) circuits that have made the current digital revolution possible, and from 1995-2006 I managed the High Performance Computing (HPC) Research infrastructure at the University of East Anglia (UEA, Norwich) and worked with scientific research groups across the campus including those modelling the climate system.

#### Endorsement

The submission is endorsed by Councillor Richard Bearman, Leader of the Green Party group on Norfolk County Council, and Councillor Claire Stephenson, Leader of the Green Party group on Norwich City Council.

- 1 My evidence explains why Climate Change is a very serious threat to social, economic and environmental standards both globally and locally, and has triggered the strongest possible response in the UK with a unique Act of Parliament aimed directly at eliminating these threats.
- 2 My evidence explains national and local policy that relates to reducing carbon emissions from transport.
- 3 My evidence shows that the Highways Agency choice of using an extremely large area – more than a large Shire county and 8 District Council areas for its calculations is flawed in many respects:
  - i No rationale has been given for choosing this spatial context for appraising carbon emissions.
  - ii It contradicts a report commissioned by the Highways Agency itself to better understand the carbon implications of major projects. This report from Forum for the Future laid out a clear method of choosing a Project Carbon Boundary whereas the HA submission HA/07/1 uses arbitrary boundaries.



<b>Public Inquiry into Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
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- iii Even if the wide-area boundary choice could be justified, the modelling resolution or accuracy at which emissions across such a wider area is much less accurate. This leads to a much greater scope for “noise” in the model (as HA/07/1 itself calls it).
  - iv The “Entire Domain” network is subject to constraining by National Trip End Model (NTEM) growth factors (national growth forecasts). This creates an artificial model of growth where loss of growth in one place leads to an (computational) automatic reconfiguration of growth elsewhere. This means that the **same** overall growth is forecast with or without the Postwick scheme.
  - v Therefore the overall movement of traffic in the “Entire Domain”, and consequential carbon emissions, are to all intents and purposes the same in the computer model, with or without the Postwick scheme. This is false.
  - vi Using NTEM model constraining for the purposes of comparing real-world growth and associated carbon emissions in different scenarios leads to incorrect and misleading conclusions. An artificial model is imposed from outset and used for interpretation by the HA, but this does not reflect the way the real-world would develop.
  - vii It is therefore an artefact of the computer model and the spatial context chosen that the HA finds no significant growth in carbon emissions.
  - viii The computer model also creates, false (artificial) “savings” of carbon emissions in the wider network if Postwick is built. It is also entirely false to offset the local Postwick emissions by such “savings” which are only a numerical consequence of a particularly flawed modelling exercise, and do not reflect what would happen in reality.
- 4 On the basis of this flawed approach, the HA calculate minimal costs and carbon emissions over the “Entire Domain”. It is, in fact, entirely predictable that this would be the case given the flawed model used. If one defines a model at outset with the same overall growth in both with-Scheme and without-Scheme scenarios, then it is no surprise that there is insignificant differences in carbon emissions and the monetarised cost of emissions in the output.
  - 5 My evidence uses a localised model of Postwick Hub following a careful rationale based on the “Project Carbon Boundary” developed in the Forum for the Future report. This is based on including carbon emissions, both increases and savings, from a project on the basis that they may be **attributed** or **associated** with the project.
  - 6 My evidence shows that carbon emissions are increased as a result of the operational use of the Scheme by vehicle movements. Using Webtag methodology *on the HA provided data*, the Scheme produces an increase of 72,900 tCO<sub>2</sub>e over the appraisal period and an NPV of -£3,490,353 in the localised model.

<b>Public Inquiry into Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
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- 7 However, my evidence indicates that I have major concerns about the lack of data quality and consistency of GHG emission modelling for the Scheme. I highlight that that the promoter's estimates of carbon emissions have altered over time, and recent figures show a significant downward divergence from the previously published figures.
- 8 The Full Business Case to DfT stated that the whole period emissions were 81,262 tonnes of carbon (not tCO<sub>2</sub>eq). This equates to 298,231 tonnes of carbon dioxide, CO<sub>2</sub> (tCO<sub>2</sub>eq). On this basis, we would expect the monetarised value to be an NPV of the order of -£14,000,000.
- 9 I make the case that the planning system is charged with producing reductions in CO<sub>2</sub> emissions (NPPF, para 94). I also make the case for singularity in how the planning system discharges this obligation: that is, that any singular decision process for scheme or project that increments carbon emissions is contrary to the NPPF.
- 10 The fundamental point is that the Postwick Hub Scheme will, in itself, increase CO<sub>2</sub> emissions whilst there is an urgent need to reduce CO<sub>2</sub> emissions. There are also ways of solving transport problems in East Norwich, and at Postwick, without increasing CO<sub>2</sub> emission, or by increasing them significantly less.
- 11 I also make the point that such increases in carbon emissions are contrary to the direction of travel of the UK Climate Change Act, and may contribute to the UK not meeting its budgets in future years.
- 12 They are also contrary to the direction of travel in the legal obligations on the Department for Transport and the Highways Agency under the sectorial allocation for transport under the Climate Change Act.
- 13 They also ignore the call by the UK Committee on Climate Change for skilled integrated land-use and transport planning to make significant emission cuts by 2020.
- 14 On the basis of all these arguments, my evidence shows that the Postwick Hub scheme is environmentally unsustainable, introduces additional carbon emissions that are not offset in other ways and will add to the global accumulation of greenhouse gases, damaging the potential for quality of life of future generations.
- 15 The Scheme should not pass this Public Inquiry on this basis.

<b>Public Inquiry into Joint Core Strategy for Broadland, Norwich and South Norwich, Broadland Part of Norwich Policy Area Examination</b>	<b>Matter 2 – The implementation of the submitted JCS proposals Climate Change Impacts</b>
<b>Norwich Green Party Paper on Carbon Emissions for SW (without NDR) against NE APPENDICES</b>	

## **6 APPENDIX E : Summary of Norwich Green Party 2010 submission to Examination of JCS**

- 1 The full text of submission is at <http://www.gndp.org.uk/content/wp-content/uploads/downloads/2010/10/Matter-1-35-and-8-8018-Green-Party.pdf>
- 2 The below is summary of key points made on carbon accounting:
  - i The NDR was being presented as a “fixed element”, and it would introduce a major carbon footprint element into the JCS. No realistic public transport policy could be developed to offset the scale of the additional NDR footprint, let alone generate an overall emissions reduction across the JCS.
  - ii The JCS sets no objectives to reduce car use or reduce carbon emissions from transport. The JCS sets no targets or delivery measures on carbon emissions. Aspirational statements are made with no realistic, quantitative methods of auditing their delivery.
  - iii GNDP designed-out carbon accounting as early as 2007 (as per email exchange with NNTAG above)
  - iv GNDP failed to build in carbon accounting and follow existing practice, and as such was travelling against the direction of the UK Climate Change Act (2008) and could not prove that their plan was consistent with national policy
  - v Carbon emissions accounting is totally missing from EIP88 (“Public Transport and the Northern Distributor Road”) – this noted a tentative “ring” to implementation delivery plans. This concurs with the discussion of my recent submission to the current Inquiry on the LIPP.
  - vi Carbon emission reduction planning is totally missing from the decision process within EIP86 (“The distribution of development, particularly in relation to public transport opportunities”), the document being aspirational but not concrete in proving reductions in carbon emissions.
  - vii Carbon emission reduction is not properly addressed in the JCS Sustainability Appraisal. The large emissions from the Postwick Hiub and NDR developments were not included in this analysis.
  - viii A “Plan B” JCS was required with sustained and quantified transport emission reductions. This should include a substantive re-write of NATS and NATS IP to contains emissions-centric modelling and options appraisal against a delivery plan with real dates (with Mayor Johnson’s Transport Strategy as an example).

Carbon footprint ensemble using NCC 2007-2010 NDR emission figures

