

CHAPTER 17: CUMULATIVE IMPACTS

Introduction

- 17.1 This chapter provides an assessment of the potential effects of the proposed development in conjunction with changes arising from other developments in the surrounding area. It also provides an assessment of the potential combination of some or all of the effects identified in the EIA on a particular receptor. All past, present and reasonably foreseeable developments have been considered as part of this report.
- 17.2 The requirement for cumulative assessment is stated in the following legislation:
- Directive 85/337/EEC requires the assessment of *'the direct effects and any indirect, secondary, cumulative, short, medium and long term permanent or temporary, positive and negative effects of the project'*;
 - Directive 97/11/EC states that criteria for assessment includes *'the cumulation with other projects'*; and
 - EIA Regulations 2011 state that, *"the characteristics of the development must be considered having regard, in particular to...the cumulation with other development"*.

Methodology

- 17.3 Cumulative effects may be divided into two categories. The first considered in this chapter is the cumulative effects of the proposed development with other proposed developments or projects. These proposed developments or projects should be both reasonably foreseeable in terms of delivery and should be located within a realistic geographical scope where environmental effects could combine to create a more significant change to a particular sensitive receptor. These are referred to as cumulative effects. As part of the re-submission application, a review of any new proposed developments has been undertaken. Indeed, all past, present and reasonably foreseeable developments have been considered as part of this assessment. Consequently, the proposed Bolton Copper Works development at Froghall has been considered in the cumulative assessment.
- 17.4 Cumulative effects can be generated at the construction stage if the sites are in close proximity and construction periods are likely to overlap. However, most construction projects employ regulatory controls and good practice to minimise impacts occurring outside the site boundary.
- 17.5 The effects of cumulative operational impacts can be varied and will depend on the scale, nature and processes/ activities of the proposed development, the location of sensitive receptors, the surrounding proposed developments and the immediate environs.
- 17.6 The second category is concerned with the combination of some or all of the effects predicted by the EIA affecting a particular receptor which may collectively cause a change of greater significance than individually. These are referred to as synergistic effects and have been assessed by professional opinion. An example of a synergistic effect could be construction related visual intrusion, dust, noise

and vibration combining to generate a significant adverse effect affecting a sensitive receptor.

- 17.7 Cumulative and synergistic effects can either be adverse or beneficial and have been assessed using the significance criteria defined in Chapter 2: Approach.
- 17.8 The 2014 Scoping Opinion provided by SMDC requested the assessment of the Crowtrees Farm Equestrian Centre. This development has now been withdrawn from the planning process, and as such has not been assessed as a development with potential cumulative impacts.

Cumulative Effects

- 17.9 This chapter considers the following proposed development as part of the cumulative assessment:

- Adjacent consented solar farm; and
- Bolton Copper Works development, Froghall.

- 17.10 These are described in further detail development.

Adjacent consented solar farm

- 17.11 In December 2015, a 5MW solar farm on adjacent land received planning permission (Reference: SMD/2015/0220). The solar farm is located on land immediately adjacent to the leisure scheme and within the ownership of Laver Leisure. This includes solar development within areas of the former quarry.

- 17.12 The consented development comprises a c. 8.5MWp solar farm to produce renewable electricity obtained directly from the sun using photovoltaic technology. The solar farm will comprise the following:

- PV panels and associated supporting frames and ground mounting;
- 5 low voltage switch gear cabins (housed in prefabricated containers) and transformers
- A substation housed in a prefabricated container to allow connection to the Local Distribution Network;
- Fencing and CCTV;
- Internal service road;
- Temporary set down areas; and
- Site Access.

- 17.13 It is understood the construction on the site is due to start imminently. The solar farm site location and approved site layout plan are presented at **Figures 17.1 and 17.2**.

Bolton Copperworks, Froghall

Following submission of the planning application in October 2014, an EIA Scoping Report (Signet Planning, October 2014) was submitted as part of a request for a Scoping Opinion for the Land at Bolton Copperworks scheme (Ref. SMD/2014/0668). The red line and proposed site masterplan are presented at

Figure 17.3 and **17.4**. This site is identified as a key opportunity site within the Churnet Valley Masterplan (CVM) SPD.

- 17.14 The EIA Scoping report identifies the site as being developed for a variety of new land uses, including residential, employment and tourism related uses. No quantum of development is proposed within the Scoping Report nor has any further submission been made to SMDC since the issue of the Scoping Report. The CVM SPD identifies a development strategy for the site but no specific quantum for site uses have been fixed.
- 17.15 No detailed proposals are available for the Bolton Copperworks site. In order to undertake a cumulative assessment of the Bolton Copperworks site, the following development quantum have been assumed. The development quantum have been derived from the masterplan provided in the EIA Scoping Report and the uses identified in the CVM SPD:
- 215 residential units – based on a total residential area of 7.16ha at 30 development per hectare
 - Employment park (2,250sqm)
 - Visitor centre (2,500sqm)
 - 50 bed hotel
 - Outdoor activity centre – assumed same uses as proposed at Moneystone Park.
- 17.16 The following sections set out the potential cumulative effects of the proposed development on the topic areas covered in the ES.

Socioeconomics

Solar Farm

- 17.17 The construction phase of the solar farm development is anticipated to be just three months. Given the specialist nature of the installation, the nature of the construction activity, and the short timeframe, there would not be any construction labour or contractor supply issues in the local area that would represent a cumulative impact.
- 17.18 There is no notable job creation associated with the operational phase of the solar farm as only occasional maintenance is required.

Bolton Copperworks

- 17.19 This section considers the cumulative effects of the proposed Bolton Copperworks development in addition to the Proposed Development. Drawing upon available information regarding the Bolton Copperworks development, as well as assumptions on scale set out above
- 17.20 Where possible, the assessment focusses upon the cumulative temporary construction effects, as well as relevant cumulative operational effects (visitor economy and employment effects).

Construction Phase

- 17.21 The socio-economic assessment (Chapter 7) concluded that the Proposed Development will deliver minor/moderate beneficial employment and labour market effects during the construction phase. However, in judging cumulative effects, there a number of uncertainties. These include: the timeline for the construction of the proposed Bolton Copperworks development and whether there is any overlap with the construction timelines for the proposed development; the precise level of construction employment that will be supported by the development will depend on the scale and type of construction activity taking place; and the approach taken to construction procurement and maximising local benefit.
- 17.22 Given these uncertainties it is challenging to assess construction phase cumulative effects. However, if the schemes were developed in parallel it is not anticipated that there would be any adverse socio-economic effects arising from this (ie. labour supply effects), while the benefits would be temporary and of minor/moderate significance to the local economy. If the two proposed developments were brought forward sequentially (i.e. one following on from the other), the upside to this scenario would be that the temporary local construction effects would be sustained over a longer period.

Visitor Economy

- 17.23 As outlined in the socio-economic assessment, the proposed development will lead to series of beneficial effects to the visitor economy. The Bolton Copperworks development includes a hotel, as well as outdoor leisure provision which is assumed to be similar to that offered by the Proposed Development. However, it has not been possible to quantify the visitor economy effects of this development without more detailed information on the nature of the hotel offer, occupancy rates, and analysis of visitors/markets targeted etc. That being said, a qualitative view on the cumulative effects are that the development of both schemes will greatly enhance the visitor and leisure offer/capacity in the area, play an important part in attracting visitors to stay and spend in the local economy and compliment other local visitor attractions.
- 17.24 The significance of the cumulative effect of both developments on the performance of Staffordshire Moorland's visitor economy is therefore considered to be **major beneficial** in the long term.

Operational Employment

- 17.25 The latest HCA employment density guidance¹ was used to estimate the level of employment supported by the Bolton Copper Works proposals. In total, it is estimated that the cumulative developments would support around **450 permanent on-site FTE jobs** once operational. Taking into account multiplier effects, a further **110 off site FTE jobs** would be supported.
- 17.26 As outlined in the socio-economic assessment (Chapter 7), the sensitivity of the receptor is considered to be high. In total, **560 FTE jobs** would be created. The magnitude of effects is assessed as medium.

¹ Homes & Community Agency (2015); Employment Density Guide (3rd Edition)

- 17.27 The significance of the cumulative effect on the performance of Staffordshire Moorland's local economy in terms of job creation is considered to be **moderate/major beneficial** in the long term.

Landscape and Visual

- 17.28 Cumulative impacts can be defined as: "*landscape and visual effects that result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments*".
- 17.29 A summary of potential cumulative landscape and visual impacts is provided in Table 17.1 below.
- 17.30 The Bolton Copperworks are not visible from any of the key viewpoints defined for the Site, and therefore and therefore cumulative visual effects have been scoped out of the assessment.
- 17.31 The Bolton Copperworks are located within local landscape character area 1B – *Consall and Froghall* and has therefore been scoped out in terms of cumulative effects on other local landscape character areas. In addition, redevelopment of the Copperworks site are not predicted to result in any cumulative effects on the network on the footpaths, cycleways and bridleway network, and topography, due to the distance from the Site, and the predicted localised nature of the changes.
- 17.32 The solar farm is potentially visible from a number of the principal viewpoints selected in order to determine visual effects. The solar farm has therefore been considered cumulatively in conjunction with the Site and the predicted effects are set out in the table below.
- 17.33 The solar farm is located within local landscape character area 1B – *Consall and Froghall*, and character type 3 (area 3B *Ipstones and Whiston*) and therefore potential cumulative effects on other local landscape character areas have been scoped out.

Table 17.1: Cumulative Landscape and Visual Impacts

Receptor and sensitivity	Residual effect – site only	Description of cumulative effect	Cumulative effect significance – Solar Farm and Bolton Copper Works.
Landscape Character			
National level			
NCA 64: Potteries and Churnet Valley	Negligible	The site does not contribute significantly to reinforcing landscape character as defined at the national level, due to extensive quarrying and subsequent restoration. The solar farm and Bolton Copperworks are not predicted to result in any cumulative effects in conjunction with the Site on landscape character as defined at the national level.	Negligible
Local level			
<i>Type 1: Dissected Sandstone Cloughs and Valleys – Sub Area 1A: Alton and Oakamoor</i>	Negligible	The proposed solar farm application is located outside this local character area boundary, and will therefore not result in additional effects.	Negligible
<i>Type 1: Dissected Sandstone Cloughs and Valleys – Sub Area 1B: Consall and Froghall</i>	Minor adverse	The proposed redevelopment of the Bolton Copperworks site has the potential to contribute positively to landscape character. No cumulative adverse effects are therefore predicted. The southern half of the solar farm will be located within this area. The solar farm will form a minor addition to the landscape character area and the predicted minor adverse impact	Minor adverse
<i>Type 3: Dissected Sandstone Highland Fringe – Sub Area 3A: Ipstones and Whiston.</i>	Minor adverse	The proposed solar farm development is not predicted to result in significant additional effects when considered cumulatively with the Site.	Minor adverse
Footpaths, cycleways and bridlepaths	Moderate beneficial	The solar farm will have no cumulative impacts on footpaths, bridle paths or cycleways.	Moderate beneficial
Topography	Negligible	The solar farm will have negligible cumulative impacts on topography.	Negligible
Views			
Viewpoints 1-15	Negligible	The solar farm will have no additional impacts from the identified views	Negligible
Viewpoint 16	Minor adverse	The solar farm will be visible in conjunction with the Site.	Minor adverse

Receptor and sensitivity	Residual effect – site only	Description of cumulative effect	Cumulative effect significance – Solar Farm and Bolton Copper Works.
Viewpoint 17	Minor adverse	Additional planting proposed around the hub building will provide additional visual screening of the solar farm, resulting in no additional effects.	Minor adverse

Ecology

- 17.34 The potential cumulative effects are considered in respect of the permitted solar farm within former quarry working areas at Moneystone Quarry, and the proposed Bolton Copper Works, Froghall.
- 17.35 The solar farm development consented within former areas of Q1 and Q2 will lead to the loss of areas of the Approved Restoration proposals (approximately 14 ha), most significantly restored MG5 grassland in Q2 and 'open grassland' in Q1. If these affects are not mitigated adequately there will be a Moderate Adverse impact upon neutral grassland in the locality.
- 17.36 The Bolton Copperworks is located approximately 1.5 km to the west of Q3. Detailed development proposals are not know for this site. Information relating to ecological interests was obtained from online sources, principally the Multi Agency Geographical Information Centre (MAGIC www.magic.gov.uk). The site covers approximately 17 ha. It is considered that re-development of this site would not lead to any significant losses of semi-natural habitat. It is possible that legally protected species are present, however it is considered that, due to distance and the lack of semi-natural habitats within the former copper works site, there is little risk of significant impacts upon populations of protected species. The only exception to this might be the presence of roosting bats on the copper works site, which if present could be accommodated via standard mitigation techniques.
- 17.37 The Bolton Copperworks is surrounded by linear areas of ancient and semi-natural woodland which form part of the Churnet Valley SSSI, these habitats would not be affected by the development at Moneystone Quarry (due to distance and small scale, localised terrestrial impacts of the leisure development) and cumulative impacts are not anticipated. Management of woodlands associated with either (or both) of these developments provides an opportunity to deliver positive cumulative gains for woodland habitats.
- 17.38 Froghall meadows and pastures SSSI lies to the east of the copper works and is a network of species rich lowland grasslands, which are similar in some respects to the grassland at Whiston Eaves SSSI and surrounding area. Development of either or both of these sites provides an opportunity to significantly contribute to the management, expansion and connection of species rich lowland grassland in the area. It is therefore considered that there is an opportunity for a significant cumulative gain for this type of habitat, although in the absence of detailed proposals this is not certain.

- 17.39 The Leisure application will negatively impact upon approximately 19.78 ha of terrestrial habitat. It is considered that the long term management proposals of >60 ha of habitat under this application could provide an opportunity for a significant positive gain for wildlife in the local area by increasing species diversity in grassland and extending and managing woodland more favourably.
- 17.40 The Solar farm proposals for mitigation include grassland management within land to the east of Q1. Details of the development of Bolton Copperworks are unknown, however it is assumed that there will be limited loss of semi-natural habitat (previously developed site) and ecological impacts (e.g. protection of off-site habitat, protected species mitigation) could be avoided/minimised by employing standard mitigation techniques. When considering these sites together it is considered that the cumulative effects are **negligible**. It is quite possible (although not certain) that positive impacts particularly upon lowland grasslands and woodland can be delivered.
- 17.41 Operation of the site will lead to increased levels of disturbance which is potentially the most significant cumulative effect if combined with increased disturbance from other similar projects in the area. However, given the small scale nature of development and the abundance of undisturbed (or low levels of disturbance – mainly farming) in the wider area it is considered that these effects are **negligible**.

Archaeology and Heritage

- 17.42 As the consented solar farm scheme is also located within former quarries, there is no potential for surviving archaeological remains, as is the case for the proposed leisure development area. Equally, there are no surviving features of heritage value that would be affected by the proposals in combination. Accordingly, there are no cumulative archaeology and heritage impacts associated with these developments.
- 17.43 It is considered that there will be no cumulative effects upon designated heritage assets from the development of the Bolton Copperworks site; the distance between the proposed development site and the Copper Works ensures that there would be no cumulative effects.

Ground Conditions

- 17.44 The existing lagoons L4 and L7 remain un-capped as part of the revised restoration proposals. This leaves a major risk to invited and uninvited users of the quarry areas and a major restriction to opening the area for public use. The development earthworks for the leisure and solar proposals will provide major benefit by capping these lagoons and allowing access onto their surfaces to occur. In addition better management of currently exposed, potentially unstable rock faces will be achieved therefore providing a moderate to long term **moderate beneficial impact**.
- 17.45 Due to the distance between the Bolton Copperworks site and the proposed development there is not considered to be any cumulative effects in relation to ground conditions.

Drainage and Flood Risk

- 17.46 The drainage strategy for the proposed development has been developed in conjunction with that of the solar farm to produce an overarching drainage strategy for the former quarry. Therefore, the principles of reducing the runoff rate as described in Chapter 12 can be assumed across the site and thus the overall or cumulative impact of the development on drainage would be beneficial.
- 17.47 Due to the distance between the Bolton Copperworks site and the proposed development there is not considered to be any cumulative effects in relation to flood risk and drainage.

Transport and Access

- 17.48 The Solar Farm scheme is considered as cumulative for the purposes of the EIA. Once operational (if permitted) the Solar Farm is expected to generate almost zero traffic and is therefore not expected to generate a cumulative impact in conjunction with this development.
- 17.49 Development at Bolton Copperworks is considered to be committed development within the transport modelling and the cumulative effects are presented within Chapter 13 and the supporting Transport Assessment (**Appendix 13.1**).

Air Quality

Construction Phase

- 17.50 Institute of Air Quality Management (IAQM) guidance suggests that for the construction phase effects consideration should be given to a distance of up to 350m (for human receptors) and 50m (for ecological receptors) from the development site boundary. Therefore where one or more development sites are located in close proximity and their construction periods overlap, cumulative effects may be experienced at those receptors located within a 350m radius of each development site.
- 17.51 The duration of the solar farm development is anticipated to be very short term (3 months). If any of the construction works occur at the same time as the proposed development site there would be the potential for cumulative effects from the generation of dust and PM₁₀ on receptors within a 350m radius of the sites, but for a very limited time.
- 17.52 It is, however, assumed that best practice dust control measures will be implemented during the construction phase, of the solar farm, which will reduce the potential for cumulative effects to occur. Assuming such mitigation measures are implemented, the overall cumulative residual effect for dust and PM₁₀ is considered to remain of negligible significance, short-medium term, temporary and local in effect.
- 17.53 In addition, where one or more developments are under construction at the same time it is possible that construction vehicles will use the same access routes which could potentially increase local pollutant concentrations in the short-medium term.

It is, recommended that routes for all construction traffic are identified and agreed with SMBC prior to commencement of works to help reduce the likelihood of construction vehicles passing along sensitive roads (i.e. residential roads, congested roads, via unsuitable junctions). The residual cumulative effect of emissions from construction traffic associated with the solar farm is therefore considered to be direct, temporary and of **negligible** significance.

- 17.54 There is some potential for construction phase overlap between the proposed development and the proposed Bolton Copper Works development. However, the two developments are separated over 1km. IAQM guidance on the assessment of dust from construction states that any impacts are negligible beyond 350m from construction works, or 100m from haulage roads to a distance of 500m from the site. As such, the separation of the two developments will ensure that significant cumulative construction air quality effects would not arise.

Operational Phase

- 17.55 The assessment of operational traffic impacts set out in Chapter 14 is inherently a cumulative assessment in that it is wholly based on future year traffic projections which make allowance for general traffic growth in the area and the development traffic from the Bolton Copper Works. Roadside pollutant concentrations have been predicted for the following scenarios:
- 2020 Year of completion without scheme flows and Bolton Copper works;
 - 2020 Year of completion with scheme flows and Bolton Copper Works
 - 2035 (Year of completion +15 years) without scheme flows + Bolton Copper Works Flows.
 - 2035 (Year of completion +15 years) with scheme flows + Bolton Copper Works Flows.
- 17.56 Pollutant concentrations in all scenarios are modelled to be well within the air quality objectives and the impact of the scheme flows is judged to be slight adverse at the most affected receptors, even when taking the cumulative traffic growth into account. Overall, the impact of the scheme on ambient air quality is **negligible** in significance.
- 17.57 The solar farm will generate almost zero operational traffic. Therefore, the air quality assessment is considered to include for the cumulative effect of future developments that could affect the local road network surrounding the proposed development site.

Noise

Construction Phase

- 17.58 The solar farm construction timetable is not currently known but is likely to only take 3 months in total. If any of the construction works occur at the same time as the proposed development site there would be the potential for cumulative noise and vibration effects to arise.
- 17.59 It is, however, assumed that best practice noise and vibration control measures will be implemented during the construction phase of both the solar farm and the Proposed Development, which will reduce the potential for cumulative effects to

occur. Assuming such mitigation measures are implemented, the overall cumulative residual effect for noise and vibration is considered to be of minor to negligible significance, short term, temporary and local in effect.

- 17.60 The proposed Bolton Copper Works development is at an early stage in the planning system and there is therefore the potential for the construction period of this development to overlap with that of the proposed development. However, the two developments are separated by a notable distance of approximately 1.4km at the closest point. This distance alone is anticipated to be sufficient to ensure that significant cumulative construction noise and vibration impacts would not arise.

Operational Phase

- 17.61 Notwithstanding that traffic generation from the solar farm would be anticipated to be minimal, this is now operational and any trip movements form part of the baseline conditions. No significance cumulative impacts are therefore anticipated to arise.
- 17.62 In comparison, there is the potential for both the Bolton Copper Works and the proposed development to become operational at the same time. Accordingly, a series of cumulative road traffic noise levels predictions have been undertaken, following the same approach as detailed within the '*Development Generated Road Traffic Noise on Existing Receptors*' section of Chapter 15 of this ES (noise and vibration).
- 17.63 Road Traffic noise level predictions have been undertaken for the following scenarios:
- 2020 Year of completion without scheme flows;
 - 2020 Year of completion with scheme flows;
 - 2020 Year of completion with scheme flows and Bolton Copper Works
 - 2035 (year of completion + 15 years) without scheme flows;
 - 2035 (Year of completion + 15 years) with scheme flows; and
 - 2035 (Year of completion +15 years) with scheme flows + Bolton Copper Works Flows.
- 17.64 Analysis of the scheme traffic data identifies that of the transportation network considered within this assessment, the Bolton Copper Works development would only distribute development generated road traffic onto the road links referenced 1 (A52 west of Eaves Lane) and 2 (A52 east of Eaves Lane). The resulting noise levels changes for these two routes are presented in Table 17.2, for the following comparisons:
- 2020 (year of completion) with scheme flows minus 2020 year of completion without scheme flows (i.e. effect of proposed development only)
 - 2020 (year of completion) with scheme flows + Bolton Copper Works flows minus 2020 year of completion without scheme flows (i.e. cumulative effect of proposed development and Bolton Copper Works development).
 - 2035 (year of completion + 15 years) scheme flows minus 2020 (year of completion) without scheme flows (i.e. effect of proposed development and natural traffic growth); and

- 2035 (year of completion + 15 years) with scheme flows + Bolton Copper Works development minus 2020 (year of completion) without scheme flows (i.e. cumulative effect of proposed development and Bolton Copper Works development and natural traffic growth).

Table 17.2: Predicted Changes in Road Traffic Noise Levels Resulting from Operation of the Development and Bolton Copper Works Development, Free-field, dB, LA10,18hour

Link	Road Section	2020			2035		Change in Noise levels (B-A), (C-A), (D-A), (E-A)
		Baseline (A)	With Dev (B)	With Dev + BCW (C)	With Dev (D)	With Dev + BCW (E)	
1	A52 west of Eaves Lane	61.5	62.2	64.1	63.0	64.5	0.7, 2.6, 1.5, 3.0
2	A52 east of Eaves Lane	61.5	62.0	64.5	62.8	64.9	0.5, 3.0, 1.3, 3.4

Dev = Proposed development
BCW = Bolton Copper Works Development

- 17.65 It can be seen from Table 17.2 that in the year of opening (2020) the cumulative noise level increase (C-A) is calculated to be 2.6dB(A) for Link 1 and 3.0dB(A) for Link 2. These level changes correspond to Low and Medium impact magnitudes respectively in the short term. However, it should be noted that of these increases, there is minimal contribution from the proposed development (i.e. B-A = 0.7dB and 0.5dB respectively for each link), and that the majority of the effect is associated with traffic from the Bolton Copper Works development, not the proposed development. Drawing on Tables 15.5 and 15.8, the sensitivity of local receptors is High and there is likely to be a direct permanent short term effect of **Minor to Moderate adverse** significance (but primarily due to the Bolton Copper Works development, not the proposed development).
- 17.66 It can also be seen from Table 17.2 that in the future year (2035) the cumulative noise level increase (E-A) is calculated to be 3.0dB(A) for Link 1 and 3.4dB(A) for Link 2. These level changes correspond to Low impact magnitudes respectively in the long term. It should also be noted that of these increases, there is minimal contribution from the proposed development (i.e. D-A = 1.5dB and 1.3dB respectively for each link), and that half or more of these effects is associated with traffic from the Bolton Copper Works development, not the proposed development. Drawing on Tables 15.5 and 15.9, the sensitivity of local receptors is High and there is likely to be a direct permanent long term effect of **Minor adverse** significance.
- 17.67 It is anticipated that the separation distances between the two developments will be sufficient to ensure that no significant cumulative noise impacts would arise between the schemes due to noise from fixed and mechanical plant.

Waste

- 17.68 The cumulative effects of the construction programme for identified committed developments in proximity to the proposed development (the solar farm and Bolton Copperworks) have been qualitatively assessed due to the lack of details within the accessible planning documents which refer to waste management, during construction or operation.
- 17.69 The committed developments would generate excavation and construction waste which will require consideration in relation to existing demands placed on waste management infrastructure in the area.
- 17.70 It is not possible to estimate construction waste arisings for the Bolton Copperworks committed development as the floor areas of all each of the associated buildings are not publicly available.
- 17.71 The committed developments would be subject to their own construction waste management strategies. These have not been made available for review at this stage.
- 17.72 Discussions with the appointed waste management contractors for the proposed development will be required to determine the likely cumulative impacts associated with waste transportation. In terms of waste generation and disposal, identified committed developments, in addition to the proposed development, will be required to implement measures for the prevention, minimisation and sustainable management of demolition, excavation and construction waste.
- 17.73 Estimated operational waste arisings from Bolton Copperworks have been summarised in Table 16.9, based on floor areas and appropriate benchmarks from British Standard *BS5906:2005 Waste management in buildings - Code of practice* unless otherwise stated.

Table 17.3: Estimated Bolton Copperworks’ operational waste arisings

Description	Indicative GIA (m ²)	Weekly waste arising (t)*	Annual waste arising (t)*	Comments on waste calculations - methodology and assumptions
215 dwellings	-	3.7	191	Based on the average household waste generation rate in Table 16.3
Employment park	2,250	0.4	19.9	Volume arising per employee [50 l] x number of employees. Assumed 10m ² per employee and useable space to be 75% of floor area
Visitor centre	2,500	0.3	14.8	Volume per m ² of floor area [5 litres] x floor area
Hotel (50 bed)	-	0.6	29.5	Volume per bedroom [250 l] x number of bedrooms
Total	-	5.0	255	-

- 17.74 It is estimated that the Bolton Copperworks committed development could generate approximately 255 tonnes of household and commercial waste per year. The generation of 191 tonnes of household waste (which makes up 75% of the total) equates to less than 0.5% of Staffordshire Moorlands’ total annual household waste. WSP | Parsons Brinckerhoff considered this to be an insignificant increase in local waste arisings.
- 17.75 Due to its nature, a solar farm is not expected to generate any operational waste.
- 17.76 As a consequence of these measures, the quantity of material requiring disposal will be minimised as far as practicable. Considering these factors and the scale of the proposed development in relation to existing committed developments in the area, the resulting cumulative effects on existing waste management infrastructure are anticipated to be of **minor adverse** significance.

Combined / Synergistic Effects

- 17.77 This section assesses the combination of some or all of the effects identified in the EIA on the sensitive receptors identified throughout the process. As with any development, there is the potential for impacts on different components of the environment to interact, both within and outside of the immediate area of the development.
- 17.78 This section assesses the most important of these interactions briefly drawing upon the detailed information under the relevant environmental topic chapters. In most cases, the identified significance of effects is negligible or minor adverse; however, some interactive effects can occur as a result of the interrelationships between the assessment topics, which is assessed below.
- 17.79 In terms of sensitive receptors, the number of nearby residential properties is very limited, with the only realistic potential receptors being those properties

located off Eaves Lane – even though these are largely separated from the site by wooded areas. The other potentially sensitive receptors are the SSSI and the SBI to the south-west of the site.

- 17.80 Construction on the site would generate additional traffic, primarily HGVs and construction worker vehicles. Some minor delay and disruption may be caused to users of the highway during the construction of the highway infrastructure. However, this will be short term in nature as the solar farm construction period is anticipated to span only 3 months, and would result in a negligible effect on users of the highway. There would be limited visual intrusion during site works as the site is well screened by vegetation but vehicles accessing the site could cause temporary visual intrusion. Construction works may also impact on the sensitive receptors by temporarily increasing the level of emissions to air, dust and noise, albeit on a very local and short term basis.
- 17.81 The adoption of a Construction Environmental Management Plan (CEMP) will ensure that impacts on sensitive receptors are reduced as far as possible. It is recommended that the delivery of this document is secured by planning condition.
- 17.82 Overall, the potential interaction of air quality, noise, transport and visual impacts are very limited due to the lack of sensitive receptors, the well screened nature of the site, the construction methods proposed and the short construction period. Accordingly, the synergistic effect is considered to be **negligible** for the very limited number of residents and ecological receptors in reasonable proximity to the site.

Conclusion

Cumulative Impacts

- 17.83 In summary, the potential for cumulative effects alongside the consented solar farm application is limited due to the benign nature of the solar farm, the limited employment offered by the proposal and the secluded nature of both sites. This lead to the majority of assessments identifying no potential for cumulative impacts. However, there would be some additional tree removal associated with the solar farm application that could lead to a **minor** adverse effect.
- 17.84 The majority of assessments identify no potential for cumulative impacts with the proposed Bolton Copperworks site. There are considered to be **minor** adverse effects in respect of noise and waste generation and **moderate/major** beneficial effects in respect of socio economic impacts.

Combined / Synergistic Impacts

- 17.85 The combined/synergistic assessment of effects has focused on whether potential construction effects would combine to generate a significant adverse impact on sensitive receptors. The accumulation of aspects such as traffic, air quality, noise generation and visual intrusion caused by the construction and operational phase of development has been considered together.
- 17.86 The assessment demonstrates that the potential for negative effect interaction during the construction phase, all of which are short term and reversible, is very limited due to the very limited number of potential receptors. Furthermore, these impacts will largely be addressed and managed through the operation of a traffic management plan, a Construction Environmental Management Plan (CEMP) and good site practices.