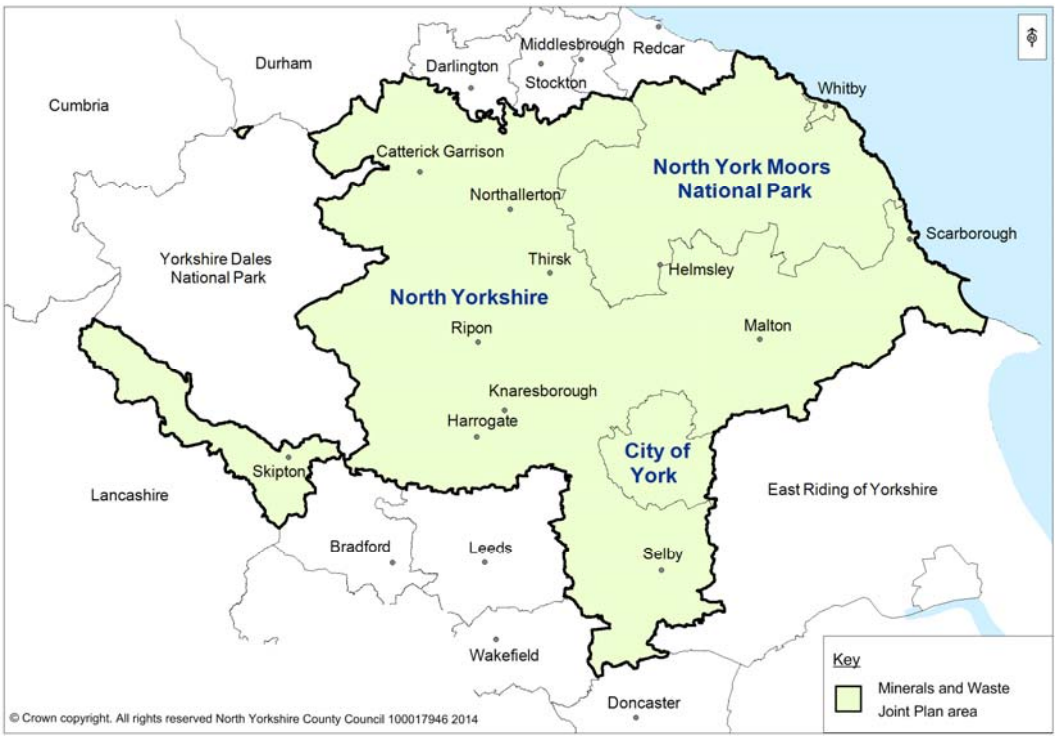
Minerals and Waste Joint Plan



Forecasting demand for aggregate minerals

Discussion Paper

July 2014

City of York Council
North York Moors National Park Authority
North Yorkshire County Council

About this paper

This discussion paper has been produced to support preparation of the Minerals and Waste Joint Plan for North Yorkshire, City of York and the North York Moors National Park Authority. It is intended to help inform decisions about future provision of aggregates minerals (sand and gravel and crushed rock). It builds on information already contained in the first Local Aggregates Assessment for the North Yorkshire sub-region (2013) and may ultimately feed into preparation of an updated Local Aggregates Assessment.

Comments on this paper are invited by Friday 22 August 2014. Comments should be sent in writing using the contact details provided on the back page. If you would like to discuss any matters raised in this paper then please contact us, also via the details on the back page.

Forecasting demand for aggregate for the North Yorkshire, York and North York Moors National Park Minerals and Waste Joint Plan - Technical Paper for Discussion

The National Planning Policy Framework (NPPF) (para. 146) states that mineral planning authorities should plan for a steady and adequate supply of aggregate minerals (sand and gravel and crushed rock) by preparing an annual Local Aggregates Assessment (LAA) *based on a rolling average of 10 years sales data and other relevant local information*. National Planning Practice Guidance (March 2014) further clarifies that LAAs *should contain a forecast of demand for aggregates based on both the rolling average of 10-years sales data and other relevant local information.* A LAA for North Yorkshire has been prepared which provides information on 10 year average sales and summarises some other local information which may be relevant. It does not set out a specific demand forecast other than that generated by forward projection of 10 year average sales. This discussion paper has been prepared in response to representations by the aggregates industry that a more objective approach to forecasting future requirements for aggregate should be developed to help inform preparation of the Minerals and Waste Joint Plan for North Yorkshire, York and the North York Moors National Park. In order to generate a forecast of demand for aggregate for the Plan area and help consideration of whether there is justification to utilise an alternative to 10 year average sales as a basis for future planning, a number of factors need to be considered. This paper considers some relatively simple approaches to establishing potential future demand, taking into account the range of uncertainties that exist. It draws on evidence from a range of sources but particularly the North Yorkshire LAA and the equivalent LAAs for other areas.

Requirements for aggregate are generally driven by economic activity, particularly in the construction sector. This paper is being produced at a time when the economy is growing again after a prolonged period of recession during which demand for aggregates has been significantly supressed. Total sales of aggregate from North Yorkshire in 2011 were only slightly more than half the equivalent figure for 2007. Factors which could have an influence on future demand include general growth in the economy, the impact of the Government's current drive for increased delivery of new housing, as well as the undertaking of any major new infrastructure projects requiring large amounts of aggregate. General growth in population could also be a factor. As the market for aggregate worked in the Plan area extends beyond the North Yorkshire boundary, particularly to the North East (Tees Valley) and to West and South Yorkshire, it is helpful to consider relevant factors, including possible supply constraints, in these areas too as they may have an impact on demand for aggregate from North Yorkshire.

1) General growth in the economy.

Overall growth in the economy can be measured through projected growth in Gross Value Added (GVA). However, there is little data available on projected GVA over the time frame of the Minerals and Waste Joint Plan. Long term projections are not available for the North Yorkshire area or market areas served by the Plan area and the nature of any relationship between GVA and demand for aggregate is not clear. Discussion with the York, North Yorkshire and East Riding Local Enterprise Partnership (LEP) has resulted in the provision of the following advice, which is based on interpretation of a range of data including CEBR, ONS, Leeds City Region Econometric Model and others:

Scenario modelling suggests that the North Yorkshire economy will grow at an annual rate of between 1.5% and 3.5% for the next couple of decades.

The rate of growth in North Yorkshire between 2002-2012 was 3% (ONS) but the second half of that period saw annual growth of only 0.8%. Despite this, there are positive signs of recovery at both local and national level.

Short term forecasts of growth predict the UK economy to grow by 3% in 2014 and 2.7% in 2015 (CBI, April 2014) though the post-recession recovery of the North Yorkshire Economy has not been as positive as national recovery rates.

So considering all these factors, it is reasonable to assume that a long term growth rate of 2.5% per annum is the most likely scenario for the North Yorkshire economy plus 1% for best case and worst case scenarios.

For the Tees Valley area (one of the main export market areas for North Yorkshire aggregate) there are no long term GVA forecasts covering the period to 2030. However, the Tees Valley LEP has indicated that it uses as its source for economic related projections the UK Commission for Employment & Skills 'Working Futures' modelling. Specific data for GVA for the Tees Valley (the main export area for North Yorkshire) is not available. This includes a projection that GVA in the North East (presumably the former government office area of Tees Valley and Co. Durham northwards) will grow by 1.5% per annum over the period 2012 to 2022. It has not been possible to obtain a comparable GVA growth figure for other main export destinations (West and South Yorkshire) during preparation of this paper.

It is therefore considered that, if GVA were to be used as a basis for predicting future demand over the plan period, a longer term growth factor in the range of 2.5-3% per annum could be appropriate. This is also broadly in line with recent (April 2014) national forecasts for the construction sector, produced by the Construction Products Association, which indicate relatively high growth (4.5%) in the short term (to 2017) as the sector recovers from recession, levelling out to a longer term rate of between 2.5 and 3%. However, long term forecasting of demand for aggregate based on GVA may not be particularly reliable as there is no reliable long term basis for forecasting GVA itself.

Table 1: Application of 2.5% GVA growth factor to 2013 aggregate sales

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel (mt)	1.50	1.54	1.58	1.62	1.66	1.70	1.74	1.78	1.83	1.87	1.92	1.97	2.02	2.07	2.12	2.17	2.23	2.28
Crushed rock (mt)	2.50	2.56	2.63	2.69	2.76	2.83	2.90	2.97	3.05	3.12	3.20	3.28	3.36	3.45	3.53	3.62	3.71	3.80
Total (mt)	4.00	4.10	4.20	4.31	4.42	4.53	4.64	4.75	4.87	5.00	5.12	5.25	5.38	5.51	5.65	5.79	5.94	6.09

Table 2: Application of 4.5% construction growth factor to 2017 with 3% GVA growth thereafter to aggregate sales

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel (mt)	1.50	1.57	1.64	1.71	1.79	1.84	1.89	1.95	2.01	2.07	2.14	2.20	2.27	2.33	2.40	2.48	2.55	2.63
Crushed rock (mt)	2.50	2.61	2.73	2.85	2.98	3.07	3.16	3.26	3.36	3.46	3.56	3.67	3.78	3.89	4.01	4.13	4.25	4.38
Total (mt)	4.00	4.18	4.37	4.56	4.77	4.91	5.05	5.21	5.37	5.53	5.70	5.87	6.05	6.22	6.41	6.61	6.80	7.01

Projection based on 2.5% GVA over the plan period from a 2013 base (Table 1 above) would result in projected sales for sand and gravel not reaching immediate pre-recession levels by the end of the plan period. For crushed rock projected sales by 2030 would be in line with immediate pre-recession levels. Application of a 4.5% reducing to 3% GVA figure (Table 2 above) would bring sand and gravel sales up to around pre-recession levels by 2030 and crushed rock sales up to a level slightly in excess of typical pre-recession years. However, it is considered unlikely that projection based only on possible GVA growth would provide a robust basis for establishing likely demand for aggregate from the Plan area for a number of reasons. Firstly, as noted above, the link between general GVA growth and demand for aggregate is not clearly established. Secondly, the very low levels of sales in the base year reflects an unusual circumstance of the legacy of a particularly deep recession in the construction sector and future growth in construction activity may not reflect any wider trend in GVA growth. This may be borne out by the fact that projected sales at 2030 (for sand and gravel) under this higher growth scenario are still, by 2030, either below or just reaching pre-recession levels and for crushed rock would be just reaching or slightly exceeding pre-recession levels. It is considered that there is a reasonable expectation, given current relatively strong growth in the economy, that sales in the Plan area over the next few years will recover at a faster rate than envisaged under the scenario of 4.5% growth to 2017 modelled in Table 2 above, although there is no specific data available on which to predict this. Overall therefore it is not considered appropriate to rely solely on predicted GVA growth as a basis for projecting future demand for aggregate produced in the Plan area.

2) Population growth

The publication *Planning 4 Minerals: A Guide on Aggregates*[1] suggests that demand for aggregates in the UK is equivalent to a little under 4 tonnes per head per annum. Population data and projections can therefore be used to assess possible implications for future requirements for aggregate. Population projections through to 2030 and beyond were published in May 2014 by ONS. Available data is summarised in the following table.

[1] Produced jointly by Quarry Products Association, British Marine Aggregates Producers Association, British Geological Survey and Entec

Table 3: Population projections - North Yorkshire and adjacent (data from ONS)

										Projected increase 2021-2031	Difference in projection 2011-2021 compared to 2001-2011	Difference in projection 2021-2031 compared to 2011-2021	Trend in rate of population growth 2011-2031 compared to 2001-2011
North Yorkshire	751,000	796,400	829,000	859,000	45,400	6.0%	32,600	4.1%	30,000	3.6%	-1.9%	-0.5%	Decreasing
West Yorkshire	2,083,200	2,226,100	2,370,000	2,497,000	142,900	6.9%	143,900	6.5%	127,000	5.4%	-0.4%	-1.1%	Decreasing
South Yorkshire	1,266,400	1,343,600	1,407,000	1,463,000	77,200	6.1%	63,400	4.7%	56,000	4.0%	-1.4%	-0.7%	Decreasing
Tees Valley	652,230	662,790	682,000	698,000	10,560	1.6%	19,210	2.9%	16,000	2.3%	+1.3%	-0.6%	Increasing slightly
Total	4,752,830	5,028,890	5,288,000	5,517,000	276,060	5.8%	259,110	5.2%	229,000	4.3%	-0.6%	-0.9%	Decreasing

Table 4: Population generated aggregate demand (based on the assumption that average consumption is 4 tonnes per head)

	Demand 2001 (tonnes) (population from Table 1x4)	Demand 2011 (tonnes) (population from Table 1x4)	Demand 2021 (tonnes) (population from Table 1x4)	Demand 2031 (tonnes) (population from Table 1x4)	Increase 2001-2011	Increase 2001-2011	Projected increase 2011-2021	Projected increase 2011-2021	Projected increase 2021-2031	Projected increase 2021-2031	Difference in projection 2011-2021 compared to 2001-2011	Difference in projection 2021-2031 compared to 2011-2021	Trend in rate of population generated aggregate demand 2011-2031 compared to 2001-2011
North Yorkshire	3,004,000	3,185,600	3,316,000	3,436,000	185,200	6.0%	130,400	4.1%	120,000	3.6%	-1.9%	-0.5%	Decreasing
West Yorkshire	8,332,800	8,904,400	9,480,000	9,988,000	571,600	6.9%	575,600	6.5%	575,600	5.4%	-0.4%	-1.1%	Decreasing
South Yorkshire	5,065,600	5,374,400	5,628,000	5,852,000	308,800	6.1%	253,600	4.7%	224,000	4.0%	-1.4%	-0.7%	Decreasing
Tees Valley	2,608,920	2,651,160	2,728,000	2,792,000	42,240	1.6%	144,840	2.9%	64,000	2.3%	+1.3%	-0.6%	Increasing slightly
Total	19,011,320	20,115,560	21,152,000	22,068,000	1,104,240	5.8%	1,036,440	5.2%	916,000	4.3%	-0.6%	-0.9%	Decreasing

This suggests a possible increase in requirements for aggregate as a result of population growth amounting to approximately 1.95 million tonnes in 2031 compared to 2011. This figure would represent increased demand arising across the whole of North, South and West Yorkshire and the Tees Valley. It should be noted that it is not expected that all the aggregate required as a result of population growth within these areas would need to be supplied from North Yorkshire as aggregate is also supplied into these

areas from other sources. A further consideration is that the estimated per capita consumption for the Yorkshire and Humber area, based on consumption data published by BGS in the collation of the Aggregates Minerals Surveys for 2005 (a year of relatively high total sales) and 2009 (a year of relatively low total sales), is in the vicinity of 2.3 and 2.1 tonnes respectively; very substantially below the national figure quoted in *Planning 4 Minerals: A guide on Aggregates.* For the Tees Valley area the equivalent figures is 1.2 tonnes (2009). If a lower assumed figure of 2.5 tonnes per capita is utilised, the increased requirement for aggregate arising from population growth in 2031 compared to 2011 reduces to around 1.22mt.

Population growth provides only an indirect indication of possible demand for aggregate and data on per-capita consumption rates appears variable and may not therefore provide a reliable basis for predicting demand.

3) Projected housing growth

The Minerals Products Association, in response to Issues and Options consultation on the Joint Plan, has suggested that a comparison could be made between historic rates of housing completions and the planned future rate, as a proxy for wider demand for aggregate, in order to give an indication of future demand in the Plan area. Published information (*Planning 4 Minerals: A Guide on Aggregates*[2]) indicates that 60 tonnes of aggregate is required to build a typical house, with around 400 tonnes in total being required when associated infrastructure is taken into account.

Information on past housing completion rates, published by CLG, has been obtained for the 16 year period 1997/98 to 2012/13 and can be compared with projected housing requirements as indicated in recently adopted or emerging local plans over the 16 year period 2015-2030 (ie the period covered by the MWJP). The detailed data gathered as part of this exercise is provided in Appendix 1 and is summarised in the following table, which presents the information for North Yorkshire and the main external market areas to which aggregate produced in the Plan area is sold. It is recognised that the position with regard to projected house building rates is fluid and the numbers may change, upwards or downwards as plans are finalised or reviewed.

[2] Produced jointly by Quarry Products Association, British Marine Aggregates Producers Association, British Geological Survey and Entec

Table 5: Housing completions and planned growth[3]

	Total Housing Completions over 16 year period (1997/98-2012/13)	**Tonnes aggregate equivalent (at 400t/house)**	**Tonnes aggregate equivalent (per annum)** (ie figure from previous column divided by 16)	**Total projected housing requirement over 16 year period (2015-2030)**	**Tonnes aggregate equivalent (at 400t/house)**	**Tonnes aggregate equivalent (per annum)** (ie figure from previous column divided by 16)
North Yorkshire	27,480	10.99mt	0.69mt	54,638	21.86mt	1.37mt
West Yorkshire	83,990	33.60mt	2.10mt	159,736	63.89mt	3.99mt
South Yorkshire	37,310	14.92mt	0.93mt	82,251	32.90mt	2.06mt
Tees Valley	27,160	10.86mt	0.68mt	27,700	11.08mt	0.69mt
Total	175,940	70.38mt	4.40mt	324,325	129.73mt	8.11mt

Demand for aggregate generated by housing development and associated infrastructure only represents a proportion of total demand for aggregate. The Mineral Products Association has estimated that it accounts for around 15% of total construction activity. However, the Mineral Products Association has also commented that the 400t/house figure is not intended to be used as a basis for predicting demand.

Notwithstanding the range of uncertainty that exists, it is nevertheless considered that projected housing growth could provide a useful contribution to estimating future demand. This is because there is an obvious direct link between house building and requirements for aggregate, as well as a link between house building and requirements for other built infrastructure which will also generate demand for aggregate. Furthermore, data is available which enables a reasonable assessment to be made of the likely scale of house building in both the plan area and key external markets over the majority of the plan period, although again there is some uncertainty over this as plans for housing are prepared and reviewed.

[3] the above figures on projected housing requirements represent a maximum theoretical number (for example where an Authority's plan is based on a projected range of housing numbers the high end range figure has been used and, in some cases, where the period for which an Authority is planning for housing has commenced some of the projected total housing requirement may already have been built).

An alternative way of approaching this method would therefore be to look at the proportionate increase in expected housing completions over the Plan period, compared with historic completions, to generate a percentage increment which could be applied to historic average sales. This is essentially the method suggested by the MPA in response to Issues and Options consultation. The following table compares historic completions with projected future requirements. A 10 year period has been used in each case in in order to facilitate comparison with 10 year average aggregate sales data.

Table 6: Comparison of 10 year forecast requirements 2015-2024 for key aggregate market areas and actual completions for the 10 year period 2003/4-2012/13 (derived from information in Table 5)

Sub-region	Actual completions 2003/4-2012/13	10 year forecast requirements 2015-2024	% change
West Yorkshire	53,750	98,660	+84%
South Yorkshire	23,530	51,410	+118%
North Yorkshire	15,940	34,190	+114%
Tees Valley	15,960	17,320	+9%
Total	109,180	201,580	+85%

As mentioned earlier, it is also necessary to reflect the fact that housing-derived demand for aggregate only represents a proportion of total demand (estimated at around 15% by the Mineral Products Association). In the absence of any other data it is therefore assumed in this paper that around 15% of total demand for aggregate can be apportioned to demand directly or indirectly associated with housing growth.

Taking into account current 10 year average sales (as at 2013) of 2.2mtpa (sand and gravel) and 3.4mtpa (crushed rock) the application of an 85% growth factor to 15% of the current average sales figure would lead to an additional requirement of around 0.28mtpa for sand and gravel and an additional 0.43mtpa for crushed rock. This could lead to demand reaching an annual level of around 2.48mtpa (sand and gravel) and 3.83mtpa (crushed rock). These figures are similar to typical pre-recession annual sales. For sand and gravel the figure is a little below that derived by applying a 4.5% reducing to 3% growth factor (see Table 2) to current sales. For crushed rock the figure is about 0.5mt lower, although in both these cases the projected figure using a GVA growth scenario would not be reached until 2030. However, it should be noted that these assumptions are very dependent on the

proportion of demand for aggregate which is ascribed directly or indirectly to house building, with a higher or lower figure leading to a correspondingly higher of lower projected demand for aggregate. The lack of a very robust basis for defining this proportion is a weakness of this potential methodology. A further consideration with this methodology is that it is considered unlikely that increased demand generated by growth in house building will step up immediately to the predicted higher level, taking into account current low levels of sales and an expectation that rates of house building may increase over time as the economy recovers and local plans are implemented. If this method were to be used as a basis for forecasting if may therefore be necessary to assume a progressive built up in demand to the projected higher level. For current purposes it could be assumed that a progressive increase over the 5 year period to 2018 could be realistic. A possible scenario based on this approach is shown below.

Table 7: Scenario based on projected change in rates of house building

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel (mt)	1.50	1.70	1.90	2.10	2.30	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Crushed rock (mt)	2.50	2.75	3.00	3.25	3.50	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
Total (mt)	4.00	4.40	4.80	5.20	5.60	6.00	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46

4) Impact of supply constraints elsewhere

It is also necessary to consider how the level of demand on the Plan area may be impacted by factors arising outside the area.

Data on aggregates consumption in 2009 in key market areas supplied by the Plan area has been published in the National collation of the 2009 aggregates monitoring survey (BGS). Data on exports from the Plan area to other Yorkshire and Humber sub-regions in 2009 is provided in the NY LAA. This indicates the following:

Table 8: Consumption of aggregates worked in the Plan area

	Land won sand and gravel consumed (kt)	Land won sand and gravel sourced from Plan area (kt)	% consumed originating in plan area	Crushed rock consumed (kt)	Crushed rock sourced from Plan area (kt)	% consumed originating in plan area
West Yorks	810	240	30%	2,332	250	11%
South Yorks	719	107	15%	2,106	177	8%
North Yorks	769	Est 700^	Est 90%^	2,322	Est 1500^	Est 65%^
Total	2,298	Est 1,047		6,760	Est 1,927	

^ No specific data is available for the amount of sand and gravel and crushed rock produced in the Plan area that was consumed in the plan area. However it is considered reasonable to assume that the large majority of both types of aggregate consumed in North Yorkshire originate within the Plan area.

NB - although data on consumption in the Tees Valley is published in the National collation of the 2009 Aggregates monitoring survey a significant volume consumed in that sub-region was of unrecorded origin. However, it is considered reasonable to assume that, based on known exports of sand and gravel and crushed rock from the Plan area to the Tees Valley, exports from the Plan area account for a substantial proportion of total consumption in the Tees Valley.

The above data suggests that a significant proportion of the aggregate consumed in West and South Yorkshire was sourced from outside North Yorkshire. It is also known that aggregate from other sources, such as County Durham, is supplied into the Tees Valley area, although specific figures are not available.

A potential factor which may impact on demand in the Plan area is pressure arising from constraints on availability of good quality sand and gravel elsewhere. In particular, the recent draft LAA for West Yorkshire identifies an expectation that there will be on going constraint on supply of sand and gravel from within West Yorkshire. The draft LAA notes that it had been a concern that West Yorkshire may become totally reliant on import of sand and gravel upon closure of Methley Quarry in Leeds. However, the LAA also notes that there are now two sites with permission, with combined reserves of 1.6mt. Whilst neither of these sites is operational they indicate the potential for a local contribution to supply and therefore supply side factors in West Yorkshire may not lead to a substantial change in the level of imports required in the near to mid term. Other known sources of supply of both sand and gravel and crushed rock into West Yorkshire (besides from the Plan area) include South Yorkshire, East Riding, Derbyshire, the North West Region and the Yorkshire Dales National Park. The West Yorkshire LAA estimates a potential shortfall of around 0.61mtpa of sand and gravel which may need to be met by imports, with around one-third of this amount currently being provided by imports from North Yorkshire. Whilst resources in some of these other areas are known to be constrained, particularly in South Yorkshire where there are likely to be substantial difficulties in maintaining supply of concreting sand and gravel, other sources of imports to West Yorkshire have relatively health reserves, with (for crushed rock) some having the benefit of rail links in to the West

Yorkshire area. It is therefore likely that a proportion of any increased demand arising in the West Yorkshire area will continue to be met by imports from areas other than North Yorkshire.

Taking the above information into account, it is considered that in forecasting demand it may be reasonable to make some allowance for increased demand from West Yorkshire for sand and gravel worked in North Yorkshire. There is no specific basis to quantify this but a potential approach would be to apply a growth factor to the proportion of sand and gravel exported to West Yorkshire and add this to the total projected demand. The only published information on the actual volume of sand and gravel exported to West Yorkshire is based on NYCC survey data and published in the North Yorkshire Sub-region LAA. This suggests that in 2009 c.0.24mt were exported, out of total sales of 1.7mt, equating to around 14%. If it is assumed that any shortfall in indigenous supply from West Yorkshire, as well as imports to West Yorkshire from other sources, will become more constrained over time then it may be reasonable to assume that demand for exports from North Yorkshire will grow at an annual rate higher than that derived by applying a possible North Yorkshire GVA growth factor allowance of 2.5%pa. It could therefore be assumed that the amount of sand and gravel exported to West Yorkshire from the Plan area would grow at a rate of 5%pa. The impact of this potential approach is shown in the following table. For the purposes of this table it has been assumed that the base year position is that 14% of total 2013 sales were exported to West Yorkshire, in line with the proportion exported in 2009.

Table 9: Assumed growth in sand and gravel demand from West Yorkshire

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel exported to West Yorkshire (mt) Assumed 2.5% growth factor	0.210	0.215	0.221	0.226	0.232	0.238	0.244	0.250	0.256	0.262	0.269	0.276	0.282	0.289	0.297	0.304	0.312	0.320
Sand and gravel exported to West Yorkshire (mt) Assumed 5% growth factor	0.210	0.221	0.232	0.243	0.255	0.268	0.281	0.295	0.310	0.326	0.342	0.359	0.377	0.396	0.416	0.437	0.458	0.481
Difference (mt)	0.000	0.005	0.011	0.017	0.023	0.030	0.038	0.046	0.054	0.064	0.073	0.084	0.095	0.106	0.119	0.132	0.147	0.162

This would indicate an additional cumulative demand of around 1.2mt over the whole period, arising as a result of additional demand from West Yorkshire above a general 2.5% growth factor.

As noted above, difficulties are envisaged in maintaining supply of concreting sand and gravel in South Yorkshire. South Yorkshire MPAs are addressing this issue by seeking agreement with MPAs in the East Midlands (Nottinghamshire and Derbyshire) in order to address any shortfall. It is therefore considered unlikely that supply side factors in South Yorkshire will lead to a major increase in call on aggregate from the Plan area. However, in correspondence with the Joint Plan authorities, Doncaster Metropolitan Borough Council (the main producer of sand and gravel in the South Yorkshire sub-region) has indicated that it may not be able to continue, in the longer term, the limited export of sand and gravel to the North Yorkshire sub-region that currently takes place (estimated at between 8 and 38kt in 2009). It may therefore be reasonable to allow an additional factor for this in any demand forecast for the Plan area. This could be achieved by assuming that that an additional 30kt pa of sand and gravel would be required over the 10 year period 2021 to 2030, leading to a total additional requirement of 0.3mt.

East Riding of Yorkshire Council is the largest source of imports of sand and gravel into the North Yorkshire, averaging 90kt pa over the 4 year period 2009 to 2012. In correspondence, East Riding of Yorkshire Council has indicated that a key permission for sand and gravel working expires in 2025. An alternative site or extension would be needed to ensure continued availability of supply after that date and it is not yet clear whether a suitable site will be forthcoming. It is therefore possible that, over the period 2026 - to 2030, there would some potential for reduced export capability to North Yorkshire, although the extent of this is difficult to quantify. Taking into account current uncertainty over the impact, if any, of this issue on the Plan area it is not considered necessary to factor in an increased allowance for local supply at this stage.

A Local Aggregates Assessment for the Tees Valley area has not yet been produced but it is not anticipated that there will be a significant change in the general scale of demand from the Tees Valley area compared with the historic situation, especially as the area has generally lower economic and housing growth forecasts. Sand and gravel is also imported into the Tees Valley from Durham, where there are no near term constraints on supply of either sand and gravel or crushed rock. There are also significant imports of marine aggregate into the Tees with safeguarded wharfs in the Tees Valley Minerals and Waste Plan. A substantial unimplemented sand and gravel permission also exists in the Tees Valley area. Overall therefore it is considered that, whilst exports of sand and gravel from North Yorkshire into Tees Valley are likely to continue in line with the current position, there is no

expectation of a significantly increased call on North Yorkshire's resources. This position has generally been confirmed in correspondence with other mineral planning authorities in the North East but may need to be reviewed when a LAA for the Tees Valley area is produced.

The above analysis has focussed on sand and gravel as it is this mineral type that is subject of greatest supply constraints in the area. However, correspondence has also taken place with other mineral planning authorities known to export significant quantities of crushed rock into North Yorkshire. This generally indicates that substantial problems in maintaining supply of crushed rock are not envisaged over the timeframe of the Plan (ie to 2030). However, an important issue to consider is the role of the Yorkshire Dales National Park (YDNP) in the supply of crushed rock. The YDNP lies within the NY sub region but outside the area covered by the Joint Plan.

Historically, the YDNP has been a major supplier of crushed rock, with exports mainly into remaining areas of Y&H (particularly West Yorkshire) as well as the North West Region. Data for 2009 suggests that 395kt of crushed rock from the YDNP was sold into the North Yorkshire sub-region. A separate local plan for the YDNP is currently being prepared and will contain policy on aggregate quarries. A draft Plan published in May 2014 indicates that the two sites in the Park supplying crushed rock (excluding sites supplying high polished stone value limestone which does not exist in the Joint Plan area) are due to expire in 2030 and 2042. Substantial permitted reserves exist at these sites and the overall crushed rock landbank in the YDNP is around 26 years. The YDNPs current preferred approach is to support the principle of limited extensions in time, area or depth within the current quarry footprint, provided certain environmental criteria are met. Overall therefore, whilst the overall objective of Government policy is to maintain landbanks of aggregate outside national Parks, it is not considered likely that significant supply constraints within the YDNP will impact on demand for crushed rock from the Joint Plan area over the period to 2030.

5) Major infrastructure projects

A further factor which should be considered is that a range of individual infrastructure projects may generate a significant requirement for aggregate, for example major road schemes and other large scale development projects. Linking these directly with requirements for aggregate from a particular area can be problematic as it may be possible for them to be supplied by

aggregate from a variety of sources. For example major infrastructure projects in West Yorkshire may be capable of being supplied by aggregate from rail linked sources in the Midlands as well as, or instead of, by road from more local sources and this will be determined by commercial considerations.

There are a range of planned major infrastructure projects currently underway or under consideration in the main areas supplied by aggregate from the Plan area. However, the draft West Yorkshire Local Aggregate Assessment does not identify any specific projects which are likely to lead to an unusually high level of demand for aggregate (although the LAA does refer to the growth expectations for the area and the associated need for further employment opportunities and improvements in infrastructure). The draft South Yorkshire LAA identifies only the proposed HS2 scheme as potentially leading to an unusually high requirement for aggregate, although this would not be expected to take place until 2025 at the earliest.

The North Yorkshire LAA refers to major road building projects, particularly the A1 upgrade (Leeming to Barton) and the construction of the Bedale, Aiskew, Leeming Bar bypass. The A1 upgrade to motorway standard is now under construction and is expected to be completed by 2017. Construction of the Bedale, Aiskew, Leeming Bar bypass is expected to commence shortly and be completed within a similar timeframe. Both these schemes are likely to lead to a substantial requirement for aggregate. However, it should be noted that upgrading of the A1 to motorway standard has been taking place progressively throughout North Yorkshire over the past decade or more and demand from this type of construction activity will already be reflected in historic sales over the equivalent period. The current A1 upgrading activity is therefore not expected to constitute an unusual level of demand in the context of this area. It should also be noted that the current works are likely to represent the last major phase of A1 upgrading activity within reasonable proximity of North Yorkshire aggregate resources. It is therefore possible that future demand for North Yorkshire aggregate for major road building activity could decrease in the relatively near future, although other potential major developments in the area, such as the Allerton Waste Recovery Park and the proposed York Potash project, could offset any reduction in demand from road construction. A local aggregates assessment for the Tees Valley area has not been produced at the date of preparation of this paper.

Overall, it is considered unlikely that current known specific infrastructure projects are likely to lead to an unusually high demand for North Yorkshire aggregate in the context of historic sales averaged over a 10 year period. The impact of major infrastructure projects on demand form the Plan area is therefore considered to be neutral.

Conclusions

This paper has considered a number of possible options for generating a demand forecast for aggregate from the North Yorkshire, York and North York Moors National Park plan area to consider alongside a projection based on 10 year average sales.

All the methods considered have some disadvantages. These mainly arise out of the lack of a reliable, direct and quantifiable, link between the factor and demand for aggregate. In seeking to identify a method, it is also important to bear in mind the potential for 'double counting' of growth factors. For example any demand projected from growth in population would overlap with growth in demand projected from increased housing completions and the latter, together with other infrastructure projects, with GVA growth in the construction sector.

Linking aggregates demand directly to population growth is unlikely to be robust as the available information does not present a clear picture of the scale and nature of any inter-relationship. There is no clear signal from current planned specific infrastructure projects over the time period to 2030 and it is concluded that this should be viewed as a neutral influence on aggregate demand. Whilst it may be expected that there will be some connection between GVA growth and demand for aggregate the nature of the inter-relationship is not clear and GVA is difficult to forecast with any confidence over the timeframe of the Plan. On the other hand such a method has the benefit of relative simplicity and may fit, certainly in the near to mid-term, with the wider economic picture as the economy emerges from recession and construction activity increases. Linking demand for aggregate with the scale of future housing requirements has advantages, as there is a direct link between house building and demand for aggregate and the proposed rate of house building can be projected over the plan period. On the other hand the quantitative relationship between house building and requirements for aggregate is not clear and there are still some uncertainties over the numbers of houses planned to be built in the market areas served by North Yorkshire over the period to 2030. A further factor which may need to be taken into account is the potential for a relative increase in demand by West Yorkshire for concreting sand and gravel in response to supply constraints in that area, as well as the impact of expected supply constraints in Doncaster. Again it is not possible to quantify the scale of any such increased demand with any precision.

Any method will therefore need to rely on a number of assumptions and it is considered that there may be risks involved in adopting an overly sophisticated approach. The NPPF requires that account should be taken of 10 year historic sales and other relevant

local information. It may therefore be appropriate to take a balanced view based on a range of information, including 10 year historic sales, in identifying the level of demand to be planned for. The following table summarises the potential implications for demand of the various methods considered, focussing on those which are considered to have most potential in contributing to a reliable forecast of demand:

Table 10: Comparison of alternative methods for predicting demand

	Projected annual demand for sand and gravel 2020	Projected annual demand for sand and gravel 2030	Projected cumulative demand for sand and gravel to 2030	Projected annual demand for crushed rock 2020	Projected annual demand for crushed rock 2030	Projected cumulative demand for crushed rock to 2030
10 year average historic sales[4]	N/A	N/A	39.6mt	N/A	N/A	61.2mt
GVA growth at 2.5%[5]	1.8mt	2.3mt	33.6mt	3.0mt	3.8mt	56.0mt
GVA growth at 4.5%/3%[6]	2.0mt	2.6mt	37.0mt	3.3mt	4.4mt	61.7mt
Linked to proportionate change in housing growth (assume 15% of total demand is derived directly or indirectly from house building)[7]	2.5mt	2.5mt	42.0mt	3.8mt	3.8mt	64.8mt
Additional factor for major infrastructure development	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Additional factor for impact of stronger demand from West Yorkshire[8]	0.05mt	0.16mt	1.2mt	N/A	N/A	N/A
Additional factor for impact of sand and gravel supply constraints in South Yorkshire[9]	N/A	0.03mt	0.3mt	N/A	N/A	N/A

[4] Based on figures presented in NY LAA May 2014 using 2013 base date

[5] Using 2013 base date sales from 2014 aggregates monitoring survey of 1.5mt sand and gravel and 2.5mt crushed rock

[6] Using 2013 base date sales from 2014 aggregates monitoring survey of 1.5mt sand and gravel and 2.5mt crushed rock. Assumes 4.5% growth to 2017 and 3% thereafter

[7] Using current 10 year average sales as base position (2.2mt sand and gravel and 3.4mt crushed rock) and assumes full additional requirement applies from 2019 onwards with progressive build up in preceding years.

[8] Assuming that the proportion of sand and gravel exported to West Yorkshire grows at 5%pa rather than 2.5%pa North Yorkshire GVA estimate

[9] See discussion in Section 4 above

The summary shows that the various methods considered produce a range of results, with the 10 year average sales figure representing an approximate mid point for both sand and gravel and crushed rock. This suggests that the 10 year average sales figure may currently be of some value as an indicator of the likely scale of future demand. However, the discussion in this paper suggests that there are other factors that need to be considered in generating a forecast of demand. These include the prospect of increased rates of housing building across the various market areas supplied by the Plan area, as well as the prospect of some additional demand from West Yorkshire, particularly in the longer term, as a result of supply issues in that area. Probable longer term sand and gravel supply constraints in South Yorkshire are also a factor. It is therefore considered, particularly for sand and gravel, that it could be appropriate to provide for some additional allowance above the 10 year historic average figure.

In conclusion, taking into account the range of issues raised in this paper, it is suggested that the following figures could provide an appropriate indication of likely demand over the period to 2030.

For sand and gravel a figure of 43.5mt over the 18 year period 2013 to 2030
For crushed rock a figure of 64.8mt over the 18 year period 2013 to 2030

These figures are based on a 2013 base date to facilitate use of the most up to date data and to help with comparison across the various forecasting methodologies considered. As the Minerals and Waste Joint Plan will provide for mineral supply over the period 2015 to 2030 it would be necessary to make an adjustment to the above figures to reflect the 16 year planning period. It is considered that this adjustment could be made by deducting known sales for 2013 (based on the most recent annual monitoring sales), together with projected sales for 2014 based on Table 7 above.

This would lead to the following figures being used for plan-making purposes:

Table 11: Demand forecast for the period 2015-2030

	Forecast requirement 2013-2030 (mt)	**Allowance for sales 2013 and 2014 (mt)**	**Forecast requirement 2015-2030 (mt)**	**Forecast requirement 2015-2030 (annual equivalent) mt**
Sand and gravel	43.5	(1.5+1.7) = 3.2	40.3	2.52
Crushed rock	64.8	(2.5+2.75) = 5.3	59.5	3.72

Appendix 1

Data

Housing Projections for planning authorities / counties

The following table shows the projected housing forecasts for the North Yorkshire sub-region and adjoining areas. The latest known sources of information have been used and assumptions made on the anticipated housing requirements over the joint plan time frame. Where annual figures were provided by the local authority these have been used to project the requirement over the plan period. Where no annual figures are available an assumption has been made that rate of requirement will be consistent with previous years. These calculations are identified in the italicised brackets within the table.

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015- 2030)
West Yorkshire						**159,736**
Leeds	74,000	3,660 (2012-17) 4,700 (2018>)	2012 - 2028	Core Strategy under Examination. Gross figure.		(3x3660)+(13x4700)
Bradford	42,100	2,200	2011 - 2028	Core Publication Feb 2014		(16x2,200)
Calderdale	8500 – 10,000	555 *(10,000/18 year plan period)*	2012 - 2029	Core Strategy Preferred Options 2012	Currently updating housing figures	8,888 (16x555)
Kirklees	22,470	1,123 *(22,470/20 year plan period)*	2010 - 2028	Submission Core Strategy April 2013	The submission Core strategy has been withdrawn. No further information is available	17,968
Wakefield	28,800	1,600	2008 - 2016	Adopted Core Strategy 2009		25,600 (16x1,600)

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015-2030)
Tees Valley						**27,700**
Darlington	3,750	265pa (2016-21) 395pa (21-26)	2016 - 2026	Adopted Core Strategy (2011)		(6x265)+(10x395)
Hartlepool	2,400		2012 - 2027	Publication Local Plan	withdrawn	2,400 (16x150)
Redcar	2,700	270pa	2011 - 2021	Adopted Core Strategy		(16x270)
Stockton-On-Tees	6,940	555pa	2011 - 2024	Adopted Core Strategy		(16x555)
Middlesbrough	6,970	410	2012-29	New local plan – Housing section submission version March 2014	5,540	6,560 (16x410)
Durham	31,400	1,570 *(31,400/20 year plan period)*	2011 - 2030	Local Plan Submission Version (2014)		**25,120** (16x1,570)
					4,320	
					8,880	

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015-2030)
North Yorkshire sub-region						**54,638**
Craven	2,400	160			Draft figure of 160 pa 2012 - 2027 agreed by Members in Oct	2560 (16x160)
Hambleton		290* 260**	*2011-16 **2016 - 2026	Core Strategy adopted in 2007 and Site Allocations DPD adopted in 2010. At April 2012		4,190 (1x290+15x260)
Harrogate	7,800	390	2004 - 2024	Core Strategy adopted in 2009.		6,240 (16x390)
Richmondshire	3,060	180	2011-2028	Submission version of local plan		2,880 (16x180)
Ryedale	3,000	200	2012-2027	Adopted Local Plan sep 2013		3,200 (16x200)

Scarborough	9245-7900 *	485-415*		Objectively assessed Housing Needs Paper. Updated 2014.	*annual requirement will depend on the outcome of the potash application. Higher figure with, lower without. For the purposes of this exercise the higher requirement has been used.	7,760 (16x485)
Selby	7,200	450	2011-2027	Adopted Core Strategy 2013		(16x450)
Yorkshire Dales NP	231	12	2012 - 2025	Housing Development Plan 2012		192 *(16x12)*
North York Moors National Park	468	26	2008-2026	Adopted Core Strategy (2008)	No housing target is set but the Core Strategy Identifies the estimated likely level of housing growth.	416 *(16x26)*
York		1250		Preferred Options Consultation	Preferred approach as set out in the PO consultation 7,200	**20,000** *(16x1250)*

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015-2030)
South Yorkshire						**82,251**
Doncaster	20,910	1,162	2011 - 2028	Adopted Core Strategy	Annual figure calculated from total requirement divided by plan period (in years)	18,587 (1,162x16)
Rotherham	12,750	850	2013-2028	Submission Doc 2012		13,600 (16x850)
Sheffield		1,425		Adopted Core Strategy	Commencing work on new strategy following housing supply issues	22,800 (16x1,425)
Barnsley		1,704 pa	(2008-26)	Adopted Core Strategy 2011		27,264 (16x1,704)

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015-2030)
Cumbria						**32,724**
South Lakeland	7,495	468	2009 - 2025	Adopted Core Strategy		(16x468)
Eden	4,110	274	2009/10 – 2024/25	Adopted Core Strategy		(16x274)
Barrow-in-Furness	n/a	n/a	To 2016	At start of new Local Plan process – current housing policies only up to 2016	No information available on website	
Copeland	4,150	230 (+20%) pa first 5 years 300pa x 10 years	2012 - 2027	Adopted Core Strategy Dec 2013	Additional 20% at start of plan leads to a 10% over remaining plan	4,752 (14x300)+ (2x276)
Allerdale	5,167	300	2011 - 2028	Pre-Submission Draft	7,488	(16x300)
Carlisle	n/a	550-650 pa		Preferred Options Summer 2013	4,384	10,400 (16x650)
Lake District National Park	900		2010 - 2025	Adopted Core Strategy. Estimate of provision rather than target.		900

Areas	Projected number	Annual Requirement	Timeframe	Source	Notes	Forecast over joint Plan period (2015-2030)
Former Humberside					4,800	**56,576**
East Riding	23,800	1,400	2012-2029	Strategy Document- Proposed Submissions document Jan 2014		(16x1,400)
Hull	14,400	760	2011	Issues and Options Consultation may/June 2014		12,160 (16x760)
N Lincolnshire	12,063	754	2010-2026	Adopted Core Strategy 2011		12,064 (16x754)
North East Lincolnshire	9,330	622	15 years	Issues and Options Statement		(16x622)

22,400

Table Housing Completions 1998/99-2012/13

The following table shows the number of housing completions in North Yorkshire and adjoining areas over a 16 year period.

Adjoining Areas	1997/98	1998/99	1999/ 2000	2000 /2001	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
West Yorkshire	5,410	5,170	4,870	5,160	4,900	4,730	6,180	6,700	7,130	6,190	7,850	5,410	3,340	3,810	3,900	3,240	83,990
Cumbria	1,230	1,380	570	1,030	1,470	1,400	1,080	1,110	1,400	1,240	1,030	850	780	660	1,020	850	17,100
Tees Valley	2,940	1,940	2,100	1,820	780	1,620	1,470	1,570	1,670	2,270	2,370	1,420	1,560	1,100	1,150	1,380	27,160
South Yorkshire	2,680	2,730	890	1,640	2,380	3,460	1,550	1,950	2,460	1,470	2,930	3,270	2,200	2,790	2,780	2,130	37,310
Durham	1,490	1,330	1,120	1,110	1,520	1,390	1,720	1,320	2,080	2,600	2,510	1,310	1,120	1,110	1,290	950	23,970
York	1,220	860	-	-	540	650	410	470	850	490	300	240	540	370	250	250	7,440
Craven	*140*	*90*	*-*	*-*	*110*	*150*	*160*	*80*	*80*	*50*	*90*	*90*	*130*	*90*	*200*	*40*	1,500
Hambleton	*250*	*230*	*-*	*350*	*-*	*-*	*120*	*150*	*290*	*230*	*270*	*-*	*120*	*170*	*140*	*40*	2,360
Harrogate	*630*	*490*	*520*	*570*	*290*	*450*	*380*	*270*	*310*	*250*	*300*	*200*	*190*	*160*	*90*	*50*	5,150
Richmond	*90*	*160*	*-*	*70*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*10*	*50*	*50*	*70*	500
Ryedale	*260*	*110*	*120*	*-*	*60*	*150*	*110*	*70*	*80*	*110*	*180*	*100*	*160*	*120*	*180*	*150*	1,960
Scarborough	*280*	*190*	*160*	*240*	*190*	*370*	*230*	*310*	*170*	*210*	*310*	*-*	*130*	*120*	*240*	*90*	3,240
Selby	*380*	*220*	*270*	*310*	*200*	*170*	*300*	*360*	*430*	*820*	*540*	*230*	*260*	*360*	*260*	*280*	5,390
North Yorkshire	2,040	1,480	1,070	1,540	850	1,290	1,300	1,240	1,360	1,670	1,690	660	970	1,000	1,160	720	20,040
East Riding	1,790	1,260	-	1,050	960	1,060	1,290	860	850	800	650	380	320	440	-	-	11,710
Hull	520	410	220	300	460	540	-	-	-	890	620	390	230	300	60	630	5,570
North Lincolnshire	1,580	-	-	-	-	-	530	-	1,130	660	480	350	290	340	20	260	5,640
North East Lincolnshire	240	-	-	-	260	200	500	430	190	470	200	230	220	390	70	-	3,400

Source: CLG (2014) Live Table 253 - House building: permanent dwellings started and completed, by tenure and district, Housing Completions Monitoring Data

Comparison of 10 year forecast requirements 2015-2024 for key aggregate market areas and actual completions for the 10 year period 2003/4-2012/13 (derived from information in above tables)

Sub-region	Actual completions 2003/4-2012/13	10 year forecast requirements 2015-2024	% change
West Yorkshire	53,750	98,660	+84%
South Yorkshire	23,530	51,410	+118%
North Yorkshire	15,940	34,190	+114%
Tees Valley	15,960	17,320	+9%
Total	109,180	201,580	+85%

Sources of Information:
http://www.hambleton.gov.uk/Hambleton%20District%20Council/Planning/LDF/NYSHMAAppendix2Hambleton201111FINAL.pdf

Source: CLG (2010) Live Table 253 - House building: permanent dwellings started and completed, by tenure and district, 2004/05; City of York UA (2010) Housing Completions Monitoring Data

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South Lakeland Core Strategy : http://www.southlakeland.gov.uk/building-and-planning/the-local-plan/core-strategy/
Copeland Adopted Core strategy : http://www.copeland.gov.uk/sites/default/files/attachments/copeland_local_plan_2013_2028.pdf
Allerdale submission draft : http://www.allerdale.gov.uk/downloads/CD1_Allerdale_Local_Plan_part_1_Pre-submission_draft__May_2013.pdf
Carlisle preferred option summer 2013:
http://www.carlisle.gov.uk/downloads/31_07_13_Draft_Carlisle_District_Local_Plan_Preferred_Options_Consultation_2015-2030_July_2013.pdf
Darlington: http://www.darlington.gov.uk/dar_public/documents/_Place/PolicyRegeneration/PlanningPolicy/CoreStrategy/CoreStrategy.pdf
Redcar and Cleveland: http://www.redcar-cleveland.gov.uk/rcbcweb.nsf/E44B8E899E2616F7802571F6002FBD42/$File/Core%20Strategy%20DPD%20Adoption%20July%202007.pdf
Stockton on tees: http://www.stockton.gov.uk/documents/ert/planning/ldf/CoreStrategyDPD2050133.pdf
Middlesbrough Submission version of Local Plan Housing Document: http://www.middlesbrough.gov.uk/319553D1-17E5-4D22-9F9E-A7AE870C6E5F/FinalDownload/DownloadId-2D2B559760F5628FFA576CC29F8FF5BF/319553D1-17E5-4D22-9F9E-A7AE870C6E5F/CHttpHandler.ashx?id=10374&p=0
Wakefield: http://www.wakefield.gov.uk/319553D1-17E5-4D22-9F9E-A7AE870C6E5F/FinalDownload/DownloadId-3696A216760E3250729B459A6660C37D/319553D1-17E5-4D22-9F9E-A7AE870C6E5F/Documents/Planning/Planning%20policy/Local%20Plan/Core%20Strategy/Core_Strategy.pdf
Doncaster: http://www.doncaster.gov.uk/Images/Core%20Strategy%20(Low%20res)%20(3.1MB)37-93646.pdf
Rotherham Submission doc:
http://www.rotherham.gov.uk/corestrategyexamination/downloads/file/34/rsd01_publication_core_strategy_june_2012

Sheffield Adopted core Strategy: https://www.sheffield.gov.uk/planning-and-city-development/planning-documents/local-plan/core-strategy.html
Barnsley: https://www.barnsley.gov.uk/media/Development%20-%20Planning%20and%20Transportation/Planning%20Policy/LDF/Core%20Strategy%20Submission/Adopted%20Core%20Strategy.pdf
Ryedale : http://www.ryedaleplan.org.uk/attachments/category/12/Local_Plan_Strategy_text_only_version_5_sept_13.pdf
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Hull I&O Consultation: http://hullcc-consult.objective.co.uk/portal/localplan/io14?pointId=1398177600475
East riding: http://hullcc-consult.objective.co.uk/portal/localplan/io14?pointId=1398177600475
North Lincolnshire core strategy (2011) http://www.planning.northlincs.gov.uk/planningreports/corestratergy/adopteddpd/FullCoreStrategy.pdf

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