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16 CUMULATIVE IMPACTS, CONSEQUENTIAL DEVELOPMENTS AND IMPACT INTERACTIONS

16.1 Introduction

This section assesses the cumulative and consequential/secondary impacts that may arise during construction and operation of the development due to interaction with other developments in the area. It also considers interactions between different impacts, and shows how these have been considered within the individual sections of this EIA.

Cumulative impacts can be defined in a number of ways. The definition used in the IEMA guidance on EIA originates from the US Council on Environmental Quality, and is as follows:

“the impacts on the environment which result from incremental impacts of the action when added to other past, present and reasonably foreseeable future actions...”

Cumulative impact therefore can cover all aspects of the environment. While a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or significant) in the same geographical area, and occurring at the same time, result in a cumulative impact that is collectively significant.

Schedule 4 of the *The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* states that, as with all aspects of the environment, cumulative impacts are to be considered where there are likely to be significant effects.

Consequential impacts are those resulting from additional developments which are not part of the proposal, but which might reasonably be expected to result from the development.

Finally, with any development, there is the potential for impacts on different components of the environment to interact, both within and outside the immediate area of the development. This can lead to what is known as an impact interaction which in itself can result in a combined level of impact e.g. a sensitive receptor being affected by both noise and dust emissions nuisance during construction could potentially experience a cumulative effect greater than the individual impacts in isolation.

16.2 Assessment Methodology

~~A review has been undertaken of the proposed development with reference to other established, constructed or proposed developments in the area to analyse cumulative impacts.~~

~~The Ince Marshes site lies within Ellesmere Port and Neston Borough Council, with a small part of the proposal within Chester City District Council. In addition, the site lies close to the boundary with Vale Royal Borough Council. Consultation was undertaken with each of the local authorities above and other surrounding local authorities to ascertain the nature of any other proposed development in the area. In addition, consideration was given to employment and other allocations given within Local and Structure Plans.~~

~~A significant development has taken place to the south-west of the Ince Marshes site – the Quinn Glass Ltd glass container manufacturing, filling and distribution facility. Construction of this facility was completed in 2005. Analysis has been made of both the Environmental Statement for this project, and where available, information produced for the Quinn Public Inquiry.~~

~~Many cumulative impacts, especially where these are an established part of the baseline, are best considered as a part of the baseline environment within individual sections of the ES. This is discussed below.~~

~~Impact interactions, are likewise mainly considered within the individual aspect sections of the EIA following a robust scoping process. The sections below summarise these impacts, and describe how they have been considered within the EIA.~~

16.2 Cumulative Impacts

16.2.1 Approach to Assessment

The scope of the cumulative assessment has been outlined in Section 1. For each environmental aspect, a review has been undertaken of the proposed development with reference to other proposed and committed developments, and development allocations in the area to analyse cumulative impacts. A summary of the results of this review is shown in Table 1.3, which for each development or allocation indicates one of the following for each environmental aspect:

- where cumulative impacts have been considered,
- where it is considered that it would not be reasonable to make an assessment due to the restricted level of information known about a development or allocation,
- where it is considered development is unlikely to come forward (primarily for allocations), and
- where the potential for cumulative impacts have been discounted.

It should be noted that, a significant development has taken place to the south-west of the Ince Marshes site - the Quinn Glass Ltd glass container manufacturing, filling and distribution facility. Construction of this facility was completed in 2005. Analysis has been made of both the Environmental Statement for this project, and where available, information produced for the Quinn Public Inquiry. For most environmental aspects the development has accordingly been included within the baseline and thus not assessed in terms of cumulative impacts. For the assessment of air quality impacts, however, it is considered that this development would not be appropriately represented in the baseline and so cumulative impacts have been assessed.

It should also be noted that for traffic and associated air quality and noise impacts, the assessment of cumulative impacts has been undertaken on the basis of the total cumulative effect of all relevant developments proceeding thus providing a worst case assessment.

The methodology and assessment of cumulative impacts has been completed within each relevant section of the ES. Only impacts that have been reported in the respective sections are summarised below.

16.2.2 *Committed Developments*

16.2.2.1 *Quinn Glass*

The Quinn Glass plant had been constructed during the period within which the original EIA had been undertaken for the Ince RRP development. The plant has, however, since reached fully operational capacity (November 2007). Apart from air quality and socio-economics, for all environmental aspects Quinn Glass and its operations have therefore been included in the baseline and not assessed cumulatively. Cumulative impacts relating to the air quality and socio-economics are summarised below.

The cumulative air quality impacts of Quinn Glass and the RRP have been assessed, using data presented by Quinn Glass in the final Environmental Statement (2004) submitted in support of their planning application. The assessment focused on nitrogen dioxide and sulphur dioxide, as these are most significant pollutants that are released by both plants. The assessment has shown that the combination of emissions from the two developments is not predicted to lead to any breaches of air quality objectives in terms of human receptors. With respect to the SPA, it is concluded within the ecological section of the ES that the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA.

With respect to socio-economic effects, moderate positive local economic effects are considered likely to occur. With respect to local recreation, slight to moderate adverse impacts are anticipated. No significant impacts are considered likely at the sub-regional level with respect to economic effects and no impacts are anticipated at this level in terms of recreation.

16.2.2.2 *INEOS Chlor*

The proposed INEOS development will have no cumulative impacts with the RRP development other than in terms of air quality and socio-economics. For the CCC Application, as impacts relating to air quality are predicted to be small, it is concluded that there would be no cumulative impact with INEOS Chlor.

For the RDF (DBERR application and Entire Site), it is anticipated that the emissions from traffic associated with the two plants will not interact since they are released at ground level and will be released over 6 km apart (cumulative changes in terms of traffic flows were not considered likely). No cumulative impacts from traffic emissions were therefore considered.

The cumulative impacts of stack emissions from both developments were however considered. The assessment identified that that emissions of nitrogen dioxide were the most notable from both developments and so the assessment concentrated on the element of the emissions. It was concluded that the two proposed energy-from-waste plants would not lead to any breaches of air quality objectives in combination with each other. Indeed, the peak contribution to ground level concentrations from each individual plant in isolation is predicted to be higher than the highest combined contribution. With respect to the SPA, it is concluded within the ecological section of the ES that the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA.

With respect to socio-economic impacts, moderate positive local impacts are considered likely. Slight/moderate positive impacts may result at the sub-regional level both individually and when combined with the other potential effects of Port Weston and Liverpool John Lennon Airport (see below). Overall, therefore, whilst it is possible that some positive economic impacts may result from the development of the two schemes at both the local and sub-regional level, they are not considered likely to be significant. No significant impacts are anticipated with respect to recreation.

16.2.2.3 Port Weston

Cumulative impacts relating to sSocio-economic effects have been considered with respect to this site. The assessment concludes slight to moderate economic cumulative impacts are likely to result from the combination of the two developments. However, it is considered possible that slight to moderate positive economic impacts could also be realised at the sub-regional level when considering further potential cumulative impacts with Liverpool John Lennon Airport and Ineos Chlor. No cumulative impacts in relation to recreation are anticipated.

16.2.2.4 Liverpool John Lennon Airport

Cumulative impacts relating to Ecological and Socio-economic effects have been considered with respect to this site.

With respect to potential ecological impacts it is concluded within the ecological section of the ES that the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA.

The assessment of socio-economic impacts concludes slight to moderate local cumulative impacts are likely to result from the combination of the two developments. It is also considered possible that slight to moderate positive economic impacts could be realised at the sub-regional level. No significant impacts are anticipated with respect to recreation.

16.2.2.5 Biossence Energy from Waste Plant Eastham

Cumulative impacts relating to socio-economics have been considered with respect to this site. It is considered likely that development associated with this proposal would contribute positively to its local economy but not the local economy of Stanlow and Wolverham. It is possible, however, that at the sub-regional level, slight positive impacts may result from the combination of the developments (this would assume the CCC Application or Entire Site being consented). For the DBERR application, these impacts are expected to be slight to negligible. No significant impacts are anticipated with respect to recreation.

16.2.2.6 Shellway Road Biodiesel Plant

Cumulative impacts relating to traffic and transportation, noise, air quality, ecology and socio-economics have been considered with respect to this site. It should be noted that noise impacts consider only those impacts resulting from changes in traffic flows.

For air quality consideration has also been given to cumulative air emissions from the respective stacks of the Ince RRP development and biodiesel plant.

Traffic flow modelling predicts that, following appropriate mitigation there will be no significant increase in traffic flows resulting from the combined construction or operational traffic of the two developments and so no significant cumulative impacts are predicted.

The changes in traffic flows are such that it is anticipated that, on Meadow Lane and residences on the A5117/Poole Lane Junction, the impact would be considered to be “slight” during the daytime. With respect to night time, road noise level increases just meet the “moderate impact” significance criteria at the receivers at Meadow Lane and the A5117/Poole Lane Junction. For all other sensitive receptors it is considered that impacts are unlikely to be any worse than those reported for the Ince RRP development in isolation i.e. no cumulative impacts are predicted.

The same is reported for traffic derived air quality impacts. Consideration of stack emissions from both of the developments also concludes that the combined stack emissions will result in no cumulative impacts.

It is considered likely that the biodiesel plant would contribute positively to the local economy resulting in slight positive impacts from the combination of the developments (this would assume the CCC Application or Entire Site being consented). For the DBERR application, these impacts are expected to be negligible. No impacts will occur at the sub-regional level. No significant impacts are anticipated with respect to recreation.

~~☐ The Second Mersey Crossing;~~

~~The Second Mersey Crossing has been proposed for some years, however the proposed development has appeared more imminent over the past 18 months. Due to the distance between the two sites the only potential cumulative impacts associated with this development would be those directly linked with the Mersey Estuary—see Section 16.6.4 below.~~

~~☐ Liverpool John Lennon Airport~~

~~There is unlikely to be any cumulative impacts associated with increased traffic at Liverpool John Lennon Airport on air quality since pollutants will be dispersed over a wide area. Airport expansion could potentially impact upon the Mersey Estuary SPA/SSSI/Ramsar, however, the impact of the Entire RRP development (and both CCC and DTI applications) is negligible.~~

~~☐ Mersey Tidal Power~~

~~The Mersey Tidal Power project involves a flagship renewable energy scheme utilising tidal power on the River Mersey. Energy harnessed from this source would be renewable, predictable and without harmful emissions. The only cumulative impact this project could have with the resource recovery park is on the Mersey Estuary itself regarding bird habitats which due to the negligible impact of the RRP (both CCC and DTI applications) and the mitigation proposed would not increase any impact from the Renewables project. However, this project is at a very early stage of the planning process with the location of the proposed barrage yet to be decided.~~

~~☐ INEOS Chlor Ltd, 'Runcorn Energy from Waste Facility'.~~

~~The proposed INEOS development will have no significant cumulative impacts with the RRP development other than with air quality which is assessed fully in Section 8.4.8.4. For the CCC Application, there would be no impact since air emissions are small, while for the RDF (DTI application and Entire site), the emissions were fully assessed.~~

~~This assessment states that: "The emissions from traffic associated with the two plants will not interact, since they are released at ground level and will be released over 6 km apart, so the assessment has focussed on the emissions from the stacks", and concludes that: "It can be seen that the combination of emissions from the two proposed energy-from-waste plants is not predicted to lead to any breaches of air quality objectives. The highest contribution to ground level concentrations from each individual plant will be higher than the highest combined contribution. This will also apply to air quality impacts to the Mersey Estuary SSSI/SPA/Ramsar, thus no additional cumulative impact is expected".~~

16.2.2.7 Lostock Works (EfW Plant)

Consideration has been given to the potential for cumulative impacts with respect to air quality. It is considered likely that impacts resulting from changes in air quality will be as reported for the Shellway Road Biodiesel Plant. However, it is considered that there is insufficient data available to make a full quantitative assessment regarding cumulative impacts on air quality for this site and so no assessment has accordingly been made.

16.2.2.8 Ashton Grange Wind Farm

Consideration has been given to the potential for cumulative impacts with respect to visual receptors, however, it is considered that due to a combination of the distance from Ince RRP and the restricted views from sensitive viewpoints relevant to Ince RRP, no significant cumulative impacts are likely.

16.2.2.9 Proposed Closure of Oil Sites Road

It is proposed that in the near future, the Oil Sites Road which leads into the Shell Stanlow complex from Pool Lane may be closed to through traffic. An assessment of the impact upon traffic was made in the Transport Assessment (Appendix 14.1).

The assessment concludes that the development will not create any new locations of traffic congestion nor exacerbate any existing problems (even if Oil Sites Road is closed to through traffic). Impacts resulting from changes in noise and air quality are as reported for the Shellway Road Biodiesel Plant.

~~☐ Other Projects~~

~~Other projects either with planning permission, or with undetermined planning applications, were either too remote from the site, or were of such a scale to have no significant impact.~~

~~It is not considered that small scale developments such as alterations to existing developments or small scale construction projects would contribute significantly cumulatively with impacts arising from this development.~~

16.2.3 Non-committed Development and Allocations

~~In addition to those developments that are considered as committed and that are discussed above, consideration has also been given to non-committed development (i.e. those for which there are known aspirations to develop but for which a formal application has not yet been submitted in part or whole) and relevant development allocations within local development plans. Non-committed developments considered, where relevant in combination with the proposed Ince RRP development, are the Second Mersey Crossing and the Mersey Tidal Scheme Development allocations considered where relevant in combination with the proposed Ince RRP development, are listed within Table 1.3 in Section 1. It should be noted, that it has been assumed that the Green Belt designation between the Ince Marshes site and the villages of Ince and Elton will in most instances preclude development in this area.~~

~~The only significant areas of land that have the potential to generate significant cumulative impacts are the remaining part of the EMP4 allocation at Ince Marshes, and two Employment allocations: at Ince Power Station (EMP7, B1, B2 or B8 employment use); and Station Road, Ince (EMP8, B1 employment use). Should any of these sites be developed, any impacts would of course be dependent upon what is proposed. With the close proximity of all three sites to the development, any proposal would have the potential to impact cumulatively upon a number of factors. An estimate of the potential for such impacts is provided in Table 16.3.~~

~~The Green Belt designation between the Ince Marshes site and the villages of Ince and Elton will in most instances preclude development in this area.~~

16.2.3.1 The Second Mersey Crossing

~~From consultations with Halton Borough Council it has been determined that an application for this development may be submitted in the spring of 2008. The proposed crossing will span the Mersey Estuary to the east of the existing Runcorn Bridge.~~

~~Due to the distance between the two sites the potential cumulative impacts associated with this development would be those directly linked with the Mersey Estuary and so only ecological impacts have been considered.~~

~~Construction is planned for 2011 with opening on 2014. It is believed that a consent application will be submitted for the bridge in 2008 but it is concluded within the ecological section of the ES that the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA.~~

16.2.3.2 Mersey Tidal Power

~~The Mersey Tidal Power project involves a flagship renewable energy scheme utilising tidal power on the River Mersey. Energy harnessed from this source would be renewable, predictable and without harmful emissions. The design of this scheme is currently not decided, although a number of options are being considered which would have varying effects on the Mersey Estuary.~~

The only cumulative impact this project could have with the resource recovery park is on the Mersey Estuary itself regarding bird habitats. However, it is concluded within the ecological section of the ES that the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA.

16.2.3.3 *Development Allocations*

EMP 7, EMP 8 and EC8

All three of these policy areas relate to land in close proximity to the south of the Ince RRP site. Cumulative impacts relating to all environmental aspects have been considered with respect to this site.

With respect to geology, it has been assumed that developments on these allocations have or would remediate any known contamination using standard working practices and mitigation measures during construction. With this in mind, the overall quality of the soil and underlying geology is considered likely to improve through the process of redevelopment rather than deteriorate. The potential for cumulative impact as a result of this development in addition to the Ince RRP is therefore considered negligible.

In terms of hydrology the proposed Ince RRP development and development allocations would discharge surface water into the ditch system that is drained by the Ince Marshes pumping station. As a result uncontrolled surface water discharges for one or other of the sites can influence the other. However, the planned mitigation for the RRP site would minimise its affect on the surrounding area by providing flood compensation volumes in excess of that required for the site. In addition, the site will be protected from other sources of flooding and contamination by the raising of floor levels and storage areas to a level above predicted floodwaters. Negligible cumulative impacts are therefore anticipated.

It is considered that the development of these allocations would result in a mix of developments with the potential to contribute to the local economy. In combination with the Ince Marsh RRP development, therefore, significant positive impacts are considered likely for each (whether the DBERR application or Entire Site). Positive impacts at the wider sub-regional level are considered likely, however, these are considered likely to be less than for the local economy, potentially being slight to moderate. Slight to moderate negative cumulative impacts are anticipated with respect to recreation.

Impacts resulting from changes in traffic and related noise and air quality are as reported for the Shellway Road Biodiesel Plant. In addition to this, slight impacts are considered likely to result from the operational noise of the Ince RRP with these allocations.

With respect to landscape and visual impacts, in the absence of accurate baseline data and development proposal details it is considered unreasonable to assess cumulative impacts associated with this allocation and therefore the cumulative effects. However, with respect to ecology it is predicted there will be no cumulative impact on the SPA due to the allocations not being anticipated to have an effect on it, and that impacts upon the ecology of the entire development site and surrounding habitats (excluding the SPA) will be positive and so no adverse cumulative impacts are considered likely in combination with these development allocations. For archaeology and cultural heritage, it is considered that the cumulative impacts of the other developments will be

no greater than that of each individual development as there are no archaeological resources common to these sites that will be adversely affected.

EMP 4

Impacts resulting from changes in traffic and related noise and air quality are as reported for the Shellway Road Biodiesel Plant. Out of the remaining environmental aspects, the predicted impacts are anticipated to be the same as those experienced for the EMP7, EMP 8 and EC 8 above apart from land use.

With respect to land use, were a development to come forward on this allocation, this would result in additional land-take of agricultural land (up to 43ha). This indicates that there could potentially be a cumulative effect on land use and agriculture. In the event that all or part of the land-take effects one of more of the tenants effected by the DBERR and/or CCC Application the level of impact may increase range from slight for the DBERR application to moderate for the CCC Application (or the two in combination).

Impacts, with respect to socio-economic effects are considered likely to be the same as for EMP7, EMP 8, and EC 8 above.

WM 2, WM 3(A), WM 3(B), WM 21

Cumulative impacts relating to socio-economics have been considered with respect to this site, which are considered likely to be the same as for EMP7, EMP 8 and EC 8 above with respect to economics but with no impacts anticipated with respect to recreation.

-Cloister Way

Cumulative impacts relating to traffic and transportation and related air quality and noise, and socio-economics have been considered with respect to this site.

Cumulative impacts associated with socio-economics are anticipated to be the same as those for WM 2, WM 3(A), WM 3(B), and WM 21 above.

Impacts resulting from changes in traffic and related noise and air quality are as reported for the Shellway Road Biodiesel Plant.

16.3.3 Recent Construction Developments

~~The Quinn Glass plant has been constructed during the period within which this Environmental Impact Assessment has been carried out, and is now completed. However, the plant is currently only partly operational. For this reason, the approach to this development has been deliberately varied from aspect to aspect. This is described as follows:~~

Table 16.1: Quinn Glass Cumulative Impact

Aspect	Approach In ES
Soils & Geology	As these impacts are primarily a product of land take and

Aspect	Approach In ES
	construction, no additional information was required for this assessment. No significant cumulative impact is expected for either CCC or DTI application.
Hydrology and Hydrogeology	A review was made of information provided in the Quinn ES to assess possible cumulative impact. This is discussed in Section 7.5.6. It concludes that due to the flood compensation areas provided, no significant cumulative impact is likely.
Climate and Air Quality	Information from the Quinn Public Inquiry has been used to inform the models for this assessment. See Sections 8.3.5 and 8.3.7.
Land Use and Agriculture	As these impacts are primarily a product of land take, and the Quinn plant is constructed on previously developed land, no additional information was required for this assessment. No significant cumulative impact is expected for CCC or DTI applications.
Ecology	Information from both the Quinn ES and that presented at the Public Inquiry has been used for this assessment. No significant cumulative impact is expected for either CCC or DTI applications.
Archaeology	A brief assessment of the Quinn ES was made. As these impacts are primarily a product of land take and considering the nature of impacts from both developments, the impact was considered insignificant for both DTI and CCC applications and no further assessment was made.
Landscape and Visual	As Quinn has now been constructed, the plant was considered as a part of the baseline for this assessment. References are made to the cumulative impact of this and other developments within the viewpoint assessments in Section 12.
Socio-Economics	The only likely cumulative impacts will be additional positive benefits to the local economy of increased employment.
Noise	Cumulative assessment of noise has been calculated using the project residual noise impact figures combined with those from the Quinn ES (see Section 15.7.6) for both DTI & CCC applications.
Traffic and Transportation	Information on Quinn traffic was taken into consideration for the assessment of J14 of the M56 and A5117, the only location where the two traffic streams might act cumulatively (see Section 14.4.9). The assessment concludes that cumulative impact is unlikely.

16.3.4 Noise

The Quinn glass manufacturing plant is not fully operational at the present time. Tables 15.12, 15.13 and 15.14 in Section 15 list the cumulative impact of the entire RRP site, DTI and CCC applications with the Quinn Glass factory. The predicted noise levels from the Quinn Development were calculated in the SRL operational noise report C/046W/9780/R07/RMW/jlt 19/07/2004. It was found that the cumulative impact of both the RRP and Quinn Glass can be considered to be 'not significant'.

16.3.5 Air Quality

~~The cumulative impact on Air Quality is discussed further in Section 8.4.8 of this ES. However, it states that the cumulative impact of Quinn Glass and the RRP has been assessed, using data presented by Quinn Glass in the final Environmental Statement (2004) submitted in support of their planning application. The assessment focused on nitrogen dioxide and sulphur dioxide, as these are most significant pollutants that are released by both plants.~~

~~In addition, the assessment considered, in Section 8.4.8.4, the potential for interaction with the proposed RDF Combustion plant at Ineos Chlor's Runcorn site.~~

~~The assessment concludes that "the combination of emissions from the from the two proposed energy from waste plants is not predicted to lead to any breaches of air quality objectives. The highest contribution to ground level concentrations from each individual plant will be higher than the highest combined contribution. This will also apply to air quality impacts to the Mersey Estuary SSSI/SPA/Ramsar; thus no additional cumulative impact is expected".~~

16.3.6 Ecology

~~Regarding the Quinn Glass development, there are no significant cumulative impacts anticipated for either the CCC or DTI applications. The glass plant is constructed on previously developed land with mitigation measures proposed within the development to enhance the site's ecological value.~~

16.3.7 Socio-Economic

~~A socio-economic assessment has been conducted for this ES and found there will be benefits in regard to local jobs and businesses (see Section 13). This indicates that there potentially could be a cumulative effect on local business of further development in the area with other developments. This would increase from perhaps slight for the DTI application to moderate for the CCC application when considered cumulatively with Quinn.~~

16.416.3 Secondary / Consequential Developments

Consequential developments are additional developments which will occur as a result of a proposal. No consequential developments are anticipated directly as a result of the Resource Recovery Park especially since the proposed development itself contains a series of synergistic uses.

The RRP has the potential to lead to new commercial developments that use recycled products manufactured on site, or store or supply the waste used. A range of parameters including market forces, planning policy, land availability, workforce availability and infrastructure will determine the location for any new developments with any such development likely to be outside the local area. Due to its more diverse nature, the IWMF/ETC (CCC Application) could be said to have more potential for consequential development of synergistic industry than would the RDF (~~DTI-DBERR~~ Application).

Such developments could potentially have a variety of both positive and negative impacts. All such developments would be subject to a planning application, and in

many cases may require Environmental Impact Assessment. The impacts, both cumulative and otherwise, could only be assessed as a part of any future application.

16.4 Impact Interactions

16.4.1 Methodology

With any development, there is the potential for impacts on different components of the environment to interact, both within and outside the immediate area of the development. In order to ensure that any significant impacts were identified, a detailed scoping exercise was undertaken, the results of which were presented in the project Scoping Report, issued to consultees in July 2005. The scoping exercise included discussion with the project team, initial consultations with key stakeholders, and completion of a scoping checklist. This approach allowed the scoping process to be co-ordinated such that impact interactions between different aspects of the environment could be identified. These interactions are hence discussed within individual chapters, ~~however Table 16.2 below provides a summary of the potential interactions, which~~ are discussed further in Sections 16.5.1 to 16.5.4.

~~Table 16.2 lists the aspects of the environment on both axes, with those on the x axis representing the aspect that may be indirectly affected, whilst those on the y axis are the aspects that are predicted to be directly affected by the project. For example, the changes in noise have the potential to impact indirectly on ecology but ecological changes are unlikely to impact upon noise. These impacts are those identified for the Ince RRP project but as a general guide, apply to both DTI DBERR and CCC applications. In some cases (e.g. landscape) these impacts relate to the mitigation measures proposed.~~

16.4.2 Landscape

Landscape impacts do not in themselves usually give any interaction with other impacts, however, landscape mitigation measures are a significant change to the receiving environment and as such have a range of indirect impacts in addition to screening benefits. In particular, these will provide valuable habitat for birds and other creatures, foraging habitat for birds, including birds of prey and commuting routes for bats. They will also assist in attenuating noise. The additional land required, however, reduces slightly that available for agriculture.

Mitigation measures in response to other environmental impacts may conversely have an indirect impact upon landscape. One example of this are the proposed noise barriers proposed for sections of the Kemira Road. These in themselves have a visual impact. Further mitigation planting has been proposed to mitigate this impact which will hence be insignificant (applicable to both CCC and ~~DTI DBERR~~ applications, ~~or the two in combination~~), ~~as recorded in Table 16.2.~~

Likewise, the proposed ecological mitigation will have a landscape impact, however this is expected to be a positive one, with new wetland features adding to the diversity of features for some close viewpoints. However, the overall impact of the proposal is shown as variable dependent upon the viewpoint chosen (for ~~both DTI DBERR~~ and CCC applications ~~or the Entire Site~~).

Land-raising, though not significant in itself will alter the landform and could hence have an additional minor landscape impact. However, in this case it is not significant for either application, as discussed in Section 12.

16.4.3 *Physical Environment*

Aspects of the physical environment (including those factors within the Soils and Geology, and Hydrology and Hydrogeology sections) interact with each other and with the wider environment. For example, landraising operations are proposed as mitigation for hydrological (flood risk) impact, however, they can also have potential impacts both on the hydrological regime through deepening of stream channels and a change in the drainage regime, and on the soils themselves, through soil importation and mixing. The impact of land use changes overall on the physical environment is shown as variable, with some areas being raised from floodplain, but other areas becoming wetter. None of these impacts is expected to be significant for either application (or both together) as these are standard construction practices.

16.4.4 *Human Impacts*

Changes in agriculture have the potential to affect socio-economic factors such as employment. However, these negative impacts are insignificant when compared to the economic benefits of the development as a whole. They are therefore regarded as insignificant ~~in Table 16.2~~ for both CCC and ~~DTI-DBERR~~ applications (or the two in combination).

16.4.5 *Ecology*

Ecology covers a wide range of issues related to fauna and flora, which can be influenced by a range of factors. These include noise, air quality, hydrological changes, impacts resulting from lighting and changes in habitat, either through land-take, changes in agricultural practice etc., and are discussed in the relevant sections of the ES (lighting being dealt with under Section 10).

The ~~above-relevant~~ sections of the ES show that the impacts of noise, ~~and~~ air quality and lighting changes are not expected to be significant for either CCC or ~~DTI-DBERR~~ applications (or the two in combination). They are also insufficient to give rise to impacts which would affect the integrity or the conservation objectives of the SPA. With respect to hydrological changes these are anticipated will in fact be of benefit to wildlife, and will be encouraged, and that hydrological changes will in fact be of benefit to wildlife, and will be encouraged.

The main indirect impacts occur from the proposed ecological mitigation which increases the extent and number of water features, and alters land use. It will affect soils, but this impact will be insignificant and generally within the bounds of variation of agricultural practice.

Table 16.2: Potential Impact Interactions & Indirect Impacts (All Applications)

ASPECT – (Indirectly Affected)	Soils & Geology	Hydrology & Hydrogeology	Climate and Air Quality	Land Use and Agriculture	Ecology	Archaeology	Landscape & Visual	Socio-Economic	Traffic & Transportation	Noise
ASPECT (Direct Impact)										
Soils & Geology	Variable	Slightly Negative	None or Insignificant	Slightly Negative	Slightly Negative	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant
Hydrology and Hydrogeology	None or Insignificant	Variable	None or Insignificant	Slightly Negative	Positive	None or Insignificant	Positive	None or Insignificant	None or Insignificant	None or Insignificant
Climate and Air Quality	None or Insignificant	None or Insignificant	Variable	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant
Land Use and Agriculture	None or Insignificant	Variable	None or Insignificant	Variable	Positive	None or Insignificant	Variable	None or Insignificant	None or Insignificant	None or Insignificant
Ecology	None or Insignificant	Slightly Negative	None or Insignificant	Slightly Negative	Variable	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant
Archaeology	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	Variable	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant
Landscape and Visual	None or Insignificant	None or Insignificant	None or Insignificant	Slightly Negative	Positive	None or Insignificant	Variable	None or Insignificant	None or Insignificant	Positive
Socio-Economic	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	Variable	None or Insignificant	None or Insignificant
Traffic & Transportation	None or Insignificant	None or Insignificant	Slightly Negative	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	Variable	Slightly Negative
Noise	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	Slightly Negative	None or Insignificant	None or Insignificant	None or Insignificant	None or Insignificant	Variable

Negative	Slightly Negative	None or Insignificant	Slightly Positive	Positive	Variable
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The operation also provides potential impacts upon ecology, with additional flood storage volumes being required, and a potential increase in water levels in some areas. For wildlife, this is generally to be welcomed as these features will be designed to be of greater value to birds, water voles and aquatic invertebrates. This is discussed in Section 10.

16.4.6 Air Quality

While changes in air quality have the potential to affect ecology and agriculture, in this case, because emissions are within limits, no significant indirect impact is expected for either CCC or [DfT/DBERR](#) applications or the two in combination.

16.5 Receptor Analysis

An important part of cumulative assessment is an analysis of the cumulative impact of different factors on a single receptor. For example, a small increase in noise might not be a significant impact in itself, but when combined with a visual impact and increase in traffic might be significant for that receptor. [The interaction of impacts on a wider scale have been addressed in Section 16.4 above. This section focuses on interactive impacts on specific receptors.](#)

16.5.1 Potential Receptors

The most likely receptors for cumulative impact are human settlement or recreational use, as these can be subject to a range of impacts. For this development, such receptors might include:

- Holme Farm and potentially other farms;
- Ince Village;
- Elton Village;
- Helsby;
- Users of recreational routes.

Non-human receptors include the following:

- Birds;
- The Mersey Estuary SSSI/SAC/Ramsar Site
- Drainage Networks.

16.5.2 Settlements

The noise [and air quality](#) assessments shows no significant increases ~~into~~ noise [and air quality](#) levels in Ince, Elton, Helsby, or at Holme Farm. No significant increase in traffic levels is expected at any of the four receptors. Changes in agricultural practice will impact Holme Farm, while changes in landscape will impact all four receptors, though to a lesser extent in Elton and Helsby than at Holme Farm and Ince. With only landscape impacts occurring at the Ince, Elton and Helsby, however, cumulative impact can be disregarded [for these receptors](#).

At Holme Farm, there will be some cumulative impact upon those utilising the receptor, with landscape impacts and changes to farming practices both apparent. These impacts (for the Entire Site or CCC Application) are cumulatively judged to be significant, but this relates mainly to changes in agriculture/agricultural employment which must be weighed against the job creation potential of the site, which overall brings a positive residual impact. For the DTI-DBERR application, however, these impacts would be of moderate significance to this receptor due to the reduced landtake for this application, again becoming positive due to employment generation.-

Other settlements are generally at too great a distance to be subject to any significant cumulative impact.

16.5.3 *Users of Recreational Routes*

Users of the footpath network across the site will experience both visual impact and impact from disruption during construction (and to a limited extent during operation) through alterations to routes, noise etc. While visual impacts from close range will be significant, the disturbance impacts are not judged to be a significant additional impact. Hence impact remains the same for both CCC and DBERR Applications or the two in combination.

16.5.4 *The Mersey Estuary SSSI/SAC/Ramsar Site & Birds*

~~It is concluded within the ecological section of the ES that, whilst impacts will result from air quality emissions, the development, either alone or in-combination with other proposed developments, would not give rise to impacts which would affect the integrity or the conservation objectives of the SPA. Analysis of air emissions has shown an insignificant impact upon air quality as a result of the proposal, and this remains within the limits of the Air Quality Standards Regulations 2007, hence this would not interact with any other impact. Noise/disturbance impact is also expected to be minimal, and there will be no direct impacts upon the site itself.~~ Hydrology and water quality remain unaffected as the site drains via a pumping station to the Ship Canal and can be both controlled and contained, and site drainage will minimise the impact, ~~hence Overall,~~ there is judged to be no significant cumulative impact for either DTI-CCC or DBERR applications or the Entire Site. Impacts on this site designation are discussed fully in Section 10.

A range of factors affect the birds present on the proposed RRP development site. These include availability of nesting habitat, availability of a suitable food supply and disturbance impacts. While disturbance factors, although already present in the form of agricultural/industrial operations and model airplane flying, will increase in some areas, there will be provision of undisturbed areas with managed food sources and increased nesting habitat which overall is expected to have a positive impact. The mitigation proposed provides significant enhancement over the existing situation and as such the scheme will lead to positive impacts for birds.

Overall, the cumulative impact of the proposed development on the SPA/ Ramsar site would not give rise to any effects which would affect the site's integrity or conservation objectives.

~~The project ornithologist has concluded that since the development site is not a major roosting area, even on the highest tides, for any birds displaced from the foreshore roosts, there will be no cumulative impact relating to the SPA. Mitigation Area C will in fact be more attractive to waders/wildfowl than the current site. Therefore the impact and cumulative impact of this proposed development on the Mersey Estuary~~

~~can be considered negligible for the Entire Site or if the CCC and DTI applications are considered separately.~~

16.5.5 The Drainage Network

The drainage network could potentially be impacted by changes in water levels caused by the new drainage regime. It will also be affected by ditch realignment during construction, by landraising operations which while removing some areas from the flood risk zone, may increase the water level in others. In addition, there are impacts from general construction operations, with the potential for silt pollution, and potentially by pollution during operation. However, in spite of this, such impacts are predicted to be slight (for the ~~DTI-DBERR~~ application) or moderate (for the CCC Application/Entire Site) since the changes can be mitigated for through additional water features and the controlled drainage systems on site.

~~Table 16.3: Summary of Residual Impact (Additional Cumulative Impact—Worst Case)~~

RRP Application:	CCC Application	DTI Application	Entire RRP (Both CCC and DTI Applications)	CCC
Cumulative Development:				
Recent Development:				
<i>Quinn Glass</i>				
Soils & Geology, Land Use & Agriculture, Archaeology	NONE	NONE	NONE	
Hydrology	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
Air Quality	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
Ecology	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
Landscape & Visual	DEPENDENT UPON VIEWPOINT—SEE SECTION 12	DEPENDENT UPON VIEWPOINT—SEE S.12	DEPENDENT UPON VIEWPOINT—SEE SECTION 12	
Socio-Economic	MODERATE (+VE)	SLIGHT (+VE)	MODERATE (+VE)	
Noise	NOT SIGNIFICANT	NOT SIGNIFICANT	NOT SIGNIFICANT	
Traffic	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
Proposed Development: ⁴				
<i>Ineos Chlor</i>				
Air Quality	NEGLIGIBLE	SLIGHT	SLIGHT	
Other Aspects	NONE	NONE	NONE	
Second Mersey Crossing	NONE	NONE	NONE	
Liverpool Airport	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
Mersey Tidal Power	UNLIKELY	UNLIKELY	UNLIKELY	
Closure of Oil Sites Road	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	
<i>EMP4 (Remainder)</i>				
Ecology	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Landscape	MODERATE POTENTIAL	MODERATE POTENTIAL	MODERATE POTENTIAL	
Visual	MODERATE POTENTIAL	MODERATE POTENTIAL	MODERATE POTENTIAL	
Air Quality	MODERATE POTENTIAL	HIGH POTENTIAL	HIGH POTENTIAL	
Noise	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Traffic	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Socio-Economic	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Other Impacts	LOW POTENTIAL	LOW POTENTIAL	LOW POTENTIAL	
<i>EMP7 & EMP8 Allocations⁵</i>				
Ecology	LOW POTENTIAL	LOW POTENTIAL	LOW POTENTIAL	
Landscape	MODERATE POTENTIAL	MODERATE POTENTIAL	MODERATE POTENTIAL	
Visual	LOW POTENTIAL	LOW POTENTIAL	LOW POTENTIAL	
Air Quality	LOW POTENTIAL	MODERATE POTENTIAL	MODERATE POTENTIAL	

Noise	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Traffic	HIGH POTENTIAL	LOW POTENTIAL	HIGH POTENTIAL	
Socio-Economic	MODERATE POTENTIAL	LOW POTENTIAL	MODERATE POTENTIAL	
Other Impacts	LOW POTENTIAL	LOW POTENTIAL	LOW POTENTIAL	
<i>Other Impacts:</i>				
Potential for Secondary/ Consequential Development	HIGH POTENTIAL	MODERATE POTENTIAL	HIGH POTENTIAL	

~~1. The majority of the proposed developments are not sufficiently developed to be able to accurately assess impacts. As such, the above impact determinations should be regarded as indicative only, excepting Ineos.~~

~~2. Based upon the two nearby allocations, EMP7 and EMP8 and their proposed mix of uses. Note that it is not known what is proposed so the above impact determinations should be regarded as indicative guidance as to the potential for impact.~~

~~3. Landscape and Visual potential would be for district scale. Assumes an “Oil, Chemical and Related Industry” proposal.~~