16 Cumulative Effects

16.1 INTRODUCTION

16.1.1 This chapter assesses the potential for significant cumulative environmental effects arising from the Proposed Development. Cumulative effects comprise the combined effects of reasonably foreseeable human induced changes within a specific geographical area and over a certain period of time, and can be both direct and indirect. Assessment of the significance of cumulative effects needs to be undertaken in the context of characteristics of the existing environment.

16.1.2 There will be instances where specific environmental effects will result in a wider ranging or more significant impact as a result of the scheme. Certain environmental factors may interact with each other causing different effects. In this section the most important of these interactions will be assessed briefly drawing upon the detailed information under the relevant environmental topic chapters. This is to ensure that all of the developments considered:

- Are mutually compatible;
- Are consistent with guidance on sustainable development and associated good practice; and
- Remain within the environmental capacity of the area and its environs.

16.1.3 The DCLG published consultation draft of '*Environmental Effect Assessment: A Guide to Good Practice and Procedures*' (June 2006) outlined cumulative effects as:

- **Effect Interactions** – The interaction and combination of environmental effects of the Proposed Development affecting the same receptor either within the Site or in the local area (e.g. increased recreational access to and light spill into a woodland area); and
- **In-Combination Interactions** – The interaction and combination of environmental effects of the Proposed Development with committed projects and activities affecting the same receptor. Committed development is defined as development for which consent has been granted (e.g. residents along a road experiencing changes in local air quality and noise levels due to a cumulative increase in road traffic from new developments in the area).

16.1.4 The effect interactions associated with the Proposed Development and the in-combination interactions associated with surrounding committed developments are addressed by each technical specialism and summarised in this Chapter. The surrounding committed developments that have been taken into consideration in the assessment of in-combination cumulative effects with the Proposed Development are as follows:

Table 16.1 Developments considered within the cumulative impacts assessment

Reference Number	Address	Date Valid	Description	Status
2011/0714	The Barnsley Market Site and Former CEAG site, Barnsley	21-06-2011	Mixed-use redevelopment, comprising demolition of existing buildings on application site and replacement with retail and leisure elements, including new market, multi-storey car park and surface-level car park, new pedestrian routes, public realm, means of access and landscaping. (Outline)	Approve with conditions
2010/1431	Former YEB Depot, Harborough Hill Road, Barnsley	22-11-2010	Retail Development. Extension of time limit for implementing outline permission (B/05/1339/BA) with reserved matters (2008/1564).	Approve with Conditions

2010/0823	Former Co-op Pioneer Foodstore, Peel Street, Barnsley, S70 2RB	13-07-2010	Redevelopment of former Pioneer store into two retail units with associated car parking	Approve with Conditions
2010/0780	47 Victoria Road, Barnsley	02-07-2010	Residential Development - Conversion of existing building into 5 apartments and construction of 1 block of 16 apartments (2007/2013 Extension of time limit)	Approve with Conditions
2010/0500	37 Church Street, Barnsley, S70 2AH	04-05-2010	Erection of 3 storey office building with basement car parking (extension of time limit B/04/2497/BA)	Approve with Conditions
2010/0356	The Peel Centre Retail Park, Harborough Hill Road, Barnsley South Yorkshire, S71 1JE	29-03-2010	Improved access and service road, car park and associated works at retail park.	Approve with Conditions
2008/1363	Land off Oakwell Lane, Barnsley	29-08-2008	Erection of a block of 8 no. apartments and car parking (Resubmission).	Approve with Conditions
2010/1464	Barnsley College Honeywell Sports Centre, Honeywell Lane, Barnsley, S75 1BP	04-01-2011	Erection of two storey extension to Sports Centre Learning facility to create additional storage with classrooms and ancillary facilities above	Approve with Conditions
2010/1509	Land at Halifax Street / Rockingham Street, Barnsley	22-12-2010	Erection of 14 no. dwellings and associated highway works and public open space provision.	Approve with Conditions
2010/0192	Barnsley College, Honeywell Site, Honeywell Lane, Barnsley	19-02-2010	Erection of centre for sustainable construction and renewable energies with associated highway works, car parking and landscaping.	Approve with Conditions
2009/0169	Former Dixon Trade Direct, Wakefield Road, Barnsley, South Yorkshire, S71 1NF	06-02-2009	Erection of single storey extension to car dealership to form body shop.	Approve with Conditions
2008/1700	155 Wakefield Road, Barnsley, S71 1NG	13-11-2008	Erection of 24 no. two bedroom apartments.	Approve with Conditions

16.2 ASSESSMENT OF POTENTIAL CUMULATIVE EFFECTS ARISING FROM EFFECT INTERACTIONS

16.2.1 The interaction and combination of environmental effects of the Proposed Development in relation to the construction and operational phases of the Proposed Development following the implementation of the recommended mitigation measures, has been assessed based on the content of the technical **Chapters 5-15** of this ES. For the purposes of this assessment negligible effects have not been considered.

Site Preparation and Construction Phase

16.2.2 The very nature of construction activities will result in negative effects associated with noise, vibration, dust, accessibility and a reduction in the quality of views. These negative effects are short-to-medium term and are applicable throughout the construction period. They will vary in intensity to different sensitive receptors at different times and for different durations. Together these negative effects may interact to create further negative cumulative effects and the worst-case scenario has been determined.

16.2.3 The overall interaction of effects on residential receptors populations in the locality of the Site during the site preparation, demolition, earthworks and construction phase, is determined to be of **minor negative to moderate** significance based on worst case scenario. There are negative effects resulting from noise disturbance and vibrations, impact on existing visual resource and light sensitivity although they are likely to be a direct, temporary, short-term effect on receptors following the implementation of mitigation measures. These negative aspects of the site preparation, demolition, earthworks and construction phase are judged to outweigh the positive benefits resulting in minor negative to negligible cumulative effect as a consequence of effect interactions.

16.2.4 The individual technical **Chapters 5-15** have identified suggested mitigation measures that will be required, all of which will need to be incorporated in a comprehensive Construction Environmental Management Plan (CEMP). This CEMP will be fundamental in aiming to control and further minimise any cumulative effects during the construction of the Proposed Development.

Operational Phase

16.2.5 The assessment of effects interaction during the operational phase of the Proposed Development has indicated that there is likely to be a range of cumulative effects of positive significance on the identified common sensitive receptors. The overall effect interactions have been ascertained through a process of evaluation of the negative effects against positive effects.

16.2.6 Local pedestrian and cyclist users of the site and surrounding area are expected to experience a cumulative effect of **minor** to **moderate positive** during the operational phase, with a number of positive effects including: an increase in pedestrian safety; increased benefits to the local economy; improved accessibility; and an improvement in views. The risks to human health at the site will also be reduced below current levels following remediation of contamination and gas protection measures (if required). The noise sensitivity of the residential dwellings on Twibell Street and Burton Road is considered to be high. The magnitude of the residual effect is considered to be low. Therefore, as the design target can be met with suitable mitigation the overall significance of effect from the service yard noise is considered to represent a **minor adverse** impact. Therefore, there is likely to be a direct, permanent, long-term effect on future site users at the site of **minor to moderate positive** significance following the implementation of mitigation measures.

16.2.7 Ecological receptors in close proximity of the site will experience a mixture of positive and negative effects as a result of the operation of the Proposed Development. There is predicted to be a cumulative effect ranging from **negligible** to **minor positive** to **moderate positive** dependent on location of the receptor. The positive effects include a long term positive impact on the existing bat roosts as a result of light mitigation proposed and on trees and vegetation as a result of the habitat management measures. Further positive effects resulting from the Proposed Development including: an indirect reduction in predicted flood risk; improved accessibility; increased benefits to local employment and the local economy; and an improvement of views.

16.2.8 Due to consideration of the drainage and flood risk in the design of the Proposed Development and the mitigation measures described above there will be a combined reduction in the risk to human and ecological receptors at the site. Therefore, there is likely to be a direct, permanent long-term effect on future populations and third parties of **minor positive** effect on future populations and third parties following the implementation of mitigation measures.

16.3 ASSESSMENT OF POTENTIAL CUMULATIVE EFFECTS ARISING FROM THE PROPOSED DEVELOPMENT AND COMMITTED SCHEMES (I.E. IN-COMBINATION INTERACTIONS)

16.3.1 The cumulative effects of the Proposed Development in conjunction with the committed developments confirmed by BMBC are assessed for each individual technical topic and are discussed below:

Socio-Economics

16.3.2 The benefits associated with the proposed development *are set out in chapter 6* and include creation of over 300 FTE jobs, economic investment in the area and the regeneration benefits of the community facilities to be provided.

16.3.3 The other committed developments in the area including the redevelopment of Barnsley Markets will also bring additional community and employment opportunities.

16.3.4 The sensitive receptors that could be affected are the residents of the area particularly Twibell Street, together with existing and future business in the centre and edge of Centre areas. The magnitude of change is therefore noted and there is likely to be a direct, permanent, long-term effect on the population of **major positive** significance.

Traffic and Transport

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.5 At present, there is no specific information on the exact volumes of traffic and their movements resulting from the construction of the Proposed Development. Therefore, an assessment of the construction traffic movements in-combination with the committed developments is not feasible. It is believed that this information would be provided at later stages of scheme development, and a construction traffic management plan to minimise effects on the road network would be prepared. This traffic management plan could then be used to assess in-combination effects with the identified committed developments. Nevertheless, the volume of construction traffic when compared to the existing traffic flows on the highway network would not represent a significant increase and would be well below the 10% increase in traffic set out in the *'Institute of Environmental Assessments Guidelines for the Environmental Assessment of Road Traffic'*.

Operational Phase

16.3.6 The **TA** accompanying the detailed planning application has taken into account a variety of committed developments as specified in **Table 16.1**. Therefore the baseline used in the assessment of effects in **Chapter 5 - Traffic and Transport** is based upon the inclusion of the committed developments in wider area. The subsequent assessment of effects has incorporated the assessment of the committed developments in-combination with the Proposed Development.

16.3.7 Local pedestrian and cyclist users of the Site and surrounding area are expected to experience a cumulative effect of **minor** to **moderate positive** during the operational phase. Whilst there is predicted to be negative effects resulting from NO_2 and wind, there are a number of positive effects resulting from the Proposed Development including: an increase in pedestrian safety; increased benefits to the local economy; improved accessibility; and an improvement in views.

Air Quality

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.8 Sensitive receptors located within 200m of one or more committed developments may be subject to dust and PM_{10} generated by construction activities from the committed developments as well as the Proposed Development unless adequate mitigation measures are employed. The technical chapter of the ES recommends mitigation measures and concludes a minor negative residual effect is likely to occur. Where environmental assessments are available for the committed developments it is anticipated that standard mitigation measures to control the release of dust and PM_{10} from demolition, earthworks and construction activities will be implemented. Therefore it is considered the additional cumulative effect will be negligible. The significance of dust and PM_{10} from construction activities will remain as assessed (**minor negative to negligible**).

Operational Phase

16.3.9 Once the Proposed Development and committed developments are operational, traffic will be generated on the local road network, which will effect local pollutant concentrations (particularly NO_2 and PM_{10}). The greatest effect will be on sensitive receptors located adjacent to those roads likely to experience a change in traffic volume or composition. Traffic data for the committed developments (and others) has been included in the baseline and future

baseline flows. The effect is considered to remain **negligible** to **minor negative** for NO_2 and **negligible** or **neutral** for PM_{10}.

Noise and Vibration

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.10 Construction noise effects arising from the Proposed Development are assessed in chapter 9 and will be mitigated through measures to be set out within the Construction Environment Management Plan. Due to the distance between this site and other committed developments identified there is unlikely to be cumulative impacts arising from the construction activities associated with the site.

16.3.11 It is expected that ground-borne construction vibration levels can be controlled to ensure the magnitude of change is not greater than low.

Operational Phase

16.3.12 The effects of the various operational noise sources considered for the Proposed Development present a potential for in-combination noise effects. At street level, it is expected that road traffic noise will continue to be the overwhelmingly dominant noise source and the introduction of new plant for example will have no significant effect. The industry requirements for fixed plant noise and the plant noise limits identified in **Chapter 9 - Noise and Vibration** are intended to ensure that the effect of the combined plant noise levels from the Proposed Development and other committed developments are not significant.

16.3.13 The sensitivity of the residential dwellings on Twibell Street and Burton Road is considered to be high. The magnitude of effect is considered to be negligible. Therefore, the overall significance of effect from the petrol filling station and car wash activities is considered to represent a **negligible** impact.

16.3.14 The sensitivity of the existing noise sensitive receptors as outlined in **Table 9.43** is considered to be high. Provided that the above plant noise limits are complied with, it is considered that the magnitude of change is predicted to be negligible. Therefore, there is likely to be a **negligible** effect on existing and proposed noise sensitive receptors prior to the implementation of mitigation measures.

16.3.15 In terms of road traffic noise, the modelling based on the TA includes all committed developments and therefore the assessment undertaken for noise already quantitatively assesses cumulative effects on sensitive receptors in **Chapter 9 - Noise and Vibration**.

Ground Conditions and Contamination

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.16 In relation to risks associated with ground conditions and contamination, it is considered that there are no cumulative effects to consider that will affect human health or built environment receptors in combination with other committed developments assessed. This is due to the highly localised nature of the effects that are likely to only affect the immediate working area.

16.3.17 Ground investigations associated with the proposed development site have idenitifed moderate potential for ground contamination to be present. There is therefore potential for contaminants to be present within the soils beneath the southern site from historical contamination.

16.3.18 The redevelopment of the site may have an effect of greater positive significance to the underlying groundwater as a result of the remediation of the soil contamination, and the corresponding reduction in the potential for cross boundary migration of contamination.

Water Resources, Flooding and Drainage

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.19 In terms of in-combination effects on the water course through the site and associated drainage and water infrastructure refer to **Chapter 11 – Water Resource.** Residual effects associated with flooding during the site preparation, demolition, earthworks and construction phase have been considered to be negligible based on the strict accordance of best practice and temporary drainage management. Assuming this is the same for the other committed developments, no in-combination cumulative effects are anticipated to occur.

Operational Phase

16.3.20 The residual effects associated with the operational phase are either negligible or positive associated with an improvement from the baseline conditions as a result of the principles of best practice guidance being incorporated into the design of the Proposed Development. The Flood Risk Assessment and Drainage Strategy have been considered in combination with the committed developments for the area and therefore this has resulted in betterment for the overall area. It has been assumed that the committed developments will also implement similar mitigation measures to reduce water consumption and surface water run-off. Based on this positive cumulative effects are anticipated, however, they are likely to be of **minor** significance.

Ecology and Nature Conservation

Site Preparation, Demolition, Earthworks and Construction Phase

16.3.21 In terms of in-combination effects on the ecology of the site, refer to **Chapter 12 – Ecology and Nature Conservation**. The construction phase has the potential to impact upon the Daubentons bat roost present within the culvert at the western end of the Site, along with the associated foraging and commuting routes of the bats. However these impacts will be mitigated and are localised with no cumulative effects likely on the other committed developments.

Operational Phase

16.3.22 The cumulative effects associated with the operational phase of the site in combination with committed developments are negligible. The mitigation measures proposed result in betterment for the overall area and therefore in cumulative terms a positive effect is anticipated, however, they are likely to be of **minor** significance.

Landscape and Visual Impacts

16.3.23 The visual impact of the proposed development is set out in table 14.8 of **Chapter 14 – Landscape and Visual Impact**. Much of the existing site is brownfield land, with some areas of trees and mature vegetation around the River Dearne. The Proposed Development will enhance the derelict land areas by creating new high quality retail buildings and removing the former gas tank storage container, whilst also traversing a section of currently unlit river corridor containing trees and vegetation. The construction activities are likely to produce an impact as a worst-case scenario of **moderate** to **major negative** significance, although these effects will be temporary and of medium-term duration.

16.3.24 Whilst the supermarket will be particularly visible from Old Mill Lane in views from the south, longer distance views will see the Proposed Development against the context of surrounding industry and transport corridors on the valley sides.

16.3.25 The overall enhancement of the townscape through provision of a new building, the removal of a degraded building and the enhancement of areas of the public realm immediately adjacent should produce an overall cumulative effect on surrounding views and townscape character of **moderate to minor positive** significance.

16.3.26 The overall enhancement of the townscape through provision of new committed infrastructure at the nearby Peel Centre will have a moderately positive effect. Due to the distance between the site and other committed developments the cumulative effect on townscape character is likely to be based on views of each site independently and is therefore considered to be **moderate to minor positive** significance.

Lighting

16.3.27 The reasonably foreseeable committed developments in the surroundings have been included in the assessment in **Chapter 15 - Lighting**. Few of the identified committed developments have the potential to further contribute towards upward light in combination with the Proposed Development, thereby increasing sky glow as viewed from the limited receptors that are anticipated to experience changes to the night-time views. However, it is difficult to comprehensively measure and effectively quantify the sources of light that contribute to sky glow. In addition to this there is no widely accepted methodology or guidance on the assessment of sky glow. Therefore the in-combination effect of sky glow cannot be comprehensively outlined.

16.4 LIMITATIONS AND ASSUMPTIONS

16.4.1 The assessment of effect interactions resulting from the Proposed Development have focused on the residual effects from the site preparation, demolition, earthworks and construction phase and the operational phases following the implementation of mitigation measures. There is an assumption that mitigation measures identified in the individual technical chapters have been incorporated or adopted to mitigate any negative effects resulting from the Proposed Development.

16.4.2 The assessment of cumulative effects has been undertaken taking into account the effects resulting from the Proposed Development in-combination with the committed developments identified in agreement with BMBC.