Calderdale Local Plan

Overview of Transport Evidence Base

January 2019

1. INTRODUCTION

1.1 This document provides a summary of the transport evidence that has been compiled to support the development of the Calderdale Local Plan. This process has been ongoing for a period of approximately three years going back to 2015 and some data that supports the evidence therein goes back as far as 2008.

1.1 The development of this evidence has been iterative. Some documents have been produced as a single document to set out the strategic direction on transport or to examine particular issues where others in fact follow up on earlier versions.

1.2 The document is structured in a roughly chronological order and therefore the most up to date and in turn important documents to have been summarised are 'TN9' and 'TN10' towards the back of the report.

1.3 It is important to note the way in which the various documents summarised in this report have been treated. It is particularly important to note that TN9 and TN10 are 2018 updates and/or revisions on previous assumptions presented in earlier documents. As such the analysis here is more detailed / thorough on these two documents than it is for earlier similar such analyses. The document also only gives a light summary of the highly technical reports on the Calderdale Strategic Transport Model (CSTM) and instead focuses more on the TN9 analysis of how well fit for purpose in 2018 the CSTM remains.

1.4 Also of note is that the summaries below are a reflection of what was reported at the time and in many cases the findings of TN9, TN10 and TN11 in particular should be treated as the most current reflection of actual transport conditions and the most accurate prediction of future scenarios.

1.5 Across the course of all this evidence being compiled the Council has employed the expertise of consultancy firm WSP to develop the Local Plan transport evidence base. As such, whilst the report has been produced by internal council officers, the in-depth knowledge of the findings in each summarised report lies with this external consultancy.

1.6 The national planning policy context to transportation is provided by chapter 9 of the Revised National Planning Policy Framework (2018) - *Promoting Sustainable Transport.* The NPPF establishes that the planning system should actively manage patterns of growth, and that significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. However, it ultimately states that *development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe* (paragraph 109).

1.7 The information provided in this paper needs to be understood and appreciated in the context of the Council's Infrastructure Delivery Plan (2018); Transport Strategy (2016-31); and the policies set out in chapter 13 (Infrastructure and Masterplanning) of the Calderdale Local Plan Publication Draft (2018).

2 CALDERDALE STRATEGIC MODEL UPDATE 2015 (JUNE 2015)

2.1 The CSTM of the Calderdale area covering Halifax town and the adjacent centres was developed in 2008 and further expanded in 2009. The CSTM represented travel patterns that occurred across the key road network within the Borough, during a typical 2009 weekday. The model was developed to assess development options associated with Calderdale's Local Development Framework (LDF), the precursor to the Local Plan, and also to enable testing of a series of highway improvements options.

2.2 The 2009 CSTM inherited model formed the basis of the update to 2014 travel patterns and highway network conditions taking account of all significant highway network changes and developments since the model's previous update. The 2014 model was developed in accordance with the Department for Transport (DfT) web based Transport Analysis Guidance (WebTAG) along with the WebTAG 2 'Guidance for the Technical Project Manager.' The guidance is a requirement for all projects/studies that require government approval.

2.3 This June 2015 Report is a Local Model Validation Report (LMVR) for the 2014 base year transport modelling. This report detailed the development, calibration (testing of the model in building it) and validation (checking of the model post completion) of the traffic model to 2014 observed traffic conditions i.e. actual traffic counts. The model development involved a comprehensive and extensive data collection exercise, including manual and automatic traffic counts, road side interview surveys and journey time surveys.

2.4 The highway model calibration process was undertaken successfully and produced a reasonable standard and quality of results for all time periods. The technical information presented in this report demonstrates that the CSTM was an adequate representation of base year traffic condition for each time period. The report concluded that overall the CSTM could be considered a robust tool that was suitable to be used for traffic forecasting, development and scheme appraisal, and hence is considered to be fit for purpose.

3 CALDERDALE STRATEGIC TRANSPORT MODEL UPDATE – LOCAL MODEL VALIDATION REPORT (OCTOBER 2016)

3.1 A second update to the CSTM was undertaken in 2016. The purpose of the update was to extend and improve the network and zoning outside of Calderdale, specifically in Kirklees and Bradford.

3.2 This would enable the model to be a more suitable tool for use in assessment of highway improvements schemes with improved route choices from outside Calderdale, and for analysing cross boundary impacts of Local Plan developments, with particular attention on the boundary with Kirklees. It is important to note that the 2014 model remains the basic core and the base year for the 2016 model and in turn the analysis in TN9 and TN10.

3.3 This report is a Local Model Validation Report (LMVR) for the second update to the CSTM which focuses on the extension and improvement of network and zoning (where journeys are starting and ending) in Kirklees and Bradford. This report details the development of the model, the data required to develop the model and the checking of the traffic model against WebTAG requirements to accurately represent the 2014 observed traffic levels and route choice behaviour.

3.4 The model development has involved a comprehensive and extensive data collection and summary exercise, including commissioning of data to extend the modelled area and bring together a base platform to undertake data checks against. Demand data was used from 23 Road Side Interview sites (these real world surveys are used to create and understand the demand for journeys of routes) across Calderdale and Kirklees with the remaining unobserved trips being a combination of existing data from previous models and new synthetic trips (i.e. only modelled with not real world counts to check against) on the edge of the modelled area.

3.5 The technical information demonstrated in this report has showed that the CSTM was an adequate representation of base year traffic conditions for all time period. It was concluded that overall the CSTM was considered to be a robust tool suitable to be used for traffic forecasting, development and scheme appraisal, and hence is to be considered fit for purpose.

3.6 The highway model calibration process is a series of checks (some of which are 'screenlines' to count movements across multiple roads) of the network used in the building of the model to check observed traffic against what the model calculates. The standard tool for this kind of check is the GEH statistical formula or 'GEH statistic'. The GEH statistic is used to check whether flows between real world observations and those modelled are similar enough. A low value, ideally less than 5, is a good result and in line with WebTAG expectations. This was undertaken successfully and has produced a reasonable standard of outputs for all time periods. In all peaks at least 30 out of 32 (94%) of screenlines have a GEH value under 4. For the performance on individual sections in the whole network or 'links' performance had a GEH of less than 5 for 83%of links in AM, 87% in the inter peak and 83% in PM, and journey time routes meet WebTAG criteria in all peaks.

3.7 The strong performance indicates that overall the real network as a whole was well represented by the model. Weaker areas in the network have been examined and identified as part of the assessment undertaken in TN9.

4 TN1 – FUTURE NETWORK BASELINE (JUNE 2016)

4.1 This technical note sets out the transport baseline for assessing the emerging Calderdale Local Plan. It is designed to act as a starting point for decision making as to the type, scale and location of future land allocations for development within the borough. It provides a 'snapshot' of future network operation prior to the application of growth to be allocated under the Local Plan but following realisation of committed developments, unexpected development sites and planned major transport schemes

4.2 This baseline will be used to inform the decision making process that will create a draft settlement spatial strategy (TN3).

4.3 Previous studies were reviewed and found to be generally still relevant. Their findings were summarised as follows:

- The eastern part of the district is a more suitable location for housing and employment growth than the western part. The larger towns – particularly Halifax, Brighouse and Elland – are more suitable locations for housing and employment growth than the smaller towns and villages.

- Since there are significant constraints on the ability of the council and other agencies to deliver highway capacity enhancements, public transport improvements are essential if Calderdale is to unlock its potential for housing and employment growth.

4.4 The technical note found that trends in current transport usage relate to the decisions regarding the Local Plan in the following ways:

- As a result of high car ownership and subsequent use, future pressures on the highway network will be key to decision making on the location of development Opportunities exist to further improve on rail usage levels

- The linkages between residential development and local employment locations are key based on the current trends of commuting within a relatively localised labour market.

- Despite the topographical challenges, cycling and walking rates in Calderdale appear to be no different to other areas of West Yorkshire and therefore can be part of the travel choices for new development.

4.8 The options for travel by public transport will influence the local plan as follows:

- The accessibility of future residential and employment areas by public transport will be vital to assessing their relative merits.

- The Calder Valley Line will be a key component for the location of development, taking into account possible improvements.

- The current bus network is focussed upon travel to Halifax and this is unlikely to change in the near future. The possibility of bus route extensions into newly developed areas will need to be assessed when looking at options for development.

4.11 The issues in relation to walking and cycling as travel options in the borough are as follows:

- Areas that are accessible to cyclists and pedestrians are those with a traditional, permeable street pattern, fewer large roads, dedicated routes (such as the canal towpath) and gradual inclines.

- The main barriers to cycling and walking accessibility in Calderdale are wide, busy highways, curvilinear streets and cul-de-sacs, steep hillsides and industrial estates with limited access.

- Elland, Brighouse and Northowram and Shelf were found to be particularly accessible for pedestrians and cyclists. Hebden Bridge, Mytholmroyd, Halifax and Sowerby Bridge were found to be accessible for pedestrians and cyclists but with certain obstacles. Todmorden and Ripponden were the least accessible for pedestrians and cyclists due to the number of obstacles.

4.12 Access by active modes in Calderdale is summarised below:

- Development should be located in the larger towns in the eastern part of the district, where fewer barriers of topography are seen, rather than the smaller villages and the Upper Valley.

- Undeveloped land close to the centre of Elland and Brighouse is particularly suitable for development.

- Development in Halifax should be located as close to the centre as possible and fill gaps in the existing fabric of the town rather than spreading further outwards.

- Northowram and Shelf are suitable locations for smaller quanta of development

4.13 A range of forthcoming developments present strategic opportunities for Calderdale. Improvements to existing rail infrastructure; construction of new rail infrastructure within and close to the district; improvements to road capacity; improvements to the operation of roads; incentives for private investment in employment and housing sites; and improvements to cycling corridors, including some new routes. The timeframe for these development ranges from schemes funded by the West Yorkshire Plus Transport Fund to ambitions that form the government's Northern Powerhouse agenda. As with other topics examined, the biggest opportunities tend to be to the east of the district.

4.14 The traffic modelling undertaken, represents a baseline situation prior to local plan growth. It has identified issues of capacity constraint at the following locations:

- M62 Junction 25 Brighouse
- Brighouse Town Centre
- Hipperholme cross roads
- Stump Cross
- Elland Town Centre
- A629 corridor
- Halifax Town Centre
- A6026/Copley Lane
- Sowerby Bridge Centre
- Hebden Bridge Centre

4.15 These are mainly related to the topography of Calderdale which gives limited route choice and therefore concentrates traffic on key through routes. The modelled outputs have been displayed graphically in order to show the junction hotspot locations where the ratio of traffic volume to capacity (v/c) is above 85% and therefore indicative of a lack of capacity for additional traffic. These maps can be seen at Appendix C of TN1.

4.16 The report identified the possible highway interventions which consist mainly of traffic management schemes and minor alterations to junctions as a result of the constraints of topography and historic development. In town centres and on major corridors, efforts might be made to encourage a modal shift to bus, rail and cycling. In certain locations, road widening or more significant junction enhancements might be possible. The report also identified that significant interventions may be possible in the following locations on the network; Hipperholme Crossroads, Stump Cross, Brighouse Town Centre.

4.17 A number of schemes currently proposed as part of the West Yorkshire Plus Transport Fund will address issues seen at Brighouse Town Centre, A629 and Halifax Town Centre.

4.18 The possibility of a new junction 24a of the M62, being investigated by Highways England and Kirklees Council may also play a role in relieving some of the capacity constrained locations (however, the Council's evidence makes no assumption that J24a will proceed).

4.21 Some consistent themes emerge from the topics examined, most notably the preferential status of the eastern side of Calderdale as a result of:

- The larger towns in the east being more sustainable locations
- The opportunities for improved public transport, and subsequent uplift in usage, are more likely in the east
- Walking and cycling are relevant in Calderdale especially in the flatter areas to the east.
- The future strategic opportunities tend to be focussed on the east of Calderdale
  - Highway constraints appear to be more readily improved in the east of Calderdale
- The eastern side of the authority is also influenced by the local plans of Kirklees and Bradford.

4.23 Another key theme is that there are only limited improvements that can be made at many of the hotspot locations identified. Beyond the possible highway mitigation schemes identified, there is a need to link development to public transport currently available and likely improvements as the highway capacity will remain a constraint.

5 TN2 – IMPLICATIONS OF SETTLEMENT GROWTH (JULY 2016)

5.1 The technical note provided a detailed analysis of the various new trips that Local Plan land allocations could be expected to create relating to both housing and employment growth. The growth figures in the document were based on a number of new housing units and square meterage of employment land (both since superseded) and data from the 2011 census to provide an indication of citizens' travel behaviour. Each analysis, done settlement by settlement, for housing originating and employment originating trips is presented in an easy to read fashion but with such a level of detail that cannot be easily summarised. As such the 'New Trips Forecast' below presents the main themes that each settlement's analysis covers. Some headline findings are however presented below under 'Key Findings'.

5.2 **New Trips Forecast: Housing – Key Themes Covered for each Settlement**

- Number of new units and the new trips they will produce
- How many of those journeys originate in the particular settlement itself then head elsewhere (longer journeys / those heading elsewhere have more negative impacts because they contribute more to congestion and those making them are less likely to convert to sustainable / active modes)
- How many new trips start and finish in that same settlement
- How many new trips are shorter and, related to this, how many have the potential to be made by sustainable means (shorter journeys having more potential to be done sustainably).
- What areas and key junctions those new trips will impact and how big that impact will be
- Mitigating measures to deal with those impacts – both as part of existing transport schemes and wider or longer term strategic priorities
- Key or notable areas where the new trips won't have an impact
- The scope for new trips to convert to rail or bus and likely issues for key sustainable mode journeys (e.g. need to interchange)

- For larger settlements, more specific areas of the town where growth would be more sustainable

5.3 **New Trips Forecast: Employment – Key Themes Covered for each Settlement**

- Hectares of new employment land and the journeys it will create
- For larger settlements, where in that town those jobs will be focused
- How many of those journeys originate in the particular settlement itself then head elsewhere
- Where trips originating outside of that settlement come from
- What areas and key junctions those new trips will impact and how big that impact will be
- Mitigating measures to deal with those impacts – both as part of existing transport schemes and wider or longer term strategic priorities
- How many new trips are shorter and, related to this, how many have the potential to be made by sustainable means
- For larger settlements, more specific areas of the town where growth would be more likely and/or should be encouraged and how this should be supported in terms of sustainable journeys

5.4 ***Key Findings (notes in brackets provide 2018 updates on report findings that have seen changes since 2016)***

- Halifax, Brighouse and Elland show the greatest potential for sustainable travel due to higher levels of local employment. Halifax shows the greatest potential for sustainable travel with Brighouse and Elland showing lower potential
- Sowerby Bridge shows a similar level of potential for sustainable travel as Brighouse and Elland. A key movement for travel being toward Halifax itself.
- The Upper Valley also shows high levels of local trip making, although these would still have local impacts on the road networks. Public transport use is also higher here.
- Northowram and Shelf shows the greatest level of commuting out of the settlement, making it least suitable for intensive development. The impacts from development here would be felt at both Hipperholme and Stump Cross junctions which have no committed plan for improvement.
- The North and North West area of Halifax is less preferential for development than areas to the South due to public transport accessibility and the potential impacts on junctions on the A58.
- Through the planned WY+TF A629 corridor improvements growth is supported in Halifax and Elland and to a lesser extent Brighouse. Growth in Brighouse is supported by the WY+TF A641 corridor improvements.
- Growth in Sowerby Bridge and particularly Elland and Brighouse is supported by the planned 'CityConnect' canal towpath cycle route improvement scheme which will provide an improved option for use of active modes.
- There are a lack of planned interventions which would support major development in Sowerby Bridge and the Upper Calder Valley (although current to the time of writing, programmes have advanced).
- Development in either of the key settlements of Halifax and Brighouse would give rise to a need for as yet unplanned major interventions at the Stump Cross and Hipperholme junctions (however, at the time of writing a commission is under way to assess options and suggest interventions in that part of north west Calderdale).

- The potential level of development at Brighouse, particularly employment, is likely to mean there is a need for major interventions to improve capacity at M62 Junction 25 or abstraction of traffic via the possible junction 24a.
- The level of both housing and employment development in Elland and interactions with other areas lends significant support to the provision of a new rail station which would help mitigate the traffic impacts on the A629 corridor (this is now a programmed project).
- All settlements show high levels of reliance on the private car, greater than 70%. Therefore it is desirable to promote a policy of modal shift and in particular support the improvement of bus services between settlements so that direct services are available without the need for interchange in Halifax.

6 TN3 – PREFERRED SPATIAL STRATEGY (APRIL 2017)

6.1 Where later Technical Notes provide a detailed analysis of sites this technical note provides a strategic narrative as to the preferred settlement areas for housing and employment development in the Borough.

6.2 The preferred option for distribution of housing is influenced by the findings of TN1 and TN2 and is set out in tables 1 and 2 of the document and favours eastern Calderdale as the focus for housing growth in the borough.

6.3 An Employment Land Study (ELS) was produced for Calderdale Council in November 2016 (finalised in July 2018). The ELS found that demand is significantly greater in East Calderdale and Halifax and there is strong demand for large sites in East Calderdale. While there is some demand for employment sites in West Calderdale, this demand is for smaller sites. Based on the analysis of the ELS, Calderdale Council drew up a list of preferred employment sites for allocation. This indicates that the overwhelming majority of preferred sites are located in Halifax, Brighouse and Elland, that is, eastern Calderdale. Western Calderdale has only two sites which account for a relatively small area. Across the district, the vast majority of this land has been allocated for B2 uses, which will capitalise on the good motorway and A-road links in eastern Calderdale (especially relative to western Calderdale) and build upon the existing concentration of industrial development in this part of the district.

- The large towns in eastern Calderdale are a more sustainable location for housing and employment growth than the western part of the Borough. This is because existing employment opportunities, public services, shops, amenities and public transport are more widely available in eastern Calderdale. This reduces the need to travel long distances for everyday needs.
- Sustainable transport provision is more extensive in the eastern part of the Borough. There are more rail and bus routes and public transport service levels are higher. The settlements in eastern Calderdale are more walkable and it is easier to reach destinations by cycling. This means that more amenities, jobs and services can be reached without travelling by car.
- While the towns in eastern Calderdale require improvements in sustainable transport provision to accommodate growth, existing and planned commitments mean they will receive more investment in sustainable transport infrastructure and services than the western part of the Borough. This includes committed West Yorkshire Plus Transport Fund schemes that benefit from significant political support but do not yet have committed funding

- The eastern part of the Borough is prioritised for more employment growth than the west. Calderdale's M62 Enterprise Zone site is located at Clifton near Brighouse. Moreover, the eastern part of the Borough is located closer to employment growth areas in neighbouring and nearby districts, such as Kirklees, Bradford and Leeds.
- Focusing growth in south-east Calderdale complements similar growth plans in north-east Kirklees. Combined these plans will help to generate the critical mass of development that will attract inward investment and ensure that new housing is provided to complement new job opportunities.
- Of the towns in eastern Calderdale, Halifax and Brighouse are particularly appropriate as locations for housing and employment growth. Halifax has the highest levels of public transport service in Calderdale, the largest concentration of public services and amenities and good highway links. Brighouse has the best strategic highway links, a high concentration of amenities and public services, and above average public transport service provision.

7 TN4 – ASSESSMENT OF CUMULATIVE IMPACT (MAY 2017)

7.1 This technical note describes two stages relating to the traffic modelling of the cumulative impact of the proposed Local Plan site allocations. These have been named 5a and 5b following the stages initially set out for the work on establishing the evidence base.

7.2 Stage 5a outlines an indicative traffic modelling exercise carried out using the best available information on the likely make-up of the Local Plan at the time (August 2016). The levels of settlement growth agreed by Calderdale were used alongside historic site data to give outputs, which were subsequently used to inform the more detailed decisions on individual site allocations. This initial model run gave an early view as to the cumulative impact of development through the district and has been used to inform the decision making process regarding the final proposals for the makeup of the plan

7.3 Stage 5b defines a subsequent modelling exercise carried out with the preferred site information most likely to be included within the final draft of the Local Plan (as received from CMBC in December 2016). This describes the levels of residential and employment developments used and the associated network congestion predicted by the model. This further model run gave an overall picture of impacts across the Calderdale network as was current when TN4 was published in May 2017. Modelling was carried out using both a do-minimum highway network, with committed schemes only, and a do-something network with the A629 Phases 1a and 1b schemes of the West Yorkshire + Transport Fund (WY+TF).

7.4 The Local Plan sites that have been modelled represent a 'worst-case scenario' for the network in which all development comes forward. This is modelled under conditions that can be described as "business as usual", with only limited highway improvements and no changes in demand that represent significant shift away from use of the private car or reduced levels of travel.

7.5 The results of the analysis in TN4 refer to impacts as were current to its publication in May 2017. Given that allocations have changed between that date and the composition of this summary note, the reader should refer to the impact analysis of TN9 towards the end of this summary document for the most current understanding of the impacts of a 'Do Something' scenario.

8 TN5 – HIPPERHOLME SENSITIVITY TEST (MARCH 2017)

8.1 This technical note ascertains the impact of allowing housing growth within Hipperholme. It is intended to show the likely impacts of allowing the development of housing sites close to the already congested junction of the A644 and the A58 (Hipperholme Cross roads), located in the centre of Hipperholme. It also allows for reporting on the wider network impacts that are seen and any re-routing across the settlement area.

8.2 Modelling was undertaken of the local plan preferred sites with and without the residential developments in Hipperholme. The final sites used were based on the most up to date information for the local plan allocations at that time (March 2017). The outputs show that an already congested network, as shown in the base year, did not contain unused capacity for the traffic related to the Hipperholme sites to utilise. There is a marginal worsening shown for the Hipperholme cross roads by the modelling of the additional sites, however due to the model's strategic nature there is also re-routing of traffic away from the area in order to accommodate the new traffic.

8.3 In terms of the allocation of the potential sites in Hipperholme, the modelling carried out gives the following information to be taken into account for decision making:

- It can be clearly demonstrated that the Hipperholme cross roads junction is at an unacceptable level of congestion currently and this is worsened by the overall predicted growth in traffic as a result of the wider local plan allocations.
- The potential sites in Hipperholme are of a scale which does worsen the situation at the Hipperholme cross roads even though they create relatively minor additions to traffic.
- There are re-routing impacts shown upon minor routes which are not necessarily appropriate for through traffic
- The traffic demand calculations do not account for the potential for above average active travel/public transport usage or travel outside the traditional peak hours (peak spreading).
- The traffic modelling exercise has not given sufficient evidence to support the rejection of these sites, given that they are relatively sustainable, being close to the village centre amenities, located on a high frequency bus routes and on brownfield land. However, if they should be allocated in the final Local Plan draft, the provision of a small scale mitigation scheme for the Hipperholme cross roads should be included as a necessity.
- The Council took the decision not to promote sites in the Green Belt close to this junction.

9 TN6 – SITE APPORTIONMENT (JULY 2017)

9.1 This Technical Note outlines the methodology used to identify congested locations on the transport network and the contribution made by individual planned developments over the timeframe of the Local Plan. The likely form of improvements at these locations is also described in order to inform the future infrastructure plan.

9.2 In order to assess the likelihood of achieving developer contributions or other infrastructure investment to address network issues, a site apportionment exercise is necessary. Using an analysis of the 'Do Something' scenario as outlined in TN4 this apportionment identifies

which proposed developments contribute significant congestion impacts and in turn where transport infrastructure improvements will be necessary.

9.3 The note looked at all 'nodes' in the transport network (points where traffic goes into and out from a junction) using a model that used the flows of traffic and the relationship of that flow to the capacity of the junctions. This flow (or volume) to capacity relationship is called the volume/capacity ratio (from here expressed at v/c) is important as those routes arms of junctions with a v/c above 85% or with more than 300 cars passing through them per hour are generally considered as congested. This is used to suggest the specific development sites and in turn the associated transport infrastructure improvements that will be required to support the Do Something scenario.

9.4 The main of the analysis in TN6 refers to site specific assessments of impact as was current to its publication in July 2017. Given that allocations have changed between that date and the composition of this summary note, the reader should refer to the impact analysis of TN10 towards the end of this summary document for the most current understanding of the impacts of a 'Do Something' scenario.

9.5 It is worth noting that, despite the changed position of the allocations in the submission draft of the Local Plan (see TN10 below), all the congestion hotspots and associated transport schemes suggested in TN6 as required to mitigate against growth impacts of the local plan are now being considered under the following categories.

9.6 Schemes of the West Yorkshire Plus Transport Fund:

- A58/Tuel Lane,
- A643/Church Street/Ogden Lane,
- A641/Bailiff Bridge,
- B6112 Stainland Road/Saddleworth Road,
- A58/A641 (Wyke),
- improvements for the centre of Brighouse.

9.7 Under development to prepare for future allocation of funding:

- A629 at Old Lane and Improvements to the north side of Halifax, A58/Wakefield Road (Hipperholme), A58 corridor incorporating Wyke Lion, Hipperholme cross-roads and Stump Cross junctions.

9.8 Included in the Infrastructure Delivery Plan alongside the submission draft Local Plan as local schemes with strong potential for developer contributions:

- Wakefield Rd / Copley Lane, White Gate/Mill Lane (Mixenden), A643 Walton Lane/A649 Wakefield Road.

9.9 In areas of the borough where the allocations have been reduced and as such the traffic impact will not be as significant:

- A6025/Exley Lane, Dewsbury Road/Elland Riorges Link (Elland), Huddersfield Road/South Lane (Elland)

10 TN7 - AIR QUALITY CONSTRAINTS ASSESSMENT (JUNE 2016)

10.1 This technical note sets out the key air quality elements to be considered when assessing the possible options for development within the emerging Local Plan. The Local Plan will need to identify land areas across the borough for future development. As such the plan will need to include a number of strategic and development policies relating to local air quality management, that will fulfil the National Planning Policy Framework (NPPF) sustainable development criteria.

10.2 A baseline review of existing air quality across the borough of Calderdale has been undertaken to ascertain any air quality constraints for assessing areas for development within the emerging Calderdale Local Plan. This technical note is designed to act as a starting point for decision making as to the location of future land allocations for development within the borough, and will be used to inform the decision making process that will create the draft Local Plan.

10.3 In terms of local air quality, CMBC has designated seven Air Quality Management Areas (AQMAs) within their administrative area as a consequence of their Review and Assessment work. These have often been declared in areas where there is a combination of high traffic volumes and buildings located close to the roadside which can hinder the dispersion of exhaust fumes. Local air quality monitoring data shows exceedances of the annual mean NO2 concentration objective are only occurring within these AQMAs.

10.4 Locations where there is a risk of exceeding the NO2 EU limit value are:

- Huddersfield Road, Brighouse;
- Huddersfield Road, Elland;
- Calderdale Way, Elland, Halifax Road, Elland;
- Elland Wood Bottom, Elland;
- Huddersfield Road, Halifax;
- Skircoat Road, Halifax;
- Cow Green, Halifax;
- Broad Street, Halifax;
- Orange Street, Halifax;
- Wharf Street, Sowerby Bridge; and
- Bolton Brow, Sowerby Bridge.

10.4 Locations already exceeding the NO2 EU limit value are:

- M62 south of Elland;
- Wakefield Road, Brighouse;
- Huddersfield Road, Salterhebble
- Salterhebble Hill, Salterhebble
- Burdock Way, Halifax;
- Haley Hill, Halifax;
- New Bank, Halifax; and
- Godley Road, Halifax.

10.5 It is identified that AQMAs have often been declared in areas where there is a combination of high traffic volumes and buildings located close to the roadside which can hinder the dispersion of exhaust fumes. Local air quality monitoring data shows exceedances of the annual mean NO2 concentration objective are only occurring within these AQMAs. Junction capacity constraints have also been identified and are located in key population areas of

Calderdale. It is clear from this review that there is a correlation between the junction capacity constraints on the network and areas of poor air quality. Local planning policy therefore plays a significant role in ensuring that development schemes are designed with a sustainable approach. Pre-application discussions with the relevant air quality officer are also important to confirm the scale of development and the assessment requirements. In addition, there will be a need to assess air quality to sustain compliance with and contribute towards EU limit values or national objectives for pollutants.

10.6 It is apparent that the eastern side of Calderdale has preferential status for development. As larger towns are already located in the east, this area can be considered a more sustainable location for future development. This is because there is a greater opportunity for improved sustainable transport and highway constraints appear to be more readily improved in the east of Calderdale. Such measures work positively with air quality thus limiting constraints in this region.

10.7 Development proposals with the likelihood to cause pollution or be exposed to potential sources of pollution will therefore need to demonstrate that measures can be implemented to minimise emissions to a satisfactory level, and in particular within AQMAs proposals should be consistent with the aims and objectives of the Council's Air Quality Action Plan and NPFF.

11 TN8 - STRATEGIC VISION FOR SOUTH EAST CALDERDALE – TRAFFIC STATEMENT (JUNE 2016)

11.1 This Traffic Statement sets out the background to the Thornhills Lane and Woodhouse sites, access to sustainable modes of transport and highway infrastructure improvement which are coming forward. Its main purpose is to set out the traffic modelling work that has been carried out to support the Strategic Vision for South East Calderdale and the Masterplan.

11.2 The balance of evidence indicates that Brighouse and Raistrick will be the key focal points for new residential development. This is due to the availability of land and their relative sustainability, with fewer potential impacts on the important environmental designations in the west of the District.

11.3 Brighouse as a town is also likely to benefit from capacity improvements to the A641, A644 and potentially also a new M62 junction 24a which could all be delivered through the West Yorkshire +Transport Fund. Whilst these improvements are at the early stages of the design development, there is a reasonable prospect that they will be forthcoming during the Local Plan period. It is noticeable that the A641 corridor improvements would resolve the vast majority of capacity issues in the west of the town centre and close to the southern end of the Thornhills Lane site.

11.4 Alongside the implementation of the sites, there is a need to maintaining various footpaths and bridleways across the sites. The plans ensure that pedestrian access to the Woodhouse site and along the Bronte Way and Spen Valley Heritage Trail at Thornhills Lane are maintained. Plans to introduce green swathes of land required as Sustainable urban Drainage Systems for flood alleviation will also help to maintain or provide these routes.

11.5 The modelling work set out in this report demonstrates that the existing network is presently operating satisfactorily but with some key junctions that have insufficient capacity which result in queuing and delays on critical parts of the network. The impact of the

Thornhills Lane and Woodhouse sites will result some more onerous impacts by the end of the local Plan Period.

11.6 However, it is reasonable to expect that the highways infrastructure improvements coming forward will mitigate this impact. Hence it is concluded that there is no highways reason why the two sites should not be allocated in the forthcoming Local Plan.

11.7 It accepted that the network will need further improvements to mitigate the development of the two Sustainable Urban Extensions. Given the impact at the Forecast year is not unduly onerous, it is considered that, with the implementation of the strategic highway improvements referred to previously, the impact of the Thornhills Lane and Woodhouse sites can be readily mitigated. There is therefore no justifiable highways reason why these two sites should not be allocated.

12 TN9– ASSESSMENT OF CUMULATIVE IMPACT- July2 018

12.1 TN9 follows the conclusions of TN10 that the transport model is a robust tool and provides an analysis of the results of inputting the 2018 submission draft land allocations. TN9 has two modelled scenarios. The 'Do Minimum' is based upon only very minor improvements between 2014 (the base year of the model) and 2032. The 'Do Something' scenario, also looking at impacts between 2014 and 2032, considers that Phases 1a and 1b of the A629 corridor improvement programme and the Clifton Link Road have been completed. Both scenarios have the same 'maximum growth' assumption with regard to the level of housing and employment growth on allocated sites.

12.2 It is important to note that the allocations have been through a series of revisions over the years that the Local Plan has been in development. As such the number of sites used in the modelling for TN9 is in fact more than what was taken forward with the Submission Draft of the Local Plan. This can be seen in Appendix A of TN9 where all sites shown have been modelled but only the yellow sites have been taken forward in the submission draft allocations. As such the 'maximum growth scenario' that is the basis for TN9 is now in fact higher than the maximum suggested in the submission Local Plan document. This does however provide an advantage to the approach taken in TN9 whereby the impacts modelled can be expected to be more severe than those created by the submission Local Plan's maximum growth possibility.

12.3 It is also important to note that the transport interventions that form the basis of the 'Do Something' scenario in TN9 are in fact fewer in number, scope and in turn benefit to the highway network than what is in development in the Borough. This does not consider the range of other changes and improvements on the A629, the Halifax town centre improvement scheme, the A641 Corridor programme for approaches into Brighouse or the Corridor Improvement Programmes of the A646 and A58. All these emerging schemes have progressed into the early stages of development and will continue to progress. They are however in an earlier stage in their progression and without the firmer financial commitment of the schemes included in the Do Something scenario and as such were not considered appropriate to include. Their likely progression across the life of the plan will however amount to a further alleviation of the impacts as modelled in the Do Something scenario.

12.4 The maximum growth assumption of the modelled scenarios assumes 16,899 residential units across 661 sites, 11 of which contain more than 200 units. It also assumes 39 employment sites across 93.17 hectares. Trip generation is calculated on a multi-modal basis rather than just upon car movements, as was the recommendation of TN9. A set value is given for movements in and out of residential units and for employment sites different rates are given for office, industrial and storage & distribution uses.

Identifying Significant Impacts

12.5 Impacts are measured in terms of traffic flows over an hour vs the capacity of that part of the network over an hour. Where the flow is 85% of the capacity on a junction this is generally agreed as the point at which congestion begins. The Do Something scenario forms the main focus of the TN9 analysis. In TN9 the locations highlighted with an orange dot or line in figures 3 to 18 are those where at least one arm of a junction in the Do Something scenario has above 85% flow of traffic compared to the capacity on that arm of the junction. The red dots or lines represent locations where an arm of a junction is above 100% in the Do Something scenario and thereby heavily congested. This volume over capacity will be referred to as 'v/c' throughout the rest of this document. Significant delays are generally those of one minute or more.

12.6 The Do Minimum modelling shows levels of congestion that would be unacceptable without further intervention. It shows that current areas of constraint are inevitably worsened as a result of the planned level of growth associated with the local plan.

12.7 Below is a summary of the impacts by key settlement under the Do Something scenario.

HALIFAX – There are some junction arms above 85% v/c however the delays by 2032 are increases of less than one minute and therefore not considered significant. The Halifax town centre improvement scheme will likely further alleviate these issues but has not been factored into the model.

BRIGHOUSE – With the Garden Suburbs and Clifton Business Park in close proximity to Brighouse, this settlement sees a more significant impact than most. These are listed as follows:

- The western Ludenscheid Link roundabout experiences southbound and northbound movements that are over capacity.
- The traffic related to the large Thornhills housing site has a major impact on congestion and delays at the junction of the A644 and A643.
- The Thornhills site also produces an impact as a result of additional traffic using inappropriate links in the network, e.g. Thornhills Beck Lane.
- Existing congestion is worsened through the centre of Brighouse on the A641. The model showing an increase in delay of 4 minutes northbound and 1 minute southbound in the AM peak and 2 minutes in each direction in the PM peak.
- Junction 25 of the M62 shows links at the junction to be close to capacity. These are shown on the roundabout itself rather than the A644 or the M62.
- Ludenscheid Link western roundabout (A6025/A644/A643)
- Wakefield Road/Clifton Road roundabout (A644/A643)
- Ludenscheid Link eastern roundabout (A641/A643)
- Huddersfield Road/Clifton Road (A641/A643)
- Brookfoot Lane/Elland Road (A6025)
- A641/Mill Royd Street

14.4 The key capacity constraints that show unacceptable levels of congestion in Brighouse are the worsening of existing issues, however these are resolvable. The problem locations align with the proposed A641 corridor West Yorkshire Plus Transport Fund scheme, which is currently at a pre-feasibility stage and therefore can be tailored to suit the impacts of the Local Plan, and the significant transport infrastructure that will form part of the master planning of the Thornhills garden suburb site and Clifton employment site.

- ***ELLAND*** – The modelled scenario for Elland contains large sites at North of Elland and on Saddleworth Rd between Greetland and Barkisland. These sites are not in the submission Local Plan allocations. In this scenario the most significant impacts are on the two junctions in the centre of West Vale which are the only junctions to see a delay of above one minute. A number of other junctions also see v/c of above 90% although this is generally on one arm of each junction and uniformly with a delay of less than one minute. The later stages of the A629 corridor improvement programme, not modelled, are designed to bring improvements to the Elland area.

- ***A58 CORRIDOR (NORTH EASTERN CALDERDALE)*** - There are significant issues shown at both Wyke Lion, for A58 traffic, and at Stump Cross, for A6036 traffic. There are increases in delays at Hipperholme Crossroads that add to the already significant issues currently seen at this junction. Rerouted journeys away from major junctions also cause capacity issues in the Hipperholme area. It is expected that a comprehensive corridor study for the A58, A6036, A644 and A649 in this North Eastern part of the borough will address these issues in a holistic manner (including public transport modes). There is not however an agreed major transport intervention in place for this part of the borough.

- ***BAILIFF BRIDGE*** – The model shows significant impacts at Bailiff Bridge junction however this area has been taken into account in the A641 Corridor programme and it is reasonable to expect that a scheme will be brought forward to mitigate these impacts.

- ***A629 AND A6026 CORRIDORS (SALTERHEBBLE, AINLEY TOP AND COPLEY AREAS)*** – Given the capacity improvements of the modelled Phase 1a and 1b works on the A629 more traffic is drawn to this area of the network and away from areas like the A641 where improvements have not been modelled in the Do Something scenario. This results in significant delays along this corridor. The A6026 itself and the junction with Copley Land show significant delays which would need new transport interventions although these may be relatively simple improvement to signal operations. Ainley top shows significant disruption at the westbound off slip from the M62, roundabouts south of the M62, Blackley Road entry to the northern roundabout, Link capacity issues eastbound on slip to the M62 and Link capacity issues on Lindley Moor Road (A643). Programmed but early stage (and therefore not modelled) improvements to the A629 may provide some improvement to the issues in the Ainley Top area as might the currently under installation of a junction 24a on the M62.

- ***SOWERBY BRIDGE*** – The significant delays in Sowerby Bridge are on Sowerby Street, Wharfe Street and Tuel Lane. The Corridor Improvement Programme for the A58 is expected to bring forward improvements could bring improvements that mitigate these delays.

- ***NORTH HALIFAX*** – Significant delays are only recorded in the Do Something scenario south of Shay Lane at the junction with Ovenden Way and southbound on Brackenbed Lane at the junction with Pellon New Road. Future transport schemes have the potential to improve these impacts.

- ***HEBDEN BRIDGE*** – With little development focused in the Upper Valley only one junction, Heptonstall Road to the A646, sees a v/c above 85% and this could easily be mitigated with optimised signal timings.

13 TN10 – REVIEW OF PREVIOUS LOCAL PLAN EVIDENCE BASE (MAY 2018)

13.1 TN10 is critical to the transport evidence of the submission Local Plan. Produced in May 2018, it provides an examination of the 2014 Calderdale Strategic Transport Model which underpins the assumptions and methods in previous technical notes (TN4, TN5 and TN6). It thereby provides an assessment as to whether the model remains a robust enough tool within which to input the housing and employment land allocations of the 2018 submission draft Local Plan.

13.2 The methodology of the TN10 assessment focuses on five areas of the borough at Halifax town centre, Brighouse, Elland, Hipperholme and North Halifax. These areas are the critical parts of the district because they are contain a combination of the key current population centres and areas of employment, most key areas of the transport and in particular highway network and are in or close to the main areas of proposed housing and employment land development.

13.3 Transport models, particularly on a large, borough wide scale are complex undertakings that require the building of a transport network, the creation of locations across that network where journeys may begin or end, the inputting of those journeys and then the checking and rechecking that the way those journeys have been inputted is a decent reflection of how things work in the real world.

13.4 The Calderdale model was created in 2014 using some data from a model dating to 2008 and, to be relevant in 2018 all of the above processes had to be checked. A short summary of each exercise is set out below.

13.5 Transport network model coverage – found to be sufficient Zoning system (where journeys are starting and ending) –Based on census output areas and found to be realistic. The consultants recommended that large developments should be added to it as standalone zones. Roadside Interviews (RSIs) – These real world surveys are used to create and understand the demand for journeys of routes. 'Holes' in the coverage at Wyke lion, routes west of Elland, Ainley Top and north Halifax were found. Where these 'holes' in the model exist the model still contains journeys but they are based on historic data and the synthesis of trips via the use of land use and population data.

13.6 Coverage of Calibration Data (part of the information on traffic movements used to help build the model) – Movements to/from Halifax and to/from Kirklees are covered well. Ainley Top and the A629 at Elland bypass are not covered.

13.7 Coverage of Validation Data (information on movements to check if the model is right) – Concentrated on Halifax and Elland and exclude Cooper Bridge, some Brighouse movements and Hipperholme

13.8 Matrix Infilling – Any movements not observed via real world RSI have been infilled using the 2008 model. This information could be said to be out of date but few changes in land use and transport infrastructure since that time mean that it is reasonable to assume that changes in patterns of travel demand are minimal

13.9 Calibration Screenlines (checks across an area of the network used in the building of the model to check observed traffic against what the model calculates) – Across a total of 11 (22 if considered in terms of the two directions of traffic) screenlines only one showed poor results, that being the line East of Elland with a poor match in the AM peak.

13.10 Validation Screenlines (an independent check of the models results) – Across five (10 if considered in terms of the two directions of traffic) such lines the Brighouse south line showed a poor match between model and observed in the am (model higher) and that east of Halifax is also poor (model lower than observed). However both have relatively low flow movements.

13.11 Validation Link Flow Performance (using the statistical formula 'GEH statistic' as explained in the Local Model Validation Report chapter above) to check whether flows between real world observations and those modelled were similar enough. A low value, ideally less than 5, being a good result) – High GEH values were found west of Elland, otherwise most are in or close to the GEH WebTAG (government guidance) maximum of 5 in the AM peak. In the PM peak most failures are within GEH of 10 (still quite low), a few in central Elland are worse than this.

13.12 Journey time performances – 94% match between observed and modelled movements in the AM, PM and inter-peak. Notable poor correlations were found in the Elland to Ripponden link (both ways) and Liversedge to Hipperholme towards Hipperholme.

13.13 Trip Rates - Trip rates are the movements of vehicles in and out of sites by development type e.g. homes, offices and industrial uses. In the UK trip rates are benchmarked against a national database of trip rate figures provided for individual developments up and down the country. This database, known as TRICS, allows local authorities to understand what it is reasonable to expect a development to produce in terms of the trips in and trips out of a site. TRICS was used in the Calderdale model to calculate a reasonable trip rate for development sites in the borough. This produced a trip rate for residential and employment sites on a borough wide level as well as in site specific terms for the Clifton Business Park and Garden Suburb sites. In TN10 these trip rates have been compared to those produced for both individual sites and those for whole boroughs. The consultants concluded in a comparison between these site level and borough level trip rates to the Calderdale model that Calderdale trip rate assignment was acceptable and robust.

13.14 Kirklees model comparison (also using the GEH statistic) – In a comparison of the findings of the Kirklees and Calderdale transport models in terms of movements across the border of the two authority areas there were mixed results. There is no conventional way for comparing models but the GEH statistic approach was deemed an appropriate way to understand the cross-model relationship. The analysis showed that more than half of the routes had a GEH value below or close to the GEH value of 5, that is to say that the models

came out with about the same result. Where the results were significantly different the Calderdale model generally had good results (GEH below or close to 5) when comparing modelled and observed flows. Whilst Kirklees observed counts data isn't available, the good match in Calderdale might suggest that the Calderdale model was stronger on the cross boundary routes examined.

13.15 Distribution – The distribution of trips, where journeys go from and to, has in the 2014 transport model for the borough been concluded as robust by the consultants. They arrived at this conclusion via a comparative review of distribution in the same boroughs examined for trip rate comparisons.

13.16 Modal Split – This is how people make their journeys (i.e. car, bus, train etc.). Existing split between modes, taken from census data and the TRICs database, is the basis for the transport model. 'Car only' TRICS evidence was the basis previous transport evidence however the consultants make a recommendation that a multi-modal approach should be taken for future work (see TN10).

13.17 TN9 also reflects on a series of comments from Highways England and on the requirements of the National Planning Policy Framework with a response that acknowledges the policy requirements and concerns and assures that the modelling exercise undertaken for TN will take into account those concerns.

13.18 Whilst TN10 found a number of issues in the model as pointed out in the bullets above these were found to be exceptions to an otherwise well performing model. As such it was concluded that the model is a valid tool for use with an exercise related to assessing the local plan. Although there are points where the model is weaker, there is no distinct pattern to these which shows a particular weakness in a single geographical area which would be a concern to the local plan assessment.

14 TN11 – CROSS BOUNDARY IMPACTS - A COMPARISON OF FLOWS ON SELECT LINKS IN 2014 BASE AND 2032 'DO SOMETHING SCENARIO' MODELS

15.1 TN11 arose from the Duty to Cooperate between Kirklees and Calderdale and questions raised by Kirklees as part of this process. Concerns had been raised from Kirklees with concern about the potential impact of the garden suburbs on the transport network in Kirklees. An exercise was therefore undertaken to disaggregate and specify what impacts were happening as a result of development. This 'Select Link Analysis' provides information of where traffic comes from and goes to at selected links in the network. This technical note details a variety of select link analyses done to compare the flows between the 2014 Base model and 2032 Do Something model. This can therefore be used for assessing the impact of the proposed local plan growth.

15.2 From the links into Kirklees that have been examined, the following has been shown by the select link exercise:

- At Chain Bar the major impacts from Calderdale traffic are seen on Bradford Road in the AM peak with an increase of 24% in total flow.
- At Cooper Bridge the AM peak growth is primarily from Calderdale while in the PM peak less than 50% of the growth is from Calderdale.
- At Bradley Roundabout the Calderdale growth is significant, however the net increase is lower due to reductions in traffic from Bradford and elsewhere.

- At Ainley Top the significant growth is seen in the AM peak only, with the majority coming from Calderdale. However, a significant proportion will be accessing the M62 and not using local roads in Kirklees.

15.3 From the links into Bradford that have been examined, the following has been shown by the select link exercise:

- At Chain Bar, on the M606, there is a minimal impact related to Calderdale traffic.
- On the A641 the AM peak shows significant growth related to Calderdale.
- In Queensbury the impact from Calderdale traffic is only shown to be significant on Brighouse Road, although growth from other areas is of a similar scale at this location.
- On the A629, Calderdale growth is only significant in the PM, but is of a similar level to that originating in Kirklees.

15.4 From the links onto the M62 that have been examined, the following has been shown by the select link exercise:

- At Chain Bar, the eastbound slip road shows 56% of total growth originating from Calderdale. The westbound on slip shows no impact from Calderdale.
- At junction 25 the eastbound slip is most affected by Calderdale traffic, however the net impact is lower due to reductions in traffic from elsewhere.
- At Ainley Top, the growth shown on both slip roads is shared (reasonably equally) between Kirklees and Calderdale originating traffic.

15.5 TN11 shows the predicted growth in traffic on key routes which interact with the neighbouring authorities to Calderdale and the M62. The increases shown should be viewed in the context of the spare capacity shown by the model and the more detailed knowledge of the local authorities and Highways England regarding their networks. It should also be noted that many of the links examined are on the edge of the Calderdale model simulation network and therefore will be less reliable at replicating base levels of traffic.

16. CONCLUSIONS

16.1 This summary paper distils the key information provided by the Technical Notes comprising the Council's transport evidence base for the Local Plan. In conclusion it is considered that:

- The development of the evidence has followed a logical and iterative process. As the evidence has evolved it has informed the emerging allocations and policies.
- The Council has been careful to ensure that the modelling is robust and does not underplay the impact of development. The modelling has therefore utilised a scenario of more development than actually proposed.
- The evidence shows that the most significant traffic impacts will be in the eastern part of Calderdale, reflecting the amount of development proposed and problematic junctions.
- Whilst Halifax and eastern Calderdale will be main focus for new development, a restrained approach has been taken to development in close proximity to Hipperholme crossroads.
- The Infrastructure Delivery Plan (IDP) identifies specific interventions to mitigate the impact of development on the highway network. These schemes are at different stages of funding and development. It should however, be noted that the development identified in the Local Plan will delivered over a period of about 15 years.

- The impact of development can be mitigated to an acceptable degree, bearing in mind the requirement of the Revised National Planning Policy Framework that *development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.*
- In addition to physical interventions identified in the IDP, the Local Plan and Transport Strategy provide the basis for policy interventions that will encourage modal shift and sustainable patterns of development. Furthermore policies within the Local Plan will enable decision makers to prevent development coming forward in advance of certainty over the delivery of infrastructure.