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APPENDIX 3

Craven District Council

Craven Local Plan

Modelling Highway Impacts of Submission Draft Plan Developments in Bentham and Settle

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1 Introduction

1.1 Overview

1.1.1 Jacobs have been asked by Craven District Council (CDC) to undertake junction assessment work to ascertain the traffic impacts of proposed development sites within the towns of Bentham and Settle as part of the forthcoming Craven Local Plan.

1.1.2 The Council is now advancing its Local Plan. This will allocate specific sites principally for residential and employment purposes across the District in line with the Local Plan Strategy.

1.1.3 In accordance with paragraph 32 of the National Planning Policy Framework (NPPF 2012), the Craven District Local Plan should take account of whether (amongst other matters) improvements can be undertaken within the transport network that cost effectively limit the significant impacts of any proposed development. This study assesses the impact of committed development (already with planning permission, but not yet occupied) and the potential residential and employment allocations in the Craven Local Plan for Bentham and Settle. The study has concluded that there are no significant impacts on the road network from the Submission Draft Plan land allocations.

1.1.4 The study has been completed with the cooperation of North Yorkshire County Council (NYCC) as the local highway authority (LHA), Aim of Study

1.1.5 This document seeks to provide evidence on the prospective highway impacts of Submission Draft Plan development proposals in Bentham and Settle within the Local Plan period to the year 2032.

1.1.6 The purpose of the analysis is to examine the overall impact of development in terms of travel demands and network performance, with a view to identifying the need for potential mitigation measures and junction improvements to complement the Local Plan growth strategy and support the Local Plan objectives.

1.1.7 The analysis is an essential element of the evidence base underpinning the preparation and justification of site allocations that will be identified in the Local Plan. Key considerations during the study have been:

- Identification of any major constraints on the local roads network as a result of Local Plan proposals and assessment of any improvement measures to mitigate and thus support these.
- Provide a transport evidence base to aid, if required, development of a robust developer contributions funding mechanism and help determine how the measures will be funded, to deliver the transport infrastructure to support the Local Plan.

2 Base Traffic Flow Data and Traffic Growth

2.1 Base Data

2.1.1 The Skipton Traffic Model does not extend in any detail much beyond the boundaries of Skipton. Bentham and Settle, therefore, were dealt with as a separate junction modelling exercise to the assessment of Local Plan traffic in Skipton.

2.1.2 The effect of background and development-led traffic growth in Bentham and Settle was based around two key junctions in Bentham and one junction in Settle. Observed traffic flow data was collected for these junctions using the NYCC C2Web Database. These junctions are:

- Settle – B6480 Duke Street / Ingfield Lane / B6480 / Cammock Lane
- Bentham – Station Road / B6480
- Bentham – Robin Lane / B6480

2.2 Assessment Year

2.2.1 The Craven Plan covers the period to the year 2032. It was agreed, therefore, that this would also determine the forecast junction assessment year, to ensure a thorough impact of built-out development on the highway network, by the end of that period.

2.2.2 This assessment required factoring the base traffic flow data to 2032 to represent the forecast growth in background traffic. This was calculated using the Department for Transport's (DfT) Trip End Model presentation PROgramme (TEMPRO) for cars, and the National Traffic Model (NTM), for HGV's.[1]

2.2.3 A Baseline 2032 forecast was established for background traffic growth and committed development sites in Bentham and Settle, i.e. minus any Local Plan development options. This would enable comparisons of traffic volumes and junction performance against the Baseline, once the Local Plan scenario was plugged into the junction assessments.

2.3 Growth Factors

2.3.1 Growth factors, between 2015 and 2032 were derived by data from the National Travel Model (NTM) database, and adjusted by local and regional TEMPRO growth factors, as shown in Table 3.2. This was to ensure a more robust figure than from TEMPRO alone, given the lack of a traffic model for Bentham and Settle.

[1] The National Trip End Model (NTEM) forecasts and the TEMPro (Trip End Model Presentation Program) software are ~~u~~used for transport planning purposes. The forecasts include population, employment, households by car ownership, trip ends and simple traffic growth factors based on data from the National Transport Model (NTM).

The National Transport Model (NTM) provides a systematic means of comparing the national consequences of alternative national transport policies or widely-applied local transport policies, against a range of background scenarios which take into account the major factors affecting future patterns of travel.

Table 2.1 Final Bentham and Settle Growth Factors

Mode	Local		Yorkshire & Humberside		Final Growth Factor
	NTM	TEMPRO	NTM	TEMPRO	
Car	-	1.158	1.261	1.151	**1.269**
HGV	-	-	1.156	-	**1.156**

The formula for deriving the Final Growth Factor was:

*Final Growth Factor = (TEMPRO Craven/TEMPRO Y&H) * NTM Factor*

The Final Growth Factors for cars and HGV's were applied to the turning count data for both junctions to derive indicative turn volumes for the background 2032 scenario, in the PM peak. For the Baseline and Local Plan scenarios, development-specific traffic was added to the turning volumes, based on their location and potential distribution.

3 Development Sites

3.1 Introduction

3.1.1 Developments specifically taken into consideration for the purposes of this report are divided into two types:

- Committed development sites - Housing or Employment with valid permissions and likely to be completed during the Plan Period on significant developments; and
- Proposed allocations in the Submission Draft Plan in Bentham and Settle which would be expected to be delivered by 2032.

3.2 Committed Development Sites

3.2.1 Committed development sites were those considered to be of sufficient size (>5 dwellings) and trip-making capability to warrant explicit modelling, in order to assess the traffic impacts within the junction assessments. This approach is consistent with other studies undertaken across North Yorkshire. Table 3-1 shows the explicitly modelled committed development sites, from 2015 onwards.

Table 3-1 Committed Development Sites in Bentham and Settle

Town	Ref ID	Site Name/Location	Type	Size Dwellings or m^2
Bentham	8/2014/15067	Felstead Low Bentham Road High Bentham	C3	7
	08/2008/8735	Mill Dam Farm Mewith Bentham	B1	93
	08/2013/13869	Land to Rear of Moor View Low Bentham Road Low Bentham	B8	953
	8/2017/17775	Low Bentham Cp School Doctors Hill Low Bentham	C3	5
	8/2017/17887	1 Felstead Low Bentham Road High Bentham	C3	16
	8/2017/18715	Former High Bentham Primary School Robin Lane High Bentham	C3	72
	08/2016/16850	Butts Depot Clapham Road High Bentham	B2	374
	08/2016/17500	Butts Depot Clapham Road High Bentham	B2	374
Settle	62/2001/1007	Ingfield Lane	C3	20
	62/2010/11138	Land to The East of Sidings the Sidings Industrial Estate	C3	5
	62/2015/15520	Sutcliffe Buildings School Hill	C3	9
	62/2015/15570	Police Station Duke Street	C3	7
	62/2007/8011	7 Station Road	B1	107
	31/2014/15285	Land at Raines Road	C3	7
	31/2013/14022	Armitstead Hall Armitstead	B1	996
	62/2015/16101	Land at Kirkgate	C3	22
	62/2016/17447	Land South of Infield Lane and West of Brockhole Lane	C3	16
	62/2016/17007	Unit A7 and Unit B5 Kirkgate Depot	B2	60
	31/2016/16935	Barn to The North of Barnstead Stackhouse Lane	B1	225

3.3 Local Plan Development Sites

3.3.1 Craven District Council provided a list of residential and employment submission draft allocations which, as at June 2018, had not been granted planning permission nor were minded to be granted planning permission and thus have not been included as committed developments. These are listed below in Table 3-2. It should be noted that standard planning use codes also apply for proposed land use, and subsequent trip generation purposes – B1 office only, B2 light industry, B8 warehousing and C3 for residential only schemes.

Table 3-2 Local Plan Development Sites in Bentham & Settle

Town	Reference ID	Site name/ Location	Type	Size Dwellings or m^2
Bentham	HB023	N of Low Bentham Road High Bentham	C3	53
	HB024	N of Lakeber Drive High Bentham	C3	27
	HB025	East of Butts Lane High Bentham	C3	32
	HB026	N of Springfield Crescent High Bentham	C3	82
	HB036	Land E of Robin Lane High Bentham	C3	16
	HB038	Land S of Low Bentham Road High Bentham	C3	19
	HB044	Land W of Goodenber Road High Bentham	C3	59
	HB052	Land Nw Bank Head Farm and S of Ghyllhead Farm High Bentham	C3	118
	LB012	Wenning View Low Bentham	C3	18
Settle	SGO21, SG066 &SG080	Land to Nw and SW of Penny Green	C3	80
	SG025	Land South of Ingfield Lane	C3	125
	SG027 & SGO68	Land S of Brockhole View	C3	57
	SG032	Car Park Off Lower Greenfoot	C3	13
	SG035	F H Ellis Garage	C3	32
	SG042	NYCC Depot	C3	8
	SGO60	Mill Close and Kings Mill Lane	C3	10
	SG079	Land N of Town Head Way	C3	26
	LA004	Land N of Barrel Sykes	C3	18
	SGO64	Land South of Runley Bridge Farm and West of B6480	C3	50
	SG060	Northern Part of Sowarth Industrial Estate	B1, B2, B8	10,400
	SG014	Land at Lord's Close	B1, B2, B8	6,616

3.4 Development Trip Generation

3.4.1 The number of trips generated by the individual sites was estimated using 85th percentile trip rates calculated using the nationally accepted and industry standard TRICS[2] database. The rates are based on the number of dwellings and size of employment areas put forward as the Council's potential Draft Allocations.

3.4.2 Trip rates calculated in TRICS were based on specified land uses of various site locations and sizes. Table 3-3 shows the trip rates considered.

Table 3-3 TRICS trip rates (PM Peak)

Land use	Units	Trip Rate In	Trip Rate Out
C3 Residential	No. of dwellings	0.403	0.219
Class B1	100 sqm of GFA	0.412	2.587
Class B2	100 sqm of GFA	0.159	0.544
Class B8	100 sqm of GFA	0.060	0.485

3.4.3 The trip rates for car and HGV were applied to the relevant development sites to generate car and HGV trips. These trip rates from TRICS are assumed to be

[2] TRICS – Trip Rate Information Computer System, the national standard for trip generation analysis.

average national rates used for trip generation based on the assumption that the proportion of non-car trips generated by development sites is by default, a national average. The total trips generated for committed developments and local plan developments (housing and employment) are presented below in Table 3-4.

Table 3-4 Total Committed and Local plan trips ends (PM Peak)

Town	Development	Trips In	Trips Out
Bentham	Committed	33	42
	Local Plan	93	171
Settle	Committed	54	40
	Local Plan	212	188

3.5 Development Trip Distribution

3.5.1 Access points onto the highway network for Local Plan sites were determined by information supplied by Craven District Council.

3.5.2 Each development requires a trip distribution to dictate how the traffic generated by the development will pass through one of the key junctions assessed. The existing turning proportions at each junction were used to determine this trip distribution for each development site

4 The Effect of Local Plan Development Traffic at Key Junctions

4.1 Introduction

4.1.1 This chapter details the results of the impact assessment of the Local Plan Development traffic on the three key junctions in Bentham and Settle.

4.1.2 The junctions assessed are shown in Table 4-1 with an accompanying location plan in Figure 4-1. For the assessed junctions, traffic flows were extracted from a spreadsheet model developed for each location for the year 2032. Baseline and Local Plan scenarios were considered.

Table 4-1 Assessed Junctions

Number	Town	Junction Name	Type
1	Bentham	Station Road / B6480	Priority
2	Bentham	Robin Lane / B6480	Priority
3	Settle	B6480 Duke Street / Ingfield Lane / B6480 / Cammock Lane	Priority

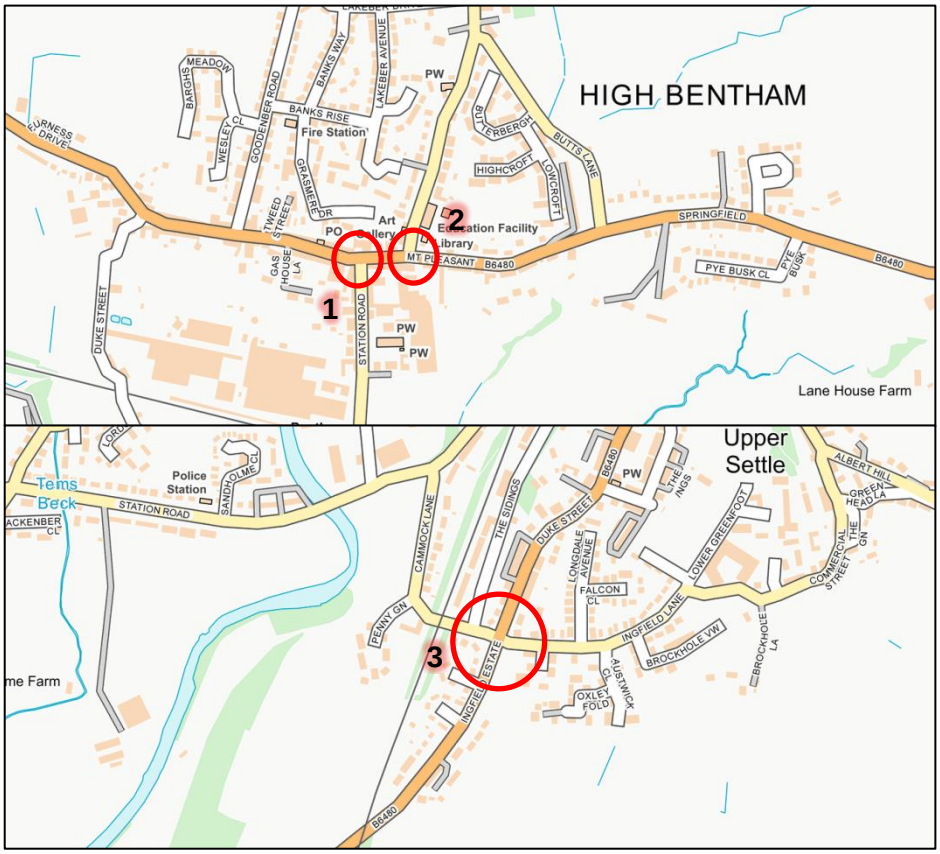

Figure 4-1 Assessed Junctions – Location Plan

4.2 Interpretation of Results

4.2.1 The junctions identified were assessed through nationally accepted junction modelling software called Junctions 9.

4.2.2 Inputs into the junction assessments are based on traffic flows through the junction taken from the spreadsheet models for the 2032 Baseline and Local Plan forecast models.

4.2.3 The key output of the junction assessment is the ratio of flow to capacity (RFC), which shows demand compared to the available capacity. The models present an RFC figure for each junction arm during the modelled period, which ensures any RFC 'spike' is captured and not overlooked by an average RFC across all junction arms. This is a standard nationally accepted way of measuring congestion at a junction.

4.2.4 RFCs are reported using a nationally accepted traffic light colouring system which has been used previously by Jacobs for North Yorkshire County Council, as the Local Highway Authority, and Local Authority districts for other strategic transport assessments involving detailed junction analysis. The traffic light colouring system works as follows:

- **Green** - RFC less than 0.85, junction is likely to operate without delays; 0.85 is an industry recognised level of congestion, where a junction starts to approach capacity
- **Amber** - RFC between 0.85 and 1, junction is approaching capacity and may be subject to minor delay
- **Red** - RFC greater than 1, junction is over capacity and delays will occur

4.2.5 The junction capacity assessment software only models junctions on an individual basis and therefore does not take into account the interaction between adjacent junctions as a result of queuing or 'platooning' traffic.

4.3 Analysis of Results

4.3.1 Results of the assessments for the 2032 Baseline and Local Plan scenarios for the three junctions are shown in Table 4-2. The figures represent the maximum RFC, per junction arm, of any 15-minute period between the 1700hrs and 1800hrs PM peak modelling period.

Table 4-2 Junction Assessment Results

Junction Number	Junction Type	Junction Name	Arm	Baseline Scenario	Local Plan Scenario
1	Priority	Bentham - High Street/Station Road	Station Road	0.25	0.29
			Low Bentham Road	0.12	0.13
2	Priority	Bentham - Mount Pleasant / Robin Lane	Robin Lane Left	0.07	0.08
			Robin Lane Right	0.17	0.20
			B6480	0.08	0.10
3	Priority	Settle - B6480 / Ingfield / Cammock	Ingfield Lane Left	0.05	0.08
			Ingfield Lane Right	0.04	0.07
			B6480 Duke Street	0.03	0.08
			Cammock Left	0.02	0.04
			Cammock Right	0.07	0.15
			B6480	0.04	0.20

4.3.2 The results from Table 4-2 show that the all three junctions are forecast to operate significantly under capacity in both the Baseline and the Local Plan scenarios.

4.3.3 The Local Plan traffic will not have any detrimental impact on any of the junctions and no junction improvement measures are required to accommodate the Local Plan development sites.

5 Summary & Conclusion

5.1 Summary

5.1.1 The aim of this report is to produce a strategic transport assessment detailing the impacts of the Local Plan housing and employment allocations in Bentham and Settle on the operation of existing highway network. In doing so this report has taken into account forecast increases in car usage up to the end of the plan period in 2032 and the likely growth in traffic from those planning permissions regarded as 'committed development' and thus likely to be built during the plan period but after the traffic survey was undertaken in 2015.

5.1.2 The primary output of the study is an assessment of the impact on three junctions across in Bentham and Settle. This assessment forecasts that all three of the key junctions will operate significantly under capacity in both the Baseline and the Local Plan scenarios.

5.1.3 The Local Plan traffic will not have any detrimental impact on any of the junctions and no junction improvement measures are required to accommodate the Local Plan development sites.

5.2 Development Sites

5.2.1 Traffic from a total of 9 Submission Draft Plan development sites which are without planning permission or soon to be granted planning permission have been modelled in Bentham and 12 in Settle.

5.2.2 The junction assessments demonstrate that the Local Plan traffic will cause only minor increases in traffic flow and this increase is significantly below any levels recognised nationally as requiring mitigation.

5.3 Mitigation Measures

5.3.1 No additional mitigation measures are required to accommodate the Local Plan development traffic in Bentham or Settle.

5.4 Conclusion

5.4.1 The modelling work undertaken on the impact of the Local Plan traffic shows that the proposed level of development associated with Local Plan sites in Bentham and Settle can be accommodated without any junction improvement measures.