Appropriate Assessment

of South Lakeland District Council's

Allocations of Land Development Plan Document

Prepared for:

South Lakeland District Council

By:

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1 Summary

Treweek Environmental Consultants (TEC) was appointed by South Lakeland District Council (SLDC) in July 2011 to undertake an Appropriate Assessment (AA) for the South Lakeland Allocations of Land Development Plan Document (DPD).

'Appropriate Assessment (AA)' is required under the EU Habitats Directive (92/43/EEC) for any proposed plan or project which is not for the management of European sites and which may have a significant effect upon them. The purpose of AA is to determine whether or not significant effects are likely and to suggest ways in which they could be avoided.

This report summarises the results of the Appropriate Assessment process, undertaken for those potential allocation sites which could not be screened out in the screening reports (TEC, 2010,2011) undertaken in December 2010 and August 2011.

The assessment is of the potential development sites for residential, employment, mixed or various purposes received by the Council for potential inclusion in the Allocations of Land DPD. The District Council will prepare the final Allocations of Land DPD fpr submission for examination taking into account this report, other evidence and feedback from the current additional consultation process.

Possible effects of the potential development sites were reviewed in this report for the following European Sites identified through screening:

Special Areas of Conservation (SAC)	**Special Protection Areas (SPA)**	**Ramsar Sites**
Morecambe Bay Pavements SAC Morecambe Bay SAC River Kent SAC	Morecambe Bay SPA	Morecambe Bay Ramsar Site

In the December 2010 Screening Report 74 potential development sites were identified as having potential "Likely Significant Effects" on European sites and therefore could not be screened out. Subsequently the District Council announced that it was not taking forward 15 of these sites, leaving 59 to be considered for Appropriate Assessment.

In the August 2011 supplementary Screening Report a further 10 sites were identified as having potential "Likely Significant Effects" on European sites. This Appropriate Assessment therefore relates to the total 69 sites not screened out and still in consideration for being taken forward in the DPD. Considering the effects of these development sites in combination this AA also seeks to address the wider sewerage issues in Kendal which were identified in the Appropriate Assessment of the South Lakeland Core Strategy and subsequently taken forward as a constraint in the adopted Core Strategy.

The Appropriate Assessment considers the direct effects of the potential allocation sites on European sites in combination with other plans and projects that are likely to be taken forward. The most significant of these are the North West England and North Wales Shoreline Management Plan and the Kendal Canal Head Action Plan. It also considers the cumulative impacts of development of multiple small sites and takes into account background environmental trends.

This report advises that the Allocations of Land DPD can only be confirmed as not having an adverse effect on site integrity of Morecambe Bay SAC/SPA/Ramsar and River Kent SAC if certain mitigation measures are incorporated into the plan. These recommendations take into account the finding that suitable alternatives appear to be available.

Specific mitigation measures in terms of changes to be applied to each proposed development site where issues remain site have been included in Annex 1.

General mitigation measures for the **River Kent SAC** includes:

- There should be no further development at sites in Burneside, Steeles Row, and Kentrigg until at least the 3rd development phase of the site allocation DPD
- The plan should also include a caveat that there should be no further development at sites in Burneside, Steeles Row, and Kentrigg sewage network improvements in place.
- Development in the Kendal area should be capped at 2000 properties unless a more stringent phosphorus effluent standard can be achieved. The development of 2000 properties is dependant upon the following timescales and conditions being adhered to:
    - that SLDC adhere to the phasing as currently scheduled in the Land Allocation DPD, publication edited, January 2012.
    - Foul flows only into the sewer network.
    - Separate systems of drainage for effluent and surface water.
    - Surface Water Management plans to be developed and produced prior to construction and agreed with United Utilities (UU).
    - Sustainable drainage systems to be implemented for all development
    - No detriment to existing serviceability.

For **Morecambe Bay SAC/SPA/Ramsar** all potentially sensitive sites around Morecambe Bay SAC/SPA/ Ramsar should include a non-negotiable requirement for SUDS, as advised in the Core Strategy.

For the **Morecambe Bay Pavement SAC** the AA concluded there would be no adverse effect on integrity.

2 Introduction

The South Lakeland Allocations of Land Development Plan Document (DPD) when adopted, will allocate land for housing, employment, shopping and open space and other uses. It forms part of the Local Development Framework for the district, and follows the adoption of the Core Strategy in October 2010.

The District Council published an Emerging Land Allocation Options DPD for consultation in January 2011 and intends to publish the Land Allocation DPD for pre submission consultation on the 18th January. After this consultation it will submit the document for independent examination by an Inspector. Subsequently, after making any necessary changes, the Council will adopt the DPD.

The Core Strategy was also previously subject to Appropriate Assessment, and certain measures recommended to avoid effects on European sites were carried forward into the Adopted Core Strategy as policies. Since the Core Strategy provides the framework for the Allocations of Land DPD it must be in conformity with these key points. However, the Land Allocations DPD must be considered as a plan in its own right and assessed using the most current information and techniques available.

This Appropriate Assessment work and report follows the Screening Report of the Allocations of Land DPD, which was intended to focus detailed investigations on the key "likely significant effects".

It must be emphasised that the Appropriate Assessment process is restricted under the Habitat Regulations to consideration of potential effects of plans or projects on European sites and does not represent a comprehensive biodiversity or ecological impact assessment. A conclusion in this report that a potential land allocation will not affect the integrity of a European site should therefore not be interpreted as a green light for development from the ecological perspective, as effects on sites, habitats and species will need to be separately assessed.

3 Methodology

The Appropriate Assessment has examined in detail the pathways of Likely Significant Effects from potential development sites to European sites identified at Screening stage, in order to determine whether it can be demonstrated that the plan will not have adverse effects on site integrity. The Appropriate Assessment considers predicted development impacts against conservation objectives and statements of favourable condition of the sites. It also assesses potential in combination effects with other relevant plans and projects.

Further details of methods applied in this Appropriate Assessment are given in Section 5.

4 Conservation Objectives of European Sites

Annex 2 summarises the reasons for designation of those European sites identified at screening stage as potentially at risk from significant effects. Headline conservation objectives, requirements to maintain favourable condition status and key factors affecting site integrity are also given for each site.

Since the River Kent SAC is considered to be most at risk of effects on site integrity arising from the DPD, the detailed Conservation Objectives are presented in full for this site at Annex 3.

The River Kent was designated as a Special Area for Conservation (SAC) in 2004. The SAC runs from tributaries and the main river north of Kendal to near the tidal limit at Sedgewick in the south.

Conservation objectives for the River Kent SAC and definitions of favourable condition of the SAC were drafted by Natural England in 2007 and revised in 2009. The principal reason for the selection of the River Kent as an SAC is that it is considered one of the best areas in the UK for white-clawed crayfish, *Austropotamobius pallipes*, an Annex 2 species of the Habitats Directive.

Further qualifying features include the significant presence of freshwater pearl mussel, *Margaritifera margaritifera*, and bullhead, *Cottus gobio*, also Annex 2 species, and the classification of the site as "a watercourse of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation", an Annex 1 habitat under the Habitats Directive.

5 Interactions between Plan and European Sites and methods of assessment

The Screening Report identified a number of ways in which development sites proposed in the Land Allocations DPD may adversely affect the European sites under consideration.

These pathways of interaction were:

1. The proposed Development Site boundary includes land that is within a European site and may lead to habitat loss or degradation.
2. The proposed Development Site boundary is within 100m of a European site and has an additional concern either because:
    a. The proposed Development Site is immediately adjacent to a European site, with potential effects from pollution;
    b. The proposed Development Site will damage or destroy habitat that could be supporting the integrity of the European site; or
    c. The proposed development site is within a flood risk area, adjacent to a European site with coastal squeeze sensitivity, where development would remove the possibility of natural coastline movement, or increase risks of pollution from extreme flooding.
3. The proposed Development Site risks overloading the existing sewage infrastructure at Burneside and increasing the risk of sewage effluent being discharged into the River Kent SAC with adverse effect on water quality.
4. The proposed Development Site risks overloading the existing sewage infrastructure at Kentrigg and increasing the risk of sewage effluent being discharged into the River Kent SAC with adverse effect on water quality.
5. The proposed Development Site drains into the Ulverston Canal, with potential pollution effects on the Morecambe Bay SAC/SPA/Ramsar Site.

In addition, further information provided by the EA and UU during the AA process has emphasised the need to further examine the issues regarding Wastewater Treatment Works (WwTW) capacity that we identified in the Core Strategy HRA. So a sixth pathway of interaction has been examined that relates to all development sites proposed for Kendal:

6. The proposed development in Kendal risks overloading the capacity of the WwTW increasing the volume of foul sewage entering the river and leading to a rise in phosphorus concentrations in the River Kent SAC.

The assessment took account of the conservation objectives defined by Natural England for the SACs and SPAs potentially affected. These are included for River Kent SAC, Morecambe Bay SAC and Morecambe Bay SPA in Annex 1.

The methods used to assess these issues are summarised in Table 1.

Figure 1 shows the distribution of European sites and potential development sites in South Lakeland

Table 1 : Methods used to assess threats and pressures to European sites

Issue	Sites affected	Methods
1. Includes land that is within a European site	Morecambe Bay SAC/SPA/Ramsar Site	Close inspection in GIS and in the field. Consideration of buffer zone requirement.
2. The proposed Development Site boundary is within 100m of a European site and has an additional concern either		
2a. The proposed Development Site is immediately adjacent to a European site, with potential effects from pollution	River Kent SAC Morecambe Bay SAC/SPA/Ramsar Site	Inspection in the field.
2b. The proposed Development Site will damage or destroy habitat that could be supporting the integrity of the European site	River Kent SAC Morecambe Bay SAC/SPA/Ramsar Site	Analysis of the potential links between habitat and conservation objectives of the European site.
2c The proposed development site is within a flood risk area, adjacent to a European site with coastal squeeze sensitivity, where development would remove the possibility of natural coastline movement, or increase risks of pollution from extreme flooding	Morecambe Bay SAC/SPA/Ramsar Site	Analysis of the site situation in relation to Shoreline Management Plan options.
3. The proposed Development Site risks overloading the existing sewage infrastructure at Burneside and increasing the risk of sewage effluent being discharged into the River Kent SAC with adverse effect on water quality	River Kent SAC	Analysis of European Crayfish distribution in relation to water quality data across England to determine potential sensitivity of the species to deteriorating water quality. Also analysis of local sewage infrastructure failures in relation to water quality data; analysis of trends in River Kent

		water quality against improvements in waste water treatment plant at Kendal, and consideration of likely trends against river quality objectives.
4. The proposed Development Site risks overloading the existing sewage infrastructure at Kentrigg and increasing the risk of sewage effluent being discharged into the River Kent SAC with adverse effect on water quality	River Kent SAC	As (3). Note that the issue is closely related to the issue raised in Core Strategy Appropriate Assessment on overall capacity issues at Kendal WwTW.
5. The proposed Development Site drains into the Ulverston Canal, with potential pollution effects on the Morecambe Bay SAC/SPA/Ramsar Site.	Morecambe Bay SAC/SPA/Ramsar Site	Site inspection.
6. The proposed development in Kendal risks overloading the capacity of the WwTW increasing the volume of foul sewage entering the river and leading to a rise in phosphorus concentrations in the River Kent SAC.	River Kent	This is a cumulative issue, with an effect resulting from existing and planned possible development in Kendal. Analysis of current Phosphorous levels. Meetings with EA, NE and UU.

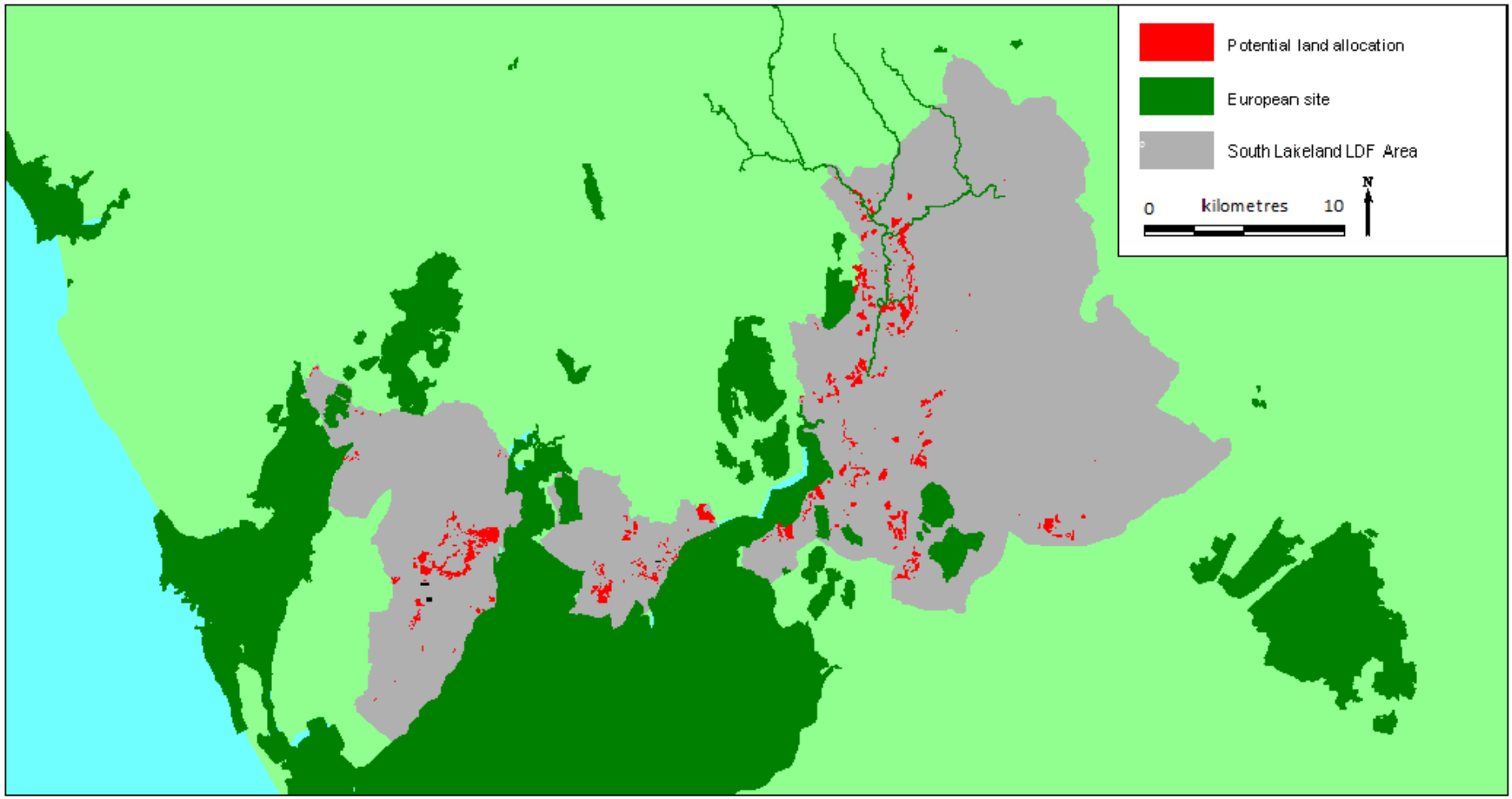

Figure 1 Location of European sites and potential development sites in South Lakeland

6 Investigations into effects on European sites

Various strands of investigation were undertaken to resolve the issues identified during screening and listed above to establish whether the implementation of the plan would have an adverse effect on the integrity of European sites.

6.1 Investigations relating to River Kent SAC

6.1.1 Potential risks of deteriorating water quality in the River Kent SAC on White-clawed crayfish

Potential significant adverse effects on the Freshwater Pearl Mussel and Bullhead species were ruled out on the following grounds:

- The Freshwater Pearl Mussel has been recorded only from Dubbs Beck, a headwater tributary well upstream of all proposed development in the plan.
- The favourable condition features for Bullhead are unlikely to be affected by the proposed development, which should not alter the physical features within the main watercourse.

Investigations were therefore focused on White-clawed crayfish and the river system itself.

Research on the water quality of rivers in England and Wales supporting populations of White-clawed crayfish has been undertaken for this report to examine the potential risks of deteriorating water quality in the River Kent SAC, arising from development, on the crayfish populations.

All available White-clawed crayfish records for England and Wales were obtained from the National Biodiversity Network Gateway. These records include records supplied by Local Records Centres, Environment Agency (EA), Biological Records Centre and many other sources. The records were then filtered for:

- Records since 2001
- Survey location on river
- Georeference precision of 100m or better

Chemical and biological river water quality data in 2003 were then requested of the Environment Agency for rivers throughout England and Wales. This dataset was then analysed in GIS against an underlying rivers network dataset and the filtered crayfish records dataset to extract river water quality data in sample locations up to 2km upstream of the crayfish records.

This process yielded 55 locations where it can reasonably be assumed that the measured water quality approximates to the water quality at the precise locations where crayfish populations were present at the time (Figure 2).

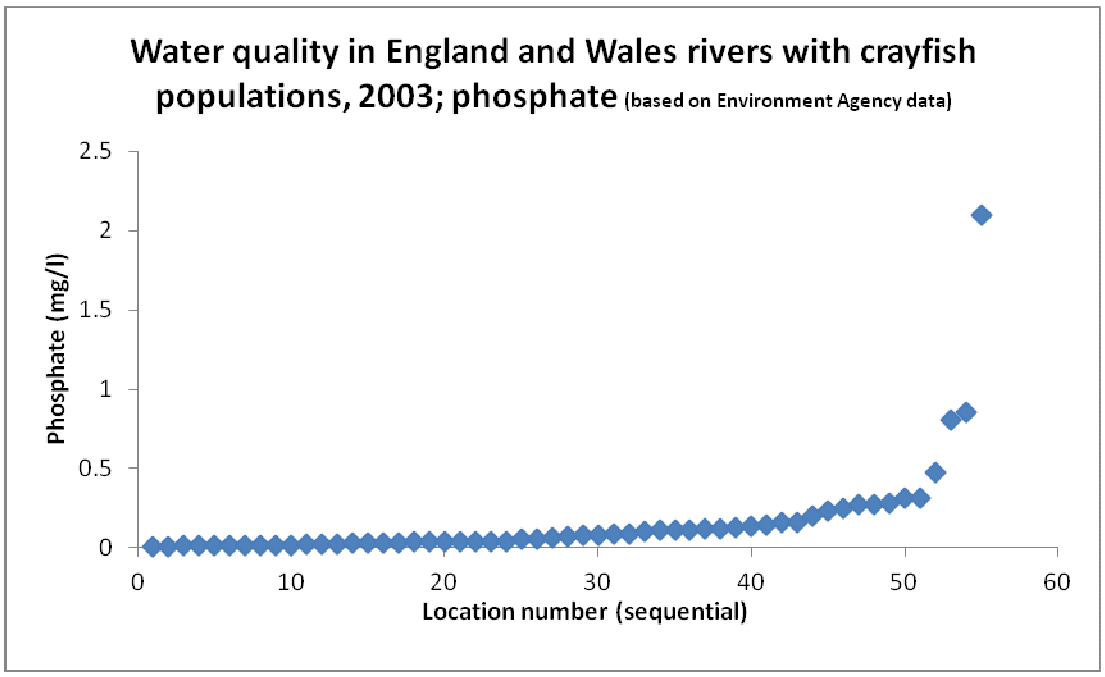

Figure 2 Water Quality in locations on rivers where crayfish population were present

The phosphorus standard for the River Kent SAC ranges from 0.02 to 0.06 mg/l (see Annex 3), with current recorded levels in or below this range (see section 6.1.2).

29 (53%) of the 55 sample locations in England and Wales have measured phosphorus levels above the highest standard set for the River Kent. It can be seen from Figure 2 that some crayfish populations are present in rivers with phosphorus levels up to 50 times higher than those currently in the River Kent.

Similar results are found through analysis of BOD and ammonia parameters at the sample locations.

The overall river quality grade (GQA chemical) at the sample locations is shown in Figure 3.

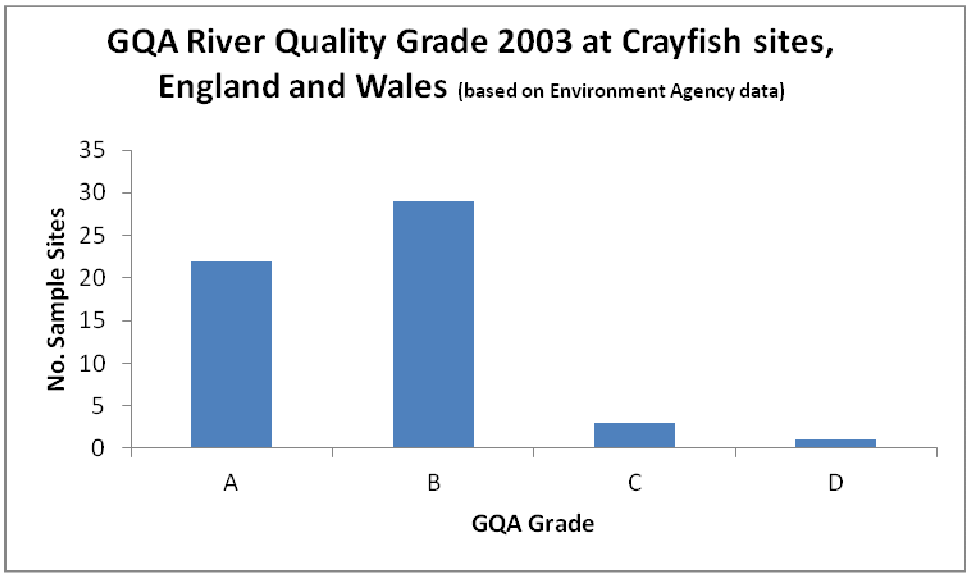

Figure 3 overall river quality grade (GQA chemical) at the 55 sample locations in England and Wales

The River Kent SAC is primarily Grade A with a small section of Grade B.

These results tend to confirm previous experimental research findings (Firkins, 1993) that White-clawed crayfish has a moderately wide range of environmental tolerance in terms of water quality. Considering this information we conclude that the site allocation DPD (alone and in combination) is not likely to adversely affect the White-clawed crayfish through deterioration in the water quality

6.1.2 Current Water Quality & potential impact of future development on phosphate levels

Chemical and biological water quality is monitored by the Environment Agency at several points in the River Kent and its tributaries, with a number of measurements taken normally on a monthly basis. Since 2009 the monitoring programme has migrated from standard GQA format to a more targeted approach designed to fit Water Framework Directive requirements.

Analysis of the data for the period 2003-2011 shows that most parameters with a target set in the SAC Conservation Objectives are met. However, concern was raised in regard to the situation for orthophosphate and the capacity of the River Kent SAC to receive an increased level of phosphate associated with further development in Kendal. The uncertainty in the capacity of the River Kent SAC to receive more orthophosphate and remain within the Conservation Objectives target led to two meetings to attempt to resolve the issue. The first was with the Environment Agency, Natural England and South Lakeland District Council on the 15th November. The second was on the 13th December and included all the stakeholders at the firs t meeting and United Utilities. The minutes from these meetings are included within Annex 4.

The standard for orthophosphate is set at 0.02 mg/L for the upper reaches above the confluence with the River Mint, 0.06mg/L for the reaches below the Kendal Waste Water Treatment Works (WwTW) and 0.04mg/L for the River Kent between these two points.

Sources of phosphorus pollution comprise mainly effluent from WwTW and diffuse pollution from agricultural runoff. In detailed modelling of the inputs, discharges and hydrology of the catchment undertaken for the Environment Agency in 2006 under the Review of Consents procedure, the principal source of the phosphorus problem in the lower Kent was identified by the Environment Agency as the Kendal WwTW. Consequently, following consultation with interested parties, the Environment Agency lowered the discharge consent at the WwTW to a point at which modelling suggested the phosphorus levels in the lower Kent would reduce to the required standard level. United Utilities then made a capital investment in a Phosphate Removal Plant at the WwTW, designed to achieve this lower discharge level. The work was completed in December 2008.

Chemical monitoring data in the downstream section of the river suggests that the plant has had a significant positive effect. See Figure 4 . The level of orthophosphate is currently at around 0.035 – 0.04 mg/l (below the threshold of 0.06 mg/l), below the anticipated target to be achieved from the capital investment in the new Phosphate Removal Plant and lower than previous modelling predicated. This appears to provide headroom for the River Kent to receive more development in Kendal. However, the reason why there is some headroom available is uncertain. Potential reasons include that either the flow levels are lower than the estimates used in the modelling or that the discharge from the WwTW is better than

expected. Orthophosphorus loading of the downstream section of the River Kent SAC is predicted to increase approximately in proportion to the increase in population, unless mitigation measures are implemented (Environment Agency communication, September 2011). This is because the discharge consent at Kendal WwTW was set to meet the phosphorus targets in the river at the time, without projection of population increase. Although the discharge consent stays the same, the greater volume of foul sewage throughput will inevitably mean a rise in phosphorus concentration in the river.

The investigation and meeting on this issue identified essential need for further modelling to fine tune the forecast and to confirm with certainly to SLDC that there exists capacity at the WwTW to accommodate population growth in Kendal.

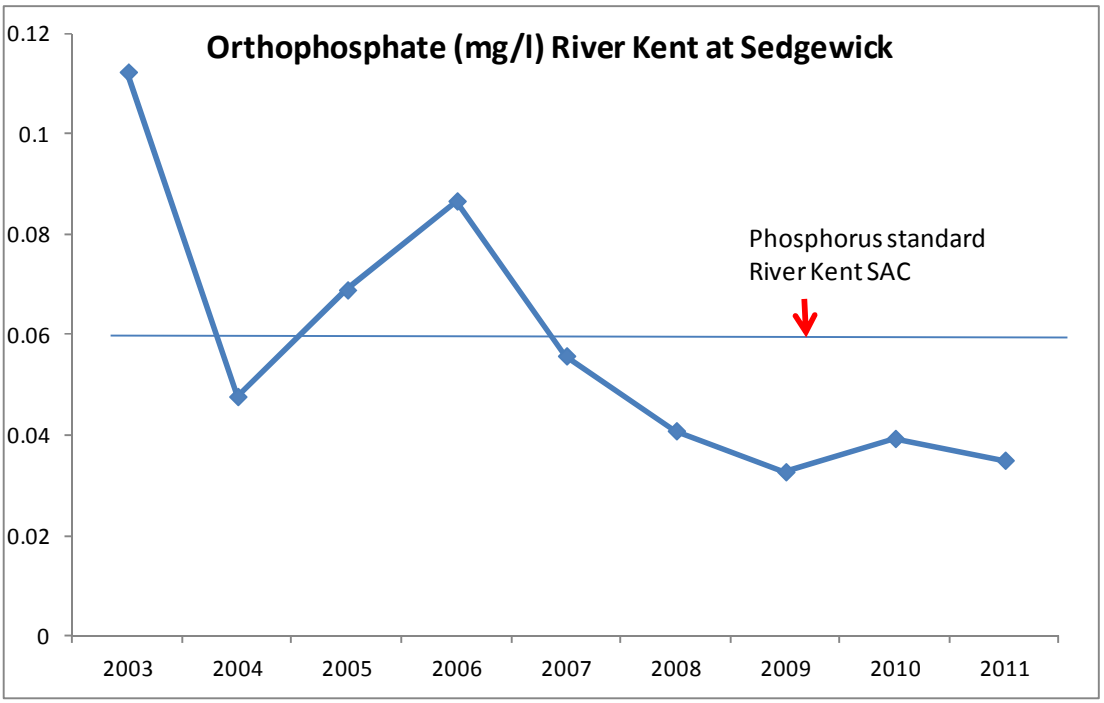

Figure 4 Orthophosphate data for the lower River Kent over the period 2003-2011.

Following the meeting held on the 13th December United Utilities undertook modelling for Kendal WwTW and the Network. United Utilities have confirmed that an additional 2000 properties in the Kendal area can be accommodated, providing that the following timescales and conditions are adhered to:

- That SLDC adhere to the phasing as currently scheduled in the Land Allocation DPD, publication edited, January 2012..
- Foul flows only into the sewer network.
- Separate systems of drainage.
- Surface Water Management plans to be developed and produced prior to construction and agreed with UU.
- Sustainable drainage systems to be implemented for all development
- No detriment to existing serviceability.

It must therefore be concluded that the level of Kendal development will lead to breach of the phosphorus target in the River Kent downstream of the WwTW, unless these mitigation measures are put in place.

There is also an additional housing limit of 2000 properties which must be adhered to unless better technology is installed at the WwTW or the EA are successful at tackling other sources of Phosphate in the catchment.

6.1.3 Burneside and Kentrigg Walk Bottlenecks

With regard to the sewerage infrastructure issues at Burneside and Kentrigg Walk specifically and the subsequent impact on the River Kent SAC, there are a number of uncertainties that are difficult to resolve which are discussed here:

1. There is a lack of monitoring data in respect of chemical or biological response of river parameters to the breakdown incidents. While no significant response is found in the few cases where routine monitoring coincides within a few days of the date of the incident, this is insufficient to show that there is never a significant adverse effect from such incidents. It is clearly not possible to retrospectively monitor infrequent past incidents.
2. Climate change forecasts include an increased frequency of extreme rainfall events of the sort that precipitate sewerage failures. Much of the sewerage network in the Burneside and north Kendal areas is of the old type, combining surface water with foul sewage, leaving it vulnerable to extreme rainfall events. New development would be serviced with modern, separate systems, but not for the full distance to the WwTW; problems are therefore likely to increase in the absence of specific mitigation measures to resolve this.
3. United Utilities is undertaking a special investigation of the problems in this area with a view to scoping and costing potential solutions; this report is not yet available.
4. The scale of investment that is likely to be required to rectify these bottleneck problems means that 2016-2020 is the earliest period in which the infrastructure improvements could be made. This conclusion has potentially serious implications for phasing of housing developments that will feed into this part of the network.

6.1.4 Development Site Overlaps River Kent SAC

A small number of potential development sites around the Natland Beck in south-east Kendal include parts of the River Kent SAC within the boundary. The SAC at this point is a narrow strip comprising the relatively steep and fast flowing Natland Beck, a tributary of the Kent. The Natland Beck is known to support good populations of White-clawed crayfish. The Natland Beck in the area of the proposed developments has various semi-natural habitats outside of the SAC boundary, including grasslands, marsh and wet woodland; these habitats support the integrity of the river habitat within the SAC.

The tributaries if the Natland Beck, although not within the SAC, also support good populations of White-clawed crayfish (Environment Agency, pers. comm). These tributaries clearly have hydrological connection with the SAC.

Development across or near the Natland Beck and its tributaries risks adversely affecting site integrity, with impacts potentially arising from all or any of the following

- loss of part of the river system habitat through culverting
- loss of adjacent habitat, such as wet grassland, woodland
- pollution of the water course from surface water runoff.

Partial development of some of these sites may be acceptable from the Appropriate Assessment perspective provided a buffer zone against the SAC and the Natland Beck tributaries is left undeveloped and managed appropriately. A permanent fence to create a 10m wide no-working buffer zone adjacent to the SAC is recommended by Natural England[1] and any developments located at least 15m from it. A landscape scheme of locally native trees should be provided where appropriate in the permanently fenced-off buffer zone. Clean, inert materials should be used for any developments. This applies along the whole length of the portion of the SAC running through the proposed development site at Natland Beck and its tributaries.

The buffer zone supports the integrity of the River Kent SAC in at least three ways:

1. Habitats in the buffer zone can be used by some fauna species that also use the river and stream tributaries – for feeding, resting, shelter or movement.
2. Human disturbance to White claw crayfish will be reduced.
3. The buffer zone acts to reduce the impacts from pollutants.

The effectiveness of buffer zones along water courses has been shown in numerous studies (Cranfield University, 2007). In the context of pollution the purpose of a buffer feature is to intercept runoff and to trap pollutants before they can enter a watercourse. Buffer features may be designed specifically for their pollution abatement role or combined with other objectives such as biodiversity protection. Pollution trapping efficiency generally is improved when the width of the buffer is increased with longer buffers increasing the percentage of mass reduction of both nutrients and sediment.

6.1.5 Development Sites Adjacent to River Kent SAC

A number of proposed development sites in the Kendal area adjoin the River Kent itself or the Rivers Mint and Sprint, substantial tributaries of the Kent in north Kendal and Burneside and of similar size to the main river in the vicinity of Kendal. These sites generally have their boundary drawn abutting the SAC boundary, which in turn is tightly drawn at the river bank. Some of these sites are rural in character, outside of the current developed areas of Kendal and Burneside; others lie between industrial sites with hard surface development running right to the river bank.

[1] Natural England (2011) South Lakeland Dc Informal Consultation – Land Allocations – Planning Infrastructure And Service Delivery Together, Letter to South Lakeland 6th July 2011

Partial development of these sites is acceptable from the Appropriate Assessment perspective provided a buffer zone is left undeveloped and managed appropriately. Following Natural England's guidance[2] we recommend a permanent buffer zone of 10 metres from the SAC boundary to ensure no risk to site integrity (Cranfield University, 2007). Any developments should be located at least 15m from it. Clean, inert materials should be used for any developments. This applies along the whole length of the portion of the SAC running adjacent to the proposed development site.

The evidence for the effectiveness of buffer zones is described in section 6.1.4 above.

An additional consideration for proposed development sites adjacent to main river sections of the SAC is the need to provide space for the river system to function optimally as habitats for characteristic wildlife communities. Studies have shown that much of the River Kent is in unfavourable condition because of past modification of the channel (Jacobs, 2010). Key impacts have included degradation of the riparian zone, leading to accelerated bank erosion rates and reductions in marginal shelter and shading. Natural England has identified river restoration projects as the most appropriate mechanism for returning these sections to 'favourable condition' for the physical habitat. Further development near the main river should not close off options to restore the river system, including the riparian zone, to favourable condition. The 10 metres buffer zone mitigation measures will help achieve this.

6.2 Investigations relating to Morecambe Bay SAC/SPA/Ramsar

The habitats and species for which Morecambe Bay SAC, SPA and Ramsar sites were selected are shown in Annex 2

6.2.1 Development Site Overlaps Morecambe Bay SAC/SPA/Ramsar

One proposed development site at Arnside includes a significant area of land within the SAC/SPA/Ramsar. Development of the full site area would affect the integrity of these European sites because the area of habitat available for would be reduced, whereas favourable condition status rests on maintenance of habitat extent. From the Appropriate Assessment viewpoint, partial development of this site could be permitted provided the developed area was wholly outside of the designated sites and behind the line of the disused railway which forms the artificial flood defence barrier against the estuary at this location.

6.2.2 Development Sites Adjoin or are close to the Morecambe Bay SAC/SPA/Ramsar

The Lido site at Grange-over-Sands protrudes into the estuary, the designated site boundaries having been drawn around it. As a small, previously developed site with no significant functional relationship with the estuary habitats, redevelopment would not constitute a threat to the integrity of the sites. There is already a significant amount of disturbance in this location from people enjoying the promenade as noted in the Appropriate Assessment of the South Lakeland District Core Strategy (2009).

A number of proposed development sites adjoin the long disused Ulverston Canal which lies between the town of Ulverston and Morecambe Bay, connecting to the estuary at

[2] Natural England (2011) South Lakeland Dc Informal Consultation – Land Allocations – Planning Infrastructure And Service Delivery Together, Letter to South Lakeland 6th July 2011

permanently closed lock gates. Land on much of the south side of the canal comprises large industrial premises, while the west end is largely occupied by industrial estate premises and car parks. Land on the north side is more rural in character, comprising grasslands, arable, woodland and a disused quarry. A small, largely wooded, hill separates the proposed development sites from the estuary. A well used cycle track runs along the towpath on the north side of the canal.

The proposed development sites include a very large site on the north side of the canal, and infilling between the developed sites on the south side and canal head.

The habitats and species for which the Morecambe Bay SAC, SPA and Ramsar sites are selected are shown in Annex 2, together with the requirements to maintain favourable conservation status and key factors affecting site integrity.

Potential risks to site integrity arise from pollutants affecting water quality, disturbance and from habitat removal, if the habitats currently present are essential to species in the estuary. All other requirements to maintain favourable conservation status cannot be affected by changes outside the designated site boundaries.

Regarding water quality, the assumption is made that the regulatory authorities would require the full modern standard foul sewage and surface water drainage infrastructure of any developments approved in this area. This would include a non-negotiable requirement for SUDS, as advised in the Core Strategy for all potentially sensitive sites. With this assumption we find no essential difference between potential development in this area and all other developments on the fringes of the estuary, and no threat to site integrity on these grounds. Natural England[3] have confirmed that they do not consider that the risk of nutrient enrichment to Morecambe Bay via the Ulverston canal is likely to have a significant effect for the purposes of HRA of the Land Allocation DPD

Regarding disturbance, we note that the sites do not immediately adjoin the estuary, being separated from it by either a large industrial complex or a small hill. The extra visitor pressure on the estuary should therefore not be significantly greater arising from these developments than other potential developments in the local plan area, and do not constitute a threat to site integrity.

Regarding habitat linkage, we note that all species for which the sites are designated are birds of estuaries, saltmarshes and mudflats, and none rely on the habitats present on the proposed development sites for any part of their life cycle. The potential loss of these habitats does not therefore constitute a threat to site integrity.

Although we conclude that in the Habitat Regulations context the development of these sites may not be precluded, we note the presence of many habitat features of high value to biodiversity and advise full evaluation of development proposals against other wildlife policies.

6.3 Investigations relating to Morecambe Bay Pavements SAC

One proposed development site with intended land-use “recreation” adjoins one parcel of the Morecambe Bay Pavements SAC to the west of Kendal.

[3] Natural England (2011) Email communication 29th September 2011

The site is a relatively flat hill top field of semi-improved grassland with occasional limestone outcrops supporting calcareous flora. A dry stone wall separates the site from the SAC. A public footpath crosses the site from north-east to south-west and then continues across the SAC in the direction of Brigsteer.

The habitats and species for which the Morecambe Bay Pavements SAC was selected are shown in Annex 2, together with the requirements to maintain favourable condition status and the key factors affecting site integrity.

Limestone Grassland is the habitat of principal importance in Scout Scar SSSI, the parcel of the SAC adjacent to the proposed development site. The risk of deterioration of this habitat from adjacent recreational activity is assessed as low, although the details of any particular planning application will need to be carefully assessed.

The listed Annex 2 species is not recorded from the parcel of the SAC at Kendal. Furthermore it is not a species that is at risk from disturbance arising from recreational activity on neighbouring land.

A substantial wall separates the proposed site from the SAC. Any additional use of the SAC is therefore likely to arise only on the public right of way; this does not pose a significant risk to the integrity of the SAC.

The requirements to maintain favourable conservation status are not affected by this potential development.

It should be noted that the biodiversity value of the proposed site independent of the SAC has not been fully assessed for this report.

7 Findings in relation to impacts from DPD

Table 2 Findings in relation to potential threats on European sites

Threat or pressures from DPD	European sites potentially effected	Findings and proposed mitigation
1. Includes land that is within a European site	Morecambe Bay SAC/SPA/Ramsar Site River Kent SAC	Boundaries of those proposed developed sites that include land within a European site need to be amended to exclude the European site entirely; additionally these sites must have sufficient buffer zone to prevent adverse effects.
2. The proposed Development Site boundary is within 100m of a European site and has an additional concern either		
a. The proposed Development Site is immediately adjacent to a European site, with potential effects from pollution	River Kent SAC Morecambe Bay SAC/SPA/Ramsar Site	Several potential development sites close to the River Kent SAC will damage or destroy habitat that is helping to protect the SAC from adverse pollution effects; others have potential to restore a more natural river morphology (see Annex 1) and this needs to be taken into account in defining development limits and site design. No development within SAC boundaries can be permitted, and we recommend a permanent fence to create a 10m wide no-working buffer zone adjacent to the SAC is recommended by Natural England[4] and any developments located at least 15m from it. For Morecambe Bay SAC/SPA/Ramsar Site the potential loss of habitats areas associated with land allocations do not constitute a threat to site integrity.
b. The proposed	River Kent	Several potential development sites

[4] Natural England (2011) South Lakeland Dc Informal Consultation – Land Allocations – Planning Infrastructure And Service Delivery Together, Letter to South Lakeland 6th July 2011

Threat or pressures from DPD	European sites potentially effected	Findings and proposed mitigation
Development Site will damage or destroy habitat that could be supporting the integrity of the European site	Morecambe Bay SAC/SPA/Ramsar Site	close to the River Kent SAC will damage or destroy habitat that is helping to protect the SAC from adverse pollution effects; others have potential to restore a more natural river morphology (see Annex 1) and this needs to be taken into account in defining development limits and site design. No development within SAC boundaries can be permitted, and we recommend a permanent fence to create a 10m wide no-working buffer zone adjacent to the SAC is recommended by Natural England[5] and any developments located at least 15m from it. For Morecambe Bay SAC/SPA/Ramsar Site the potential loss of habitats areas associated with land allocations do not constitute a threat to site integrity.
c. The proposed development site is within a flood risk area, adjacent to a European site with coastal squeeze sensitivity, where development would remove the possibility of natural coastline movement, or increase risks of pollution from extreme flooding	Morecambe Bay SAC/SPA/Ramsar Site	No sites in this category are assessed as having significant adverse effects on site integrity.
3. The proposed Development Site risks overloading the existing sewage infrastructure at Burneside and increasing the risk of	River Kent SAC	There is considerable uncertainty and lack of monitoring data in respect of the chemical or biological response of river parameters to the sewerage failures. Further development in this

[5] Natural England (2011) South Lakeland Dc Informal Consultation – Land Allocations – Planning Infrastructure And Service Delivery Together, Letter to South Lakeland 6th July 2011

Threat or pressures from DPD	European sites potentially effected	Findings and proposed mitigation
sewage effluent being discharged into the River Kent SAC with adverse effect on water quality		area risks exacerbating problems of illegal discharges into the River Kent. The solution current being sought will only stop the system from overflowing but it will still be at capacity. As mitigation SLDC will need to put relevant sites in Burneside, Steeles Row, and Kentrigg into the 3rd development phase and include a caveat in the plan that further development in these locations can not go forward without sewage network improvements in place.
4. The proposed Development Site risks overloading the existing sewage infrastructure at Kentrigg and increasing the risk of sewage effluent being discharged into the River Kent SAC with adverse effect on water quality	River Kent SAC	
5. The proposed Development Site drains into the Ulverston Canal, with potential pollution effects on the Morecambe Bay SAC/SPA/Ramsar Site.	Morecambe Bay SAC/SPA/Ramsar Site	Sites in this category are assessed as not causing adverse effects on site integrity.
6. The proposed development in Kendal risks overloading the capacity of the WwTW increasing the volume of foul sewage entering the river and leading to a rise in phosphorus concentrations in the River Kent SAC.	River Kent	This is a cumulative issue, with an effect resulting from existing and planned possible development in Kendal. The orthophosphate levels in the River Kent SAC downstream of the Kendal WwTW remain very close to the target levels agreed between the Environment Agency and Natural England after substantial investment by United Utilities in phosphate removal plant in 2008. United Utilities have confirmed that there is sufficient capacity for the development of 2000 properties within the sewer network and Kendal WwTW. This is subject to phasing of the development, use of separate systems, SUDS, and an overall surface water management plan.

8 Other plans and programmes and underlying trends

As part of the AA stage 2 process, it is also necessary to consider whether the proposed plan might have any adverse effects on integrity of sites 'In combination'. 'In combination' refers to the cumulative effect of influences acting on sites from other relevant plans and projects in the context of prevailing environmental conditions. This process therefore takes account of reasonably foreseeable impacts arising from both plans and projects and from 'background' environmental changes or trends.

8.1 Other Plans and Projects that may act in combination

Other plans within or near the Plan area have been reviewed to identify potential in-combination effects on European Sites. The background environmental trend of climate change is also briefly reviewed here in Table 3.

Table 3 Other Plans and Projects that may act in combination

Plans And Programmes Contributing To In-Combination Effects	Summary of plan/ project/ background trend	Summary of potential In-Combination Effect
Cumbria Minerals and Waste Core Strategy, 2009	Strategy for locating waste treatment facilities and minerals extraction (sand & gravel, aggregates and other special minerals) across Cumbria. Made spatially specific by the Site Allocations Policy DPD	None considered to be significant
Cumbria Minerals and Waste Site Allocations Policy DPD, consultation draft 2009	Identifies Kendal Fell Quarry as a Waste Treatment Facility First Preference/ Household Waste Recycling Centre and Roan Edge Quarry, New Hutton, Kendal as preferred Area of Search for roadstone, including extension.	Neither of these sites are considered likely to contribute to in-combination effects
Arnside and Silverdale AONB Management Plan 2009	Contains many policies aiming to conserve biodiversity resource	No policies likely to add to in-combination adverse effects
Yorkshire Dales National Park Minerals and Waste Development Plan Document Issues and Options, June 2007	Proposed policies to preclude new minerals permissions in the National Park could add to pressure on neighbouring districts, including South Lakeland.	The Cumbria Minerals and Waste Site Allocations Policy DPD has only one aggregates quarry proposal, and this site is assessed as not having adverse effect on European sites.

Plans And Programmes Contributing To In-Combination Effects	Summary of plan/ project/ background trend	Summary of potential In-Combination Effect
UK Climate Projections 2009	Defines probabilistic scenarios for rainfall, temperature and sea level rise and other parameters for defined periods through the 21st century, across the UK. For example, the central estimate for annual mean daily temperature rise for South Lakeland, high emissions scenario, is 1-2 degrees C for the 2020s, 2-3 degrees for the 2050s and 3-4 degrees for the 2080s. (http://ukclimateprojections.defra.gov.uk/). Winter rainfall, central estimate, high emissions, 0-10% higher for the 2020s, 10-20% higher for the 2050s and 20-40% higher for the 2080s. Absolute sea level rise under the high emissions scenario is projected to be 37cm. by 2080, central estimate, highly unlikely to be less than 12cm or more than 62 cm. Development undertaken in the plan period will still be present in the 2080s and it is therefore appropriate to consider the long term scenarios. .	Climate change is projected to have a range of significant effects, beyond the scope of this report to summarise here. However, water quantity and quality issues on wetland sites, increased pollution risk from extreme weather events and coastal squeeze from sea level rise may be the most significant effects relevant to European sites in the South Lakeland District. Recent extreme weather events in Cumbria have cast some doubt on whether previous flood risk projections cover the full range of risks, and it seems prudent to plan for the worst scenario.
North West England and North Wales Shoreline Management Plan SMP2 – Consultation Draft December 2009	Identifies sections of the South Lakeland coastline where it may not be feasible or appropriate to maintain existing coastal defence engineering works in the medium to long term.	Offers management realignment opportunities in response to coastal squeeze issues apparent in Morecambe Bay and Duddon Estuary.

Plans And Programmes Contributing To In-Combination Effects	Summary of plan/ project/ background trend	Summary of potential In-Combination Effect
South Lakeland Core Strategy 2010	The Core Strategy document sets out the development strategy for South Lakeland outside the National Park areas up to 2025. Policies particularly relevant include: the policy for Kendal (CS2) includes the following: Make further provision for infrastructure in line with identified need, including: • Until sewage capacity problems at Kentrigg Walk and Steeles Row, Burneside are resolved, no further development should take place above these sewer bottlenecks that add additional flow to the sewer; • Need for new waste-water treatment infrastructure. With regard to managing disturbance: the solutions for managing disturbance proposed in the Morecambe Bay Strategy and to the need to engage with Natural England have been added to Policy CS8.4 (Biodiversity & Geodiversity) and Policy CS8.5 Coast. The Core Strategy now supports stricter mitigation measures in terms of zoning and bylaw enforcement to protect Morecombe Bay SAC through the addition of specific text in CS8.5 Information has been added to the supporting text under CS2 to emphasise the fact that the Core Strategy does not consent to the development of the canal. And that issues including the potential adverse effects on the SAC associated with canal restoration mean that alternatives to canal restoration may need to be considered. (See below)	Sets the framework for the other DPDs in the Local Development Framework. The Land Allocation DPD needs to be in conformity with this document. In particular for the AA the mitigation policies included in the core strategy need to be examine closely and adhered to in the Land Allocation DPD.

Plans And Programmes Contributing To In-Combination Effects	Summary of plan/ project/ background trend	Summary of potential In-Combination Effect
Kendal Canal Head Action Plan	The AAP aims to restore the Northern Reaches of the Lancaster canal. Hydrological connectivity of the canal with the River Kent SAC could result in the introduction of invasive alien species, changes in river flows and water quality due to abstraction and discharge.	Proposals to abstract water from the River Kent downstream of the WwTW for use in the canal, and return it the Kent further upstream, raises issues of causing deterioration in water quality of another stretch of the SAC. This potential additional future pressure on water quality needs to be considered in light of water quality issues raised here. However, as the Action Plan is in the early stages of development the findings of this report and mitigation measures adopted for the site allocation DPD will have greater implications for development of the Kendal Canal Head Action Plan.

8.2 Background environmental conditions and trends

The issues of sewerage infrastructure failure at Burneside/Kentrigg Walk and discharges from the Kendal Waste Water Treatment Works (WwTW) must be considered together, in that the effects on the River Kent SAC are partly cumulative; both affect water quality in the river downstream of the treatment works.

However they are different issues in the sense that the WwTW discharge is subject to licensed consent from the Environment Agency, whereas the discharges arising from the sewerage infrastructure failure are unconsented and therefore illegal. Unconsented discharges are not monitored as closely as consented discharges, were not subject to the Review of Consents process and much is left to the judgement of the Environment Agency as to the seriousness of the effects and to the utility company as to the degree of risk from prosecution and the priority to be afforded to rectifying the issue.

The issues are also different in the sense that the WwTW discharge is affected by all proposed development in Kendal, whereas the Burneside and Kentrigg Walk issues affect only those proposed developments in Burneside and North Kendal that lie above the bottleneck locations in the sewerage infrastructure.

In Appropriate Assessment terms the wider issue was covered at Core Strategy stage, and policies designed to mitigate the problem were incorporated into the final adopted Core Strategy. In particular the policy for Kendal (CS2) includes the following:

Make further provision for infrastructure in line with identified need, including:

- Until sewage capacity problems at Kentrigg Walk and Steeles Row, Burneside are resolved, no further development should take place above these sewer bottlenecks that add additional flow to the sewer;
- Need for new waste-water treatment infrastructure.

The Burneside/Kentrigg Walk issues affect particular potential land allocations, and are more suited to Appropriate Assessment as part of the Land Allocations DPD. While these sites were the focus of attention at screening stage, it has become clear with the more detailed investigation in this report that the wider issue of the WwTW is at least as important, and it is relevant to seek to resolve the issue as far as is possible through this process.

8.3 Cumulative effects of multiple site allocations

Cumulative effects of multiple sites within the Allocations of Land DPD are also relevant. The overall effects of urbanisation on European Sites were covered in the Core Strategy AA and have been considered again here. Future issues regarding water quality and capacity of the WwTW are related to the combination of multiple site development rather than the specific locations of any particular development in Kendal.

The change of land use from agriculture to urban over a significant part of the River Kent and its tributaries SAC, arising from multiple development sites, has been considered and protection of land adjacent to the river proposed through buffer zones.

A precautionary approach has been applied here as at this stage all of the sites are being considered for development. But it is understood that the site proposals greatly exceed the required land area for allocation, so development control will have the flexible to consider sites further in terms of the functions they play in provide supporting habitat and pollution trapping efficiency.

9 Conclusions and Mitigation Measures

Interim conclusions for River Kent SAC

It is not possible to demonstrate that the level of development in Kendal envisaged in the core strategy and expressed through the emerging options list of land allocations will not have an adverse effect on site integrity of the River Kent SAC unless satisfactory mitigation measures are guaranteed.

Mitigation for River Kent SAC

The AA has recommended that buffer zones be included for certain development sites adjacent to the River Kent to address issues of loss of supporting habitat and the pollution trapping function of this land. These are included in Annex 1.

To address issues regarding the capacity of the sewerage network and the WwTW works in Kendal the following is required:

- There should be no further development at sites in Burneside, Steeles Row, and Kentrigg until at least the 3rd development phase of the site allocation DPD
- The plan should also include a caveat that there should be no further development at sites in Burneside, Steeles Row, and Kentrigg sewage network improvements in place.
- Development in the Kendal area should be capped at 2000 properties unless a more stringent phosphorus effluent standard can be achieved. However, the development of 2000 properties is dependant upon the following timescales and conditions being adhered to:
    - That SLDC adhere to the phasing as currently scheduled in the Land Allocation DPD, publication edited, January 2012.
    - Foul flows only into the sewer network.
    - Separate systems of drainage.
    - Surface Water Management plans to be developed and produced prior to construction and agreed with UU.
    - Sustainable drainage systems to be implemented for all development
    - No detriment to existing serviceability.

Interim conclusion for Morecambe Bay SAC/SPA/Ramsar

The AA found that the Site Allocation DPD may be an adverse effect on the integrity of this site. The following changes to the DPD are required to conclude no adverse effect on integrity.

Mitigation for Morecambe Bay SAC/SPA/Ramsar

- The development site at Arnside may be permitted provided the developed area was wholly outside of the designated sites and behind the line of the disused railway which forms the artificial flood defence barrier against the estuary at this location.
- All potentially sensitive sites around Morecambe Bay SAC/SPA/ Ramsar should include a non-negotiable requirement for SUDS, as advised in the Core Strategy.
- These measures are included in Annex 1 which sets out proposed mitigation for all development sites where issues remain.

Conclusion for Morecambe Bay Pavements SAC

The AA found that the Site Allocation DPD would not have an adverse effect on the integrity of this site. No mitigation measures are required.

9.1Final AA conclusions if all recommended mitigation measures incorporated into the plan

This Appropriate Assessment Report constitutes a record of the appropriate assessment required by the Conservation of Habitats and Species Regulations 2010, undertaken by South Lakeland District Council in respect of the South Lakeland Site Allocation DPD, in accordance with the Habitats Directive (Council Directive 92/43/EEC).

Following the incorporation of the above mitigation measures into the DPD by SLDC the plan can be deemed not have an adverse effect on the integrity of European sites.

Glossary

Appropriate Assessment (AA)	An assessment of the affect of a plan or project on the Natura 2000 network. The network comprises Special Protection Areas under the Birds Directive and Special Areas of Conservation under the Habitats Directive (collectively referred to as European sites)
Avoidance	Prevents impacts on European sites from happening in the first place.
Compensation	Off-site offsetting put in place where a significant impact will occur, where there is no alternative, and where the plan is deemed necessary.
Competent authority	The plan-making / decision-making authority. In relation to land use plans this are the Regional Assemblies, County Councils and Local Authorities.
Conservation Objectives	A statement of the nature conservation aspirations for a site, expressed in terms of the favourable condition required for the habitats and / or species for which the site was selected.
European sites	Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). Includes Ramsar sites in this report.
Favourable condition	Designated land is adequately conserved and is meeting its 'conservation objectives', however, there is scope for enhancement.
Habitats Directive	Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna.
Habitats Regulations	Formally known as the Conservation (Natural Habitats, & c.) Regulations 1994. These transpose the requirements of the Habitats Directive into domestic legislation.
Imperative reasons of overriding public interest	The Habitats Regulations require competent authorities to establish that there are no alternative solutions before a

(IROPI)	plan or project can be considered for imperative reasons of overriding public interest. Judgements involve an assessment of the importance of the proposal and whether it is sufficient to override the nature conservation importance of that site.
In-combination	The cumulative effects caused by the project or plan that is currently under consideration, together with the effects of any existing or proposed projects or plans.
Integrity	The integrity of a site is the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was classified.
Local Development Document (LDD)	These include Development Plan Documents (which form part of the statutory development plan) and Supplementary Planning Documents (which do not form part of the statutory development plan). LDDs collectively deliver the spatial planning strategy for a local planning authority's area.
Member State	Nation state member of the EU
Mitigation	Reduces the impact on site integrity to the point where it no longer has adverse effects.
Natura 2000	A Europe-wide network of sites of international importance for nature conservation established as under the European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC; 'Habitats Directive'). This has been transposed into UK law as the Conservation (Natural Habitats &c.) Regulations (1994; 'Habitats Regulations').
Natural England	Natural England works for people, places and nature, to enhance biodiversity, landscapes and wildlife in rural, urban, coastal and marine areas; promote access,

	recreation and public well-being. Natural England was formed by bringing together English Nature, the landscape, access and recreation elements of the Countryside Agency and the environmental land management functions of the Rural Development Service.
Precautionary principle	Prudent action which avoids the possibility of irreversible environmental damage in situations where the scientific evidence is inconclusive but the potential damage could be significant.
Priority Habitat / Species	Habitats and species identified by the Habitats Directive as being of priority importance. Twenty-three of the UK's 76 habitats are highlighted as important under the Habitats Directive priority habitats.
Qualifying Interest Feature	The reasons why the European site has been recommended for designation (e.g. the endangered species that occupy the SAC; rare habitats that occur there; or threatened birds that breed or over-winter in the SPA).
Ramsar sites	Sites designated as internationally important wetland habitats under the International Convention on Wetlands of International Importance (1976) (Ramsar Convention).
Screening	The process of deciding whether or not a plan or project requires an Appropriate Assessment
Site of Special Scientific Interest (SSSI)	UK national designation identified under the Wildlife and Countryside Act (1981) as being important for wildlife and/or geology. Over half of these sites, by area, are internationally important for their wildlife, underpinning the network of Natura 2000 sites, designated as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites.
Special Area of Conservation	Site of European importance for nature conservation designated under the Conservation of Natural Habitats

(SAC)	and Wild Flora and Fauna Directive (92/43/EEC).
Special Protection Area (SPA)	Site of European importance for nature conservation designated under the Conservation of Wild Birds Directive (70/409/EEC).

10 References

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DCLG (2006): Planning for the Protection of European Sites: Appropriate Assessment. Guidance for Regional Spatial Strategies and Local Development Documents.

DEFRA Circular 01/2005: Biodiversity and Geological Conservation – Statutory obligations and their impact within the planning system;

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English Nature guidance notes:

- Habitats Regulations Guidance Note 1, The Appropriate Assessment HRGN 1; The Conservation (Natural Habitats %c) Regulations, 1994;
- Habitats Regulations Guidance Note 2, Review of existing planning permissions and other consents HRGN2; The Conservation (Natural Habitats %c) Regulations, 1994;
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Annex 1 Proposed Development Sites with Specific Outstanding Issues and Proposed Mitigation

New site ref	Site Name	New Land Category	Issue	Mitigation
E31	No site name available	Employment Land	Site within 100m of a European site	Buffer zone against the River Kent of at least 10 metres width required. .
EN30	Land West of Natland Road, Kendal	Employment Land	Site within 100m of a European site	Buffer zone against the River Kent of at least 10 metres width required.
EN39	Fields N of Morrisons, Kendal	Employment Land	Site within 100m of a European site	Buffer zone against the River Kent of at least 10 metres width required.
M4	Land adjacent to Natland Mill Beck Lane, Kendal	Mixed – Employment / Residential	Site within 100m of a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..
M4	Land adjacent to Natland Mill Beck Lane, Kendal	Mixed - Employment / Residential	Direct spatial conflict with a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it.
MN20/ MN32#	Station Yard, Arnside	Mixed – Employment / Residential	Site within 100m of a European site	Site boundary to be reduced to exclude land within Morecambe Bay SAC/SPA/Ramsar site and to restrict development to land behind existing flood defence embankment.
ON12	Land adjacent to Natland Mill Beck Lane, Kendal	Other	Direct spatial conflict with a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it.
R107	Land at Kendal Parks Farm, Kendal Parks Road	Residential Land	Site within 100m of a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it.

R107	Land at Kendal Parks Farm, Kendal Parks Road	Residential Land	Direct spatial conflict with a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it.
R34	Land at top end of Kendal Parks Road, Kendal	Residential Land	Site within 100m of a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..
R34	Land at top end of Kendal Parks Road, Kendal	Residential Land	Direct spatial conflict with a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..
R465	Land East of Holme Houses	Residential Land	Site within 100m of a European site	Buffer zone against River Kent of at least 10 metres width required.
R489	Land South of Hall Park	Residential Land	Site within 100m of a European site	Buffer zone against River Kent of at least 10 metres width required.
R489	Land South of Hall Park	Residential Land	Kentrigg Walk sewage pollution	Buffer zone against River Kent of at least 10 metres width required.
R489	Land South of Hall Park	Residential Land	Direct spatial conflict with a European site	Buffer zone against River Kent of at least 10 metres width required.
R49	Land at Natland Road, Kendal	Residential Land	Direct spatial conflict with a European site	Buffer zone against River Kent of at least 10 metres width required.
R536	Land at Natland Road, Kendal	Residential Land	Direct spatial conflict with a European site	Buffer zone against River Kent of at least 10 metres width required.
R594	No site name available	Residential Land	Site within 100m of a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..

R594	No site name available	Residential Land	Direct spatial conflict with a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..
R596	No site name available	Residential Land	Site within 100m of a European site	Permanent fence to create a 10m wide no-working buffer zone adjacent to Natland Beck and any developments located at least 15m from it..
RN181	3 fields between Mealbank Road and River Mint, N Kendal	Residential Land	Site within 100m of a European site	Buffer zone against River Kent of at least 10 metres width required.
RN181	3 fields between Mealbank Road and River Mint, N Kendal	Residential Land	Kentrigg Walk sewage pollution	Buffer zone against River Kent of at least 10 metres width required.
RN181	3 fields between Mealbank Road and River Mint, N Kendal	Residential Land	Direct spatial conflict with a European site	Buffer zone against River Kent of at least 10 metres width required.
ON43	Site at North Lonsdale Road, Ulverston Canal Head	Other	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
EN36	North Lonsdale Road, Ulverston - Nursery units	Employment	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
R282	Former Kitware Factory	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
MN17	Land off Steel Street, Ulverston	Mixed	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
M27	Canal Side, North Lonsdale Rd	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
R277	Acrastyle	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory

EN35	North Lonsdale Road, Ulverston	Employment	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
R278	Former Ulverston Health Centre	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
M28	Canal Head/Rear Of Booths	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
M26	Fitz Bridge Field	Residential Land	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
E30	Oubas Hill / Next Ness Lane	Employment	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
E60	No site name available	Employment	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
RN246#	Rame Farm, Plumpton Woods and land towards Next Ness, N of Ulverston Canal	Residential	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
MN31#	Incorporates Booth's holding, Canal Head/ rear of Booth's, the petrol station & Lakes Glass Centre	Mixed: employment/retail/leisure & assembly/ tourism/ heritage & housing	Pollution risk to estuary via Ulverston Canal	SUDS obligatory
R120, R120#	Land adjacent to Kendal Parks and Howe Bank 2	Residential	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.

M2, M2#	Burton Road Site (Oxenholme Triangle)	Mixed employment/residential	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.
M5, M5#	Land at Brow Head Farm, adjacent to A65	Mixed employment/residential	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.
ON1	Oxenholme Rd, Kendal	Recreational	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.
RN133	Land behind WMG Hospital, adjoining Whinlatter Drive estate	Residential	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.
RN301 #	Land between Oxenholme Road and Westmorland General Hospital	Residential	Pollution risk, tributary of Natland Beck, River Kent SAC	Buffer zone to stream of at least 10m required.

Annex 2 European Sites

MORECAMBE BAY SAC

Name and location	Morecambe Bay – Site extends from Fleetwood in Lancashire across to Millom in Cumbria, incorporating the estuaries of the Lune, Duddon, Keer, Kent and Leven	
Distance from plan area	Partly within plan area	
Reason(s) for designation	Annex I habitats for which site designated SAC • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Perennial vegetation of stony banks • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') • Fixed dunes with herbaceous vegetation ('grey dunes') • Humid dune slacks	
Conservation objectives	Subject to natural change, to maintain, in favourable condition, the structure and function of the habitats for which the sites designated	
Requirements to maintain favourable condition status of site		**Key factors affecting site integrity**

• Maintained structure and function of habitats for which the sites designated • No decrease in extent of habitats	• Good water quality • No change in land use, habitat loss or fragmentation • The absence or control of invasive or introduced species • Lack of disturbance or erosion from tourism and recreation. • Appropriate management, including grazing, mowing, vegetation clearance, burning at an appropriate level, low nutrient input • Other potential threats include: commercial fisheries, aggregate extraction, gas exploration, adverse effects on interest features as a result of coastal and flood defences.

MORECAMBE BAY PAVEMENTS SAC

Name and location	Morecambe Bay Pavements
Reason(s) for designation	Annex I habitats that are a primary reason for selection of this site: • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. • *Juniperus communis* formations on heaths or calcareous grasslands • Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) • Limestone pavements • *Tilio-Acerion* forests of slopes, screes and ravines • *Taxus baccata* woods of the British Isles Annex I habitats present as a qualifying feature; for which site designated SAC: • European dry heaths • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (found at Halswater, Lancaster) • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

	Annex II species that are a primary reason for selection of this site: • Narrow-mouthed whorl snail *Vertigo angustior* (found at Gait Barrows, Lancaster).
Conservation objectives	Subject to natural change, to maintain the habitats and geological features in favourable condition (*), with particular reference to any dependent component special interest features. To maintain the surface Karst, Limestone pavement, calcareous grassland, woodland and *Juniperus communis* habitat at this site in favourable condition, with particular reference to relevant specific designated interest features.

Requirements to maintain favourable condition status of site	**Key factors affecting site integrity**
• Maintained structure and function of habitats for which the sites designated • No loss in habitat extent	• Appropriate land management • Low nutrient input • Limited air pollution

RIVER KENT SAC

Name and location	River Kent SAC
Reason(s) for designation	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation Annex II species that are a primary reason for selection of this site: • White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes* Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Freshwater pearl mussel *Margaritifera margaritifera*

	• Bullhead *Cottus gobio*	
Conservation objectives	Subject to natural change, to maintain, in favourable condition, the structure and function of the habitats for which the sites designated and for the Annex II species for which site designated	
Requirements to maintain favourable condition status of site		**Key factors affecting site integrity**
• Maintained structure and function of habitats for which the sites designated		• The absence of invasive non-native species, particularly signal crayfish, and individuals infected with crayfish plague • Good water and habitat quality – all water discharges should ensure favourable condition targets for water quality, flow and habitat quality are maintained • Adequate water supply to streams and margins -Water abstractions should ensure favourable condition targets for water quality, flow and habitat are maintained

SPAs inside the plan area

MORECAMBE BAY SPA

Name and location	Morecambe Bay SPA (Morecambe Bay SPA largely overlaps with Morecambe Bay SAC, with the exception of the Duddon Estuary which is the subject of a separate SPA designation)
Distance from plan area	Partly within plan area
Reason(s) for designation	Annex I species that are a primary reason for selection of this site: • *Sterna sandvicensis* Sandwich Tern It also qualifies under Article 4.2 of the EU Birds Directive in that it supports: • An internationally important assemblage of waterfowl and seabirds; and • Internationally important populations of regularly occurring migratory species.
Conservation objectives	Subject to natural change, to maintain in favourable condition the habitats of the internationally important populations of regularly occurring bird species listed on Annex 1 bird species, in particular: • Shingle areas Favourable condition for this feature means that there is little deviation from the established baseline for the following attributes, subject to natural change: • Extent of shingle areas • Ratio of vegetated to bare ground should not exceed 10% during the breeding season

<table>
<tr><td></td><td>Subject to natural change, to maintain in favourable condition the habitats of the internationally important assemblage of waterfowl and seabirds and the internationally important populations of regularly occurring migratory species, in particular:
Intertidal mudflat and sandflat communities, intertidal and subtidal boulder and cobble skear communities, saltmarsh communities, coastal lagoon communities
Favourable condition for these features is defined as little deviation from the established baseline, subject to natural change, for the following attributes:
Extent of habitat features
Presence and abundance of animal and plant prey species
Presence and abundance of preferred plant species (saltmarsh)
Range of vegetation heights (saltmarsh)</td></tr>
<tr><td>Requirements to maintain favourable condition status of site</td><td>Key factors affecting site integrity</td></tr>
<tr><td>Maintained populations of species and structure and function of habitats for which the sites designated
Bird communities are highly mobile and exhibit patterns of activity related to tidal water movements and many other factors. Different bird species exploit different parts of an intertidal area and different prey species. Changes in the habitat may therefore affect their prey availability. The important bird populations therefore require a functional embayment, which is capable of supporting intertidal habitat for feeding and roosting.
Note: Bird usage of the site varies seasonally, with different areas being favoured over others at certain times of the year</td><td>Appropriate management, including grazing, mowing, vegetation clearance an appropriate level
The absence or control of introduced or invasive species
Current extent and distribution of suitable feeding and roosting habitat (e.g. saltmarsh, mudflats);
Sufficient prey availability (e.g. small fish, crustaceans and worms);
Minimal levels of disturbance;
Water quality necessary to maintain intertidal plant and animal communities; and
Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.</td></tr>
</table>

Ramsar sites inside the plan area

MORECAMBE BAY RAMSAR

Name and location	Morecambe Bay	
Distance from plan area	Morecambe Bay lies between the coasts of South Cumbria and Lancashire, and represents the largest continuous intertidal area in Britain. Morecambe Bay comprises the estuaries of five rivers and the accretion of mudflats behind Walney Island. The area is of intertidal mud and sandflats, with associated saltmarsh, shingle beaches and other coastal habitats. It is a component in the chain of west coast estuaries of outstanding importance for passage and overwintering waterfowl (supporting the third-largest number of wintering waterfowl in Britain), and breeding waterfowl, gulls and terns.	
Reason(s) for designation	Designated under Ramsar **criterion 4, 5 and 6** for: • The site is a staging area for migratory waterfowl including internationally important numbers of passage ringed plover Charadrius hiaticula. • Assemblages of international importance (peak counts in winter - 223709 waterfowl) • Species/populations occurring at levels of international importance: Lesser Black-backed Gull, Herring Gull, Sandwich Tern, Great Cormorant, Common Shelduck, Northern Pintail, Common Eider, Eurasian Oystercatcher, Ringed Plover, Grey Plover, Sanderling, Eurasian Curlew, Common Redshank, Ruddy Turnstone, Great Crested Grebe, Pink-footed Goose, Eurasian Wigeon, Common Goldeneye, Red-breasted Merganser, European Golden Plover, Northern Lapwing, Red Knot, Dunlin, Bar-tailed Godwit. • Species occurring at levels of national importance: Black-headed Gull, Ruff, Whimbrel, Spotted Redshank, Common Greenshank, Eurasian Teal, Black-tailed Godwit.	
Conservation objectives	To maintain populations of those species for which this site is considered to be of European importance	
Requirements to maintain favourable condition status of site		**Key factors affecting site integrity**

• Maintained populations of species and structure and function of habitats for which the sites designated	• Appropriate management, including grazing, mowing, vegetation clearance an appropriate level • The absence or control of introduced or invasive species • Current extent and distribution of suitable feeding and roosting habitat (e.g. saltmarsh, mudflats); • Sufficient prey availability (e.g. small fish, crustaceans and worms); • Minimal levels of disturbance; • Water quality necessary to maintain intertidal plant and animal communities; and • Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.

Annex 3 Conservation Objectives for the River Kent SAC

Conservation objectives and definitions of favourable condition for designated features of interest

These Conservation Objectives relate to all designated features on the SSSI, whether designated as SSSI, SPA, SAC or Ramsar features.

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Name of Site of Special Scientific Interest (SSSI)	
River Kent and Tributaries	
Names of designated international sites	
Special Area of Conservation (SAC)	**River Kent**
Relationship between site designations	
The River Kent and Tributaries SSSI and SAC boundaries coincide throughout.	

Version control information	
Status of this Version (Draft, Consultation Draft, Final)	Consultation Draft
Prepared by	Sue Evans/Alison McAleer/Karen Slater
Date of this version	21 April 2009
Date of generic guidance on favourable condition used	Freshwater: September 2005 – January 2006.

	English Nature CSM Guidance: Generic Guidance on Objective setting and condition assessment Freshwater (July 2005) *References to "appendices to the monitoring protocols" refer to the appendices of the above guidance for the relevant habitats.*	
Other notes/version history	First drafts completed in 2007, 2008 and 12 February 2009	
Quality assurance information		
Checked by	**Name Karen Slater**	**Date 21 April 2009**
	Signature Karen Slater	

Conservation Objectives and definitions of Favourable Condition: notes for users

Conservation Objectives

SSSIs are notified because of specific biological or geological features. Conservation Objectives define the desired state for each site in terms of the features for which they have been designated. When these features are being managed in a way which maintains their nature conservation value, then they are said to be in 'favourable condition'. It is a Government target that 95% of the total area of SSSIs should be in favourable condition by 2010.

Definitions of Favourable Condition

The Conservation Objectives are accompanied by one or more habitat extent and quality definitions for the special interest features at this site. These are subject to periodic reassessment and may be updated to reflect new information or knowledge; they will be used by Natural England and other relevant authorities to determine if a site is in favourable condition. The standards for favourable condition have been developed and are applied throughout the UK.

Use under the Habitats Regulations

The Conservation Objectives and definitions of favourable condition for features on the SSSI may inform the scope and nature of any 'appropriate assessment' under the Habitats Regulations. An appropriate assessment will also require consideration of issues specific to the individual plan or project. The habitat quality definitions do not by themselves provide a comprehensive basis on which to assess plans and projects as required under Regulations 20-21, 24, 48-50 and 54 - 85. The scope and content of an appropriate assessment will depend upon the location, size and significance of the proposed project. Natural England will advise on a case by case basis.

Following an appropriate assessment, competent authorities are required to ascertain the effect on the integrity of the site. The integrity of the site is defined in paragraph 20 of ODPM Circular 06/2005 (DEFRA Circular 01/2005) as the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified. The determination of favourable condition is separate from the judgement of effect upon integrity. For example, there may be a time-lag between a plan or project being initiated and a consequent adverse effect upon integrity becoming manifest in the condition assessment. In such cases, a plan or project may have an adverse effect upon integrity even though the site remains in favourable condition.

The formal Conservation Objectives for European Sites under the Habitats Regulations are in accordance with paragraph 17 of ODPM Circular 06/2005 (DEFRA Circular 01/2005), the reasons for which the European Site was classified or designated. The entry on the Register of European Sites gives the reasons for which a European Site was classified or designated.

Explanatory text for Tables 2 and 3

Tables 2, 2a and 3 set out the measures of condition which we will use to provide evidence to support our assessment of whether features are in favourable condition. They are derived from a set of generic guidance on favourable condition prepared by Natural England specialists, and have been tailored by local staff to reflect the particular characteristics and site-specific circumstances of individual sites. Quality Assurance has ensured that such site-specific tailoring remains within a nationally consistent set of standards. The tables include an audit trail to provide a summary of the reasoning behind any site-specific targets etc. In some cases the requirements of features or designations may conflict; the detailed basis for any reconciliation of conflicts on this site may be recorded elsewhere.

Conservation Objectives

The Conservation Objectives for this site are, subject to natural change, to maintain the following habitats and geological features in favourable condition (*), with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated (SSSI, SAC, SPA, Ramsar) as individually listed in Table 1.

Habitat Types represented (Biodiversity Action Plan categories)

Rivers and Streams

Species represented

White Clawed Crayfish *Austropotamobius pallipes*
Fresh water pearl mussel *Margaritifera margaritifera*
Bullhead *Cottus gobio*

(*) or restored to favourable condition if features are judged to be unfavourable.

Standards for favourable condition are defined with particular reference to the specific designated features listed in Table 1, and are based on a selected set of attributes for features which most economically define favourable condition as set out in Table 2, Table 2a and Table 3

Table 1 Individual designated interest features

BAP Broad Habitat type / Geological Site Type	Specific designated features	Explanatory description of the feature for clarification	SSSI designated interest features	SAC designated interest features	SPA bird populations dependency on specific habitats			Ramsar criteria applicable to specific habitats			
					Annex 1 species	Migratory species	Waterfowl assemblage	1a Wetland characteristics	2a Hosting rare species &c	3a 20000 waterfowl	3c 1% of population
River and Streams	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Whole river ecosystem including characteristic aquatic and riparian habitats and species		*							
River and Streams	*Austropotamobius pallipes*	White Clawed Crayfish	*	*							
River and Streams	*Margaritifera margaritifera*	Freshwater pearl mussel	*	*							
River and Streams	*Cottus gobio*	Bullhead		*							

NB. Features where asterisks are in brackets (*) indicate habitats which are not notified for specific habitat interest (under the relevant designation) but because they support notified species.

Table 2 Habitat extent objectives

Conservation Objective for habitat extent	To maintain the designated features in favourable condition, which is defined in part in relation to a balance of habitat extents (extent attribute). Favourable condition is defined at this site in terms of the following site-specific standards.
Extent - Dynamic balance	On this site favourable condition requires the maintenance of the extent of each habitat type (either designated habitat or habitat supporting designated species). Maintenance implies restoration if evidence from condition assessment suggests a reduction in extent.

Habitat Feature (BAP Broad Habitat level, or more detailed level if applicable)	Estimated extent (ha) and date of data source/estimate	Site Specific Target range and Measures	Comments
Rivers and Streams	87km SSSI Area = 99.72ha (ENSIS 19 Feb 2001) SAC Area = 99.72ha	No loss of length of river or site area.	NB: The designated boundaries of the river do not include the full area of influence which includes the wider River Kent catchment as a whole

Audit Trail
Rationale for habitat extent attribute **(Include methods of estimation (measures), and the approximate degree of change which these are capable of detecting).**

Rationale for site-specific targets (including any variations from generic guidance)
Other Notes
The River Kent includes the following JNCC River Types: VI Sandstone, mudstone and hard limestone rivers of Scotland and Northern England (3 sections) VII Mesotrophic rivers dominated by gravels,pebbles and pebbles (2 sections) X Ultra – oligotrophic rivers (1 stretch)

Table 2a Species population objectives

Conservation Objective for species populations	To maintain the designated species in favourable condition, which is defined in part in relation to their population attributes. Favourable condition is defined at this site in terms of the following site-specific standards.
Population balance	On this site favourable condition requires the maintenance of the population of each designated species or assemblage. Maintenance implies restoration if evidence from condition assessment suggests a reduction in size of population or assemblage.

Species Feature (species or assemblage)	List supporting BAP Broad Habitats	Population Attribute (eg presence/absence, population size or assemblage score)	Site Specific Target range and Measures (specify geographical range over which target applies ie site, BAP broad habitat or more specific)	Comments
White Clawed Crayfish *Austropotamobius pallipes*	River and Streams	Population densities and health (Refer to the LIFE in UK Rivers standard survey and monitoring protocol for white clawed crayfish)	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality, and in any case should not drop below levels recorded in previous surveys.	Several surveys are available for the River Kent. Densities vary between different tributaries due to natural factors, so a typical density for the whole river can not be set. Monitoring units would be expected to average at least “moderate” abundance according to monitoring category protocols. Determination of unfavourable condition should only be made where low densities are known to be related to an impact of some kind, or where historical survey data suggest that higher densities should be present. Regular monitoring on different tributaries and upper main river, using the standard protocol, will provide data on which targets can be produced in the future.

Species Feature (species or assemblage)	List supporting BAP Broad Habitats	Population Attribute (eg presence/absence, population size or assemblage score)	Site Specific Target range and Measures (specify geographical range over which target applies ie site, BAP broad habitat or more specific)	Comments
White Clawed Crayfish *Austropotamobius pallipes*	River and Streams	Population densities and health	Absence of individuals infected with crayfish plague.	Crayfish plague can be introduced by the entry of non-native crayfish species into a site, but also by a variety of other routes, including contaminated equipment (nets, boots, etc.) and stocked fish from infected waters[1]. Outbreaks of crayfish plague typically result in 100% mortalities, unless there are isolated headwaters with crayfish in the catchment. This target requires that the utmost care be taken in terms of fish stocking and general surveying/monitoring to ensure that plague vectors are not introduced. Disinfection or thorough drying of equipment (or perhaps dedicated equipment for use only in native crayfish rivers) and stocking fish from uninfected waters are vital elements. (Nationally agreed NE/EA policy on stocking fish into crayfish SSSIs/SACs should prevent stocking from catchments containing signal crayfish or known to have experienced plague. However, given that SAFFA S. 30 does not apply to fish farms, fish from high risk farms could conceivably be introduced, via apparently risk-free farms. EA/EN are addressing this issue at present.) Awareness of this issue needs to be raised in canoeing and angling groups.

Species Feature (species or assemblage)	List supporting BAP Broad Habitats	Population Attribute (eg presence/absence, population size or assemblage score)	Site Specific Target range and Measures (specify geographical range over which target applies ie site, BAP broad habitat or more specific)	Comments
White Clawed Crayfish *Austropotamobius pallipes*	River and Streams	Population and health	Thelohaniasis (Porcelain Disease) should not affect >10% population	This disease rarely causes mass mortalities and may be present in a population at low levels without apparent harm. However, a prevalence exceeding 10% is of concern.
Fresh water pearl mussel *Margaritifera margaritifera*	Rivers and Streams	Population density	There should be no reduction in existing numbers.	Several surveys are available for Dubbs Beck: 1940 live freshwater pearl mussels recorded in 1999 - I Killeen 175 live freshwater pearl mussels recorded in 2006 - I Killeen 100 live freshwater pearl mussels recorded in 2008 - I Killeen
			Population should be restored to 1940 live freshwater pearl mussels recorded in 1999.	
			>5 mussels per m^2 within sample transects	
		Age structure	At least 20% of population $\leq$ 65mm and at least one mussel $\leq$ 30mm	Population profiles should not be attempted where mussel beds are vulnerable to damage. In this case, the target is to find at least one pearl mussel ≤ 65mm. This results in a lower degree of confidence that the population is reproductively viable but should protect it from potential adverse disturbance during survey. The data on age structure from all transects within each ECS should be aggregated and the resulting figures assessed against the targets.

Species Feature (species or assemblage)	List supporting BAP Broad Habitats	Population Attribute (eg presence/absence, population size or assemblage score)	Site Specific Target range and Measures (specify geographical range over which target applies ie site, BAP broad habitat or more specific)	Comments
		Fish host populations: juvenile trout (0+ and 1+ year classes)	Should be abundant (to be refined following the results of the Life in UK Rivers project on pearl mussel/fish host relationships).	A viable population of juvenile trout is vital to the survival of the larval stage. Physical and chemical conditions need to be suitable for the well-being of all life stages of brown trout, including free access up Dubbs Beck and conditions in the estuary and lower river where the juveniles of migratory salmonids are present. (The spillway of Borrans reservoir is impassable to salmon).
Bullhead *Cottus gobio*	Rivers and Streams	Adult population density	There should be no reduction in densities from existing levels, and in any case no less than 0.2 m^{-2} in the upland sections of the river (source altitude >100m) and 0.5 m^{-2} in the lowland sections of the river (source altitude ≤100m). (single pass electrofishing in Aug/Sep)	Routine Environment Agency monitoring is not capable of providing suitable data. A least-cost methodology for monitoring this attribute has been developed by the LIFE in UK rivers project, involving the sampling of representative reaches within the SAC. However, due to practical limitations, there is currently a lack of comprehensive information

Species Feature (species or assemblage)	List supporting BAP Broad Habitats	Population Attribute (eg presence/absence, population size or assemblage score)	Site Specific Target range and Measures (specify geographical range over which target applies ie site, BAP broad habitat or more specific)	Comments
		Population distribution	Bullhead should be present in all suitable reaches. As a minimum, no decline in distribution from current extent.	Bullhead are widespread in any flowing water at an altitude of less than 300 m. Well oxygenated water over a gravel / pebble / cobble substrate is preferred (and is essential for successful reproduction). Riffles are a favoured microhabitat. Very sluggish water with a clay / silt substrate or cold, steep-gradient upland sections with numerous cascades and boulder / bedrock substrate should be viewed as sub-optimal. Bullhead can occur in very small channels (<1 m wide) where they may be the only fish species present. Bullhead are very poor colonists, to the extent that catchments may contain many individual subpopulations. It is not feasible to assess each of these individually, but it is very important that there is no loss of these populations, and that access routes between them are not impeded
Bullhead *Cottus gobio*	Rivers and Streams	Reproduction/age structure	Young-of-year fish should occur at densities at least equal to adults.	Young-of-year (Y-O-Y) fish should be easily identifiable using length-frequency analysis. In September they are typically less than 30 mm long. Young-of-year are often much more numerous than adults, so the current target is rather conservative (to allow for natural variation in recruitment and habitat type). A ratio of 3 or 4:1 for Y-O-Y adults is not unusual. It may be necessary to refine this target at a site-specific level.

Audit Trail
Rationale for species population attributes **(Include methods of estimation (measures), and the approximate degree of change which these are capable of detecting).**
Some population targets will be subject to periodic review as additional survey data becomes available
Rationale for site-specific targets (including any variations from generic guidance)
Other Notes
Whilst large amounts of population data exist for certain species such as Freshwater Pearl Mussels, there are other species for which we currently have relatively little population size and distribution data. Population targets must therefore be subject to ongoing review as additional survey data becomes available.

Table 3 Site-Specific definitions of Favourable Condition

CONSERVATION OBJECTIVE FOR THIS HABITAT / GEOLOGICAL SITE-TYPE	To maintain the Rivers and Streams, freshwater pearl mussel, white clawed crayfish at River Kent and Tributaries SSSI in favourable condition, with particular reference to relevant specific designated interest features. Favourable condition is defined at this site in terms of the following site-specific standards:
Site-specific details of any geographical variation or limitations (where the favourable condition standards apply)	
These attribute apply to the whole site, and include targets that are required for the habitat of the supporting species.	

Site-specific standards defining favourable condition

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
Rivers and Streams	Habitat functioning: water flow	Data on gauged and naturalised flows, flow accretion methods, and the Resource Assessment Method (RAM) Framework. Site-specific hydro-ecological studies. Field observations; further investigations;	**Flow regime should be characteristic of the river.** **Levels of abstraction should not exceed Generic River Flow.** **Thresholds in relation to daily naturalised flows except where detailed site-specific hydro-ecological studies of habitat flow relationships provide robust evidence to justify deviation from**	Naturalised flow is defined as the flow in the absence of abstractions and discharges. River flow affects a range of habitat factors of critical importance to characteristic flora and fauna, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. The maintenance of both flushing flows and seasonal base flows, based on natural hydrological processes, is vital. The generic targets vary according to the specific sensitivity of the reach type, to abstraction. Within the CAMS programme all of the River Kent and tributaries are defined as 'very high' and as high	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
		ongoing review under CAMs Field observations	**those Generic Thresholds.** **Maximum % reduction from daily naturalised flow:** All sections of river: <Qn50 - 10% Qn 50-95 – 10% >Qn95 (low flows) - 1-5% Ecological flow criteria already laid down for the river should also be complied with. There should be >5cm water depth over riffles in summer to maintain suitable conditions for bullhead. There should be no obvious problems with water availability within the monitoring unit. Dubbs Reservoir compensation flow	sensitivity to abstraction. A more or less stringent threshold may be appropriate following the completion of robust hydro-ecological investigations undertaken during the Review of Consents process. Any relaxation of generic targets on regulated stretches of SSSI rivers should relate to the desirability and ecological sustainability of regulating structures. The availability and reliability of data is patchy - long-term gauged data can be used until adequate naturalised data become available, although the impact of abstractions on historical flow records should be considered. Headwater sections are particularly vulnerable to abstraction, and downstream migration of perennial heads, other than in drought conditions, is a sign of unfavourable condition. Ensure compensation flow from Dubbs Reservoir is maintained River flow affects a range of habitat factors of critical importance to pearl mussels, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. The maintenance both of occasional flushing flows and baseflows, based on natural hydrological processes, is vital. Detailed investigations of habitat-flow relationships may indicate that a more or less stringent threshold would be appropriate for a specified reach; however, a precautionary approach would need to	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			to be maintained to safeguard freshwater pearl mussel.	be taken to the use of less stringent values.	
Rivers and Streams	Habitat functioning: water quality (General assessments)	**EA standard monitoring protocols**	**Biological GQA Class**: A. In addition, no drop in class from existing situation <u>For freshwater pearl mussel:</u> The target for the Dubbs Beck and the River Kent (upstream of the Waste Water Treatment Works in Kendal) is Class A and RE1 **Chemical GQA Class**: a. In addition, no drop in class from existing situation. <u>For freshwater pearl mussel:</u> The target for the Dubbs Beck and the River Kent (upstream of the Waste Water Treatment Works in Kendal) is Class A and RE1	**River Kent is a category A river: hard upland geologies (all land over 330 m) - impermeable poor geologies, for all of the river sections.** **A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonably integrated picture in relation to many parameters.** The Biological Module of the Environment Agency's General Quality Assessment scheme is based on assessment of the macroinvertebrate community. All classified reaches within the site should comply with the targets given. The chemical module of the GQA scheme sets standards for dissolved oxygen, biochemical oxygen demand and total ammonia. It therefore covers a number of water quality parameters that commonly cause problems within river systems. Where modelling has been undertaken, the river should comply with the targets at all points along its length except within effluent mixing zones of acceptable size. Generally, water quality should not be injurious to any life stage of the fresh water pearl mussel. A wide range of water quality parameters can affect the status of interest features, but standard	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			The River Kent and Tributaries has a GQA target of A/a.	biological monitoring techniques provide a reasonably integrated picture in relation to many parameters. All classified reaches within the site that contain, or should contain, freshwater pearl mussels under conditions of high environmental quality should comply with the targets given.	
Rivers and Streams	Habitat functioning: water quality	EA monitoring	**Un-ionised ammonia** <0.021 mg L^{-1} .as a 95-percentile	The un-ionised form of ammonia is highly toxic to freshwater fauna. This target is the same as the EQS used by the EA. Where modelling has been undertaken, the river should comply with the targets at all points along its length except within effluent mixing zones of acceptable size. Nutrient enrichment from the catchment of Dubbs reservoir and Dubbs Beck, in particular, must be avoided.	Yes
Rivers and Streams	Habitat functioning: water quality	EA monitoring	**Suspended solids** No unnaturally high loads The River Kent and Tributaries has a suspended solids target of $\leq$10 mgl l $^{-1}$	Many characteristic species of different river types are susceptible to elevated solids levels, through reduced light availability (for photosynthesis), the clogging of respiratory structures, impaired visibility or siltation of coarse substrates. Elevated levels of suspended solids can also adversely affect mussel filter-feeding. Maintenance of the access track to Dubbs Reservoir must include measures to avoid silt laden run off reaching Dubbs Beck. Inert	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				material only must be used for any track repairs. Under no circumstances must crushed limestone be used. Suspended solids measurements are also essential to the estimation of particulate loads within the river network (in combination with gauged flow data), to provide an indication of the risk of siltation.	
Rivers and Streams	Habitat functioning: water quality	EA monitoring	**Total Reactive Phosphorus** (as an annual mean) ≤ 0.02 mg L^{-1} in the headwaters; ≤ 0.04 mg L^{-1} in the main river ≤ 0.06 mg L^{-1} in the large river (NB need to check against revised guidance – SRP targets for category A and B rivers are under review and may be revised downwards)	**River Kent is a category A river: hard upland geologies (all land over 330 m) - impermeable poor geologies, for all of the river sections.** Elevated phosphorus levels interfere with competitive interactions between higher plant species and between higher plants and algae, leading to dominance by attached forms of algae, deterioration of vegetative habitat, and declines in abundance and/or diversity of characteristic plant species (which may include lower plants such as mosses and liverworts). The respiration of artificially large growths of benthic or epiphytic algae may generate large diurnal sags in dissolved oxygen in the water column and/or substrate fish and invertebrate species. Excessive benthic algal growth can also enhance the trapping of fine sediments within riverine gravels, enhancing siltation and exacerbating poor substrate conditions. Where modelling has been undertaken, the river should comply with the targets at all points along it length except within effluent mixing zones of acceptable size.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
Rivers and Streams	Habitat functioning: water quality	EA monitoring. Specialist group to meet at intervals to identify national trends and extract information on individual SACs Specialist targeted studies (desk-based and intrusive ground investigations) – for example as part of pre-application work and EIA for development proposals.	**Toxic contamination** No increase in potentially toxic pollutants and no exceedence of the relevant Environmental Quality Standards (or Predicted No Effect Concentrations) for potentially toxic.	Liaison between NE and EA staff essential. Toxic contamination could result in lethal or sub-lethal effects on the interest features of the SAC. The nature of the effect would depend upon the particular contaminants present, their concentrations, bioavailability and environmental conditions. Sub-lethal effects may include effects on reproduction, physiology, genetics and health, ultimately reducing fitness for survival. Many compounds, present at low levels, can also be bio-accumulated in the food chain, with effects noticed in higher predators, such as otters. In some species a certain stage in the life cycle may be affected, eg lamprey nursery areas affected by accumulations of toxins in the sediments. Otters are particularly at risk from bio-accumulating toxic pollutants. Typically (eg for development proposals), in order to assess the risk to the SAC, a robust and thorough identification of any potential contaminants present on a site is required, through desk-based studies and intrusive ground investigations, to identify any pathways for transfer and measures that may be necessary to prevent such transfer of contaminants to the River Kent SAC. The type of Information required includes: • Site investigation to determine presence and levels of all potential toxic contaminants. Sampling should be at a level to ensure a high degree of confidence in the results, with additional sampling around any areas with high levels	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				of contamination to identify any 'hotspots'. • Conceptual site model of all possible pathways to the SAC including surface water, groundwater and blown dust. • Results of the modelling should be expressed in relation to the relevant Environmental Quality Standards (EQS) where appropriate. Some potentially toxic substances have no EQS. In these instances a Predicted No Effect Concentration (PNEC) may need to be derived in conjunction with the Environment Agency. • Risk assessment and full details of all proposed remediation measures. • Reference should be made to the EA guidance on Remedial Targets Methodology for assessing hydrological risks to groundwater for further details. Reference should be made to the EA Ecological risk framework assessment for contaminated land (due out 2008) for further details.	
Rivers and Streams	Habitat structure: substrate	Field observations Fluvial audit	Siltation No excessive siltation: maintain very little or no silt and fine sand in substrate. Channels should contain characteristic levels of fine sediment for the river type. A predominance of 'clean' gravels,	Siltation levels vary naturally, depending upon the reach type and hydrodynamic regime. Most sites should have a variety of channel substrates. Localised accumulations of silt on the inside of bends or in back channels do not necessarily indicate a problem. However, widespread siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel (due to artificial channel modifications), is a major threat to interest features. Sedimentation and siltation from stock poaching in the catchment of Dubbs Beck, in particular, must be avoided. Elevated levels of	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			pebbles and cobbles, with relatively low cover by silt-dominated substrates. Maximum fines content should not be too great to prevent establishment of new plants.	silt and fine sand can clog substrates used by juvenile mussels and can impair adult feeding/respiration. Some life-cycle stages are potentially susceptible to damage from siltation, the source of which may lie elsewhere in the catchment outside the site boundary. Where there is a perceived risk of damage occurring, or where the species is already believed to be in decline, a fluvial audit of the catchment is recommended. This is a relatively new approach developed by fluvial geomorphologists in the UK; further guidance should be sought from the appropriate freshwater specialists in the country conservation agencies. Clean, coarse sand is required in stable conditions for mussels. Many characteristic species of fish, invertebrates and even plants are susceptible to siltation at some stage in their life-cycle. Mechanisms of impact can relate to reduced interstitial spaces in coarse substrates, reduce water flow-through the substrate leading to poor quality of interstitial waters, and reduced sediment surface 'roughness' that eliminates refugia for animals with epibenthic habitats and prevents plant seeds and fragments from lodging in the substrate and taking root. Elevated levels of fines can interfere with survival of salmon, lamprey and bullhead eggs due to suffocation. It can also cause loss of interstitial refugia for salmon and bullhead fry and clog the respiratory structures of crayfish. For river types characterised by extensive *Ranunculus* beds, there	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				should be a predominance of 'clean' gravels, pebbles and cobbles, with relatively low cover by silt-dominated substrates. Maximum fines content should not be too great to prevent establishment of new plants. Fines are defined as particles <0.83 mm. Siltation may occur due to activities in the channel and banks as well as in the wider catchment. Sources of silt include run-off from agricultural land, sewage and industrial discharges, erosion, trampling of banks by livestock, in-channel works etc. A fluvial audit is recommended where specific problems have been identified, e.g. where there is a perceived risk of damage occurring or where species characteristic of the habitat are already believed to be in decline. Fluvial audit is not a monitoring tool but can deliver an understanding of geomorphological problems unattainable by any other method, and help to discriminate between problems of sediment delivery and problems of channel structure.	
Rivers and Streams	Habitat structure: channel and banks	Assess river morphology using *RHS (see text and Appendices 4 and 5 of the monitoring protocol for details).*	**Channel form** Channel form should be generally characteristic of river type, with predominantly unmodified planform and profile. For planform the target is a score	The river should support all of the habitat features necessary for characteristic flora and fauna to thrive, in characteristic proportions. Widening or deepening or straightening of channels, and extensive artificial reinforcement of banks, are indicators of unfavourable condition and reduce variations in habitat. New operations that would have this impact are not acceptable within the SAC whilst restoration may be needed in some reaches. Headwater sections are particularly vulnerable to reprofiling.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
		In addition, for planform: map data, aerial survey data, historical records and local knowledge. Routine statutory agency consenting process	for the assessment unit of at least 3 *(see Appendix 4 of the monitoring protocol in CSM Guidance for Rivers Version March 2005 JNCC).* For naturalness of the profile using transect data the target is a score for the assessment unit of 4 or 5 (see *Appendix 5 of the monitoring protocol*). No RHS site to have any of the eight categories of bank profile modification (Section I in RHS 2003 form) recorded as 'extensive'. **Maintain natural hydrogeomorphological processes.** Where possible the formation and reworking of sedimentary features should be uninhibited as part of the natural functioning of the system. Maximise the ecological potential of the modified urban areas of Kendal	The new version of Habitat Modification Score (HMS) enables a more sophisticated assessment to be made, based on the nature of modifications to a river and their estimated persistence. A guideline target might be 90% or more of condition monitoring sites should fall within the *semi-natural* HMS class 1, with the remainder *predominantly unmodified* (class 2). Physical targets will need to be adjusted to be compatible with river restoration plans to be developed according to NE's national River Restoration Strategy currently under development. Watercourses with a high degree of naturalness will be governed by dynamic processes which result in a variety of physical habitat features, including a range of substrate types, variations in flow, channel width and depth, in-channel and side-channel sedimentation features, erosion features and both in-channel and bankside vegetation cover. The characteristic channel morphology provides the habitat features necessary to fulfil the spawning, juvenile and dispersal requirements of salmon, bullhead and lamprey species. The close proximity of different physical habitat features facilitates movement to new preferred habitats with age. These features should be left undisturbed except where shown to be essential in specific urban locations for flood risk management or for water supply purposes. In areas with white-clawed crayfish, any in-channel works should at least replace the pre-works availability of crayfish refuges.	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			Woody debris Woody debris removal should be minimised, and restricted to essential activities such as flood defence where infrastructure, human life or property is under threat.	The River Restoration Strategy also requires an analysis of unmodifiable physical constraints to restoration, relating to essential flood protection to people and the built environment. The urban areas of Kendal have extensive modifications present. In these areas river functioning and habitat availability for all interest features should be maximised. There should be no net loss of habitat quality. This should be taken into account during condition assessment of those units which include these urban areas. **Coarse woody debris should not be removed from rivers as it plays a significant role in the formation of new gravel beds. Bullheads are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative bullhead spawning substrate. Fallen trunks and branches are used extensively by crayfish as refuge, particularly where other forms of refuge are in short supply.**	
Rivers and	Habitat structure	**For bank vegetation: a**	**Bank and riparian zone**	Note: The protocol in *Appendices 6 and 7* used to assess bank	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
Streams		**simplified Phase I habitat survey, carried out at 10 RHS transect locations or as part of the sweep-up survey (see *Appendix 6 of the monitoring protocol*).** **For the riparian zone: RHS transect data, assessed using the protocol in *Appendix 7 of the monitoring protocol.***	**vegetation** Bank and riparian zone vegetation structure should be near-natural. **For bank vegetation the target is a mean score for the assessment unit of 4 or 5.** For riparian zone vegetation the target is a mean score for the assessment unit of 4 or 5	and riparian zone naturalness incorporates a modification due to negative indicator species. **Extent of submerged and marginal vegetation:** These provide important cover, flood refuge and feeding opportunities for crayfish and bullhead. Vegetation management should be limited to no more than 50% of the channel width (submerged plants) and 50% of bank length (marginal fringe). **Extent of overhanging riparian vegetation:** this should cover at least 10% of bank length throughout the year, distributed in patches along the margins, and considerably more where other forms of refuge are in short supply. Overhanging vegetation provides shade for freshwater pearl mussels, keeping water temperatures optimal for the species and reducing growths of filamentous algae. Emergent vegetation provides important nursery habitat for lamprey. **Bankside tree cover**: This helps to provide temperature micro-gradients within the channel, which provides greater flexibility in habitat selection. Overhanging trees provide valuable shade and food sources, whilst tree root systems provide important cover and flow refuge for white-clawed crayfish, juvenile salmon and lamprey and adult and juvenile bullhead. In lowland reaches without any riparian trees, it may be desirable to introduce a limited amount of cover. Thick vegetation cover, riverside woodland and vegetated islands are important holt habitats and areas for otters to shelter and rest	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				during the day. Any opportunities should be taken to increase suitable habitat. Old trees, dead wood and wood trash should be retained.	
Rivers and Streams	**Plant community**: species composition and abundance	Survey the macrophytes of representative stretches at intervals of *ca.* 5 km , using the method of Holmes (1983) and a standard check-list of macrophyte species (see *Appendix 2 of the monitoring protocol*). Evaluate the community against the target community in the constancy tables *(Appendix 8 of the monitoring protocol).* Record measures of species composition and abundance on the form in *Appendix 9 of*	(i) <u>Species Composition</u> The following should all occur: for the relevant river type; at least 60% of species with abundance V or IV in the constancy table should be present, AND at least 25% of species with abundance III should be present. (ii) <u>Loss of Species</u> 60% of species with cover >1 in the initial baseline survey should be at least present and all species recorded as dominant in the initial baseline survey should still be present. (iii) <u>Abundant Species</u> At least 25-35% of species recorded as dominant in the initial baseline survey should still recorded as	In-channel vegetation of SSSI/SAC rivers should be dominated by characteristic species. Species composition and abundance should be assessed using data from two 500 m stretches in each assessment unit where possible. When assessing targets (ii) and (iii), the data from all macrophyte survey sites in the assessment unit should be pooled and compared against pooled baseline data/reference condition. Cover values are expressed using a simplified DAFOR 3-point scale. Where necessary, 5-point scale data converts into the 3-point scale as follows: 5/4 = **3,** 3 = **2,** 2/1 = **1**. Any sections classified as Type IV are considered to be in unfavourable condition. Comparisons in (ii) and (iii) should be made with the initial baseline survey/reference condition, not with survey data from the previous monitoring cycle. The text under *Targets* summarises the suggested specific targets for each of the criteria. These should be used to guide those undertaking the condition assessment, but because of local variation it cannot be expected that all elements will 'pass'. This is especially likely where sites are on the edge of their 'type' – e.g.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
		the protocol. Alien species, filamentous green algae (including *Cladophora*, *Vaucheria,* and *Enteromorpha*) and other species indicative of eutrophication are not included in these targets and are dealt with in separate targets below	dominant. The initial baseline needs to be determined.	upper reaches of chalk streams that may be occasionally dry, or upstream sites where downstream seeding of species may be limited. Loss or gain of species can be indicative of either deterioration or improvement, so assessment needs to take account of the reasons for change. Non-native species are not considered under this attribute, but are covered under *Negative indicators*. Rare species are not considered under this attribute, but are taken account of under *Indicators of local distinctiveness.*	
Rivers and Streams	**Plant community**: reproduction	Field observations during macrophyte survey	Aquatic macrophytes should be allowed to reproduce in suitable habitat, unaffected by river management practices.	Flowering outside the normal period and weed cutting or other activities that do not leave patches of plants to flower and set seed are indicators of unfavourable condition.	Yes
Rivers and Streams	**Negative indicators**: native species	Survey the macrophytes of representative stretches at intervals of *ca.* 5 km, using the method of Holmes (1983) and a standard check-list of macrophyte species (see Appendix 2 of the	**For blanketweed, epiphytic or other algae, *Potamogeton pectinatus* or *Zannichellia palustris*:** Cover values over 25% should be considered unfavourable, and should trigger further	Thresholds may vary according to tributary or river reach. The River Kent includes the following JNCC River Types: VI Sandstone, mudstone and hard limestone rivers of Scotland and Northern England (3 sections) VII Mesotrophic rivers dominated by gravels,pebbles and pebbles	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
		protocol).	investigation. Cover values should not increase significantly from an established baseline. **ii) For taxa with Species Trophic Ranks (STRs) as follows:** *River Types VI, VII – STR 1-3* *River Type X – STR 1-4* Cover values over 25% should be considered unfavourable, but should trigger further investigation. Cover values should not increase significantly from an established baseline.	(2 sections) X Ultra – oligotrophic rivers (1 stretch) Taxa typically associated with enrichment are considered negative indicators of favourable condition. The species will vary depending on the River Community Type. Species that are characteristic of enrichment, or have atypically low Species Trophic Ranks (STRs) in the Mean Trophic Rank (MTR) system (Holmes *et al.,* 1999) and that are recorded as dominant (3), are used as indicators. Note: in using MTR, each species is allocated a score dependent on its tolerance to eutrophication; this system cannot be used to assess acidification. Expert judgement will be important in assessing the ecological significance of cover values of these species. At some sites, it may be appropriate to set more stringent targets. Occasionally thresholds may need to be raised, according to wider conservation objectives. **Alien species are assessed within the Negative indicators: alien/ introduced species attribute instead.**	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
Rivers and Streams	Negative indicators: **alien/ introduced species**	For aquatic and marginal macrophytes the presence of alien species listed in Appendix 10 of the monitoring protocol should be noted during the macrophyte survey and the scoring system for naturalness applied. Field observations; external organisations (e.g. EA, SEPA, EHS, fisheries trusts and boards); local reports on alien or introduced species. Determined during population monitoring, during routine monitoring by EA eg for GQA or specific search arising from information	No impact on native biota from alien or introduced species Aquatic and marginal macrophytes **The mean SERCON score for naturalness (derived from individual survey sites) should be 4 or 5 (see Appendix 10 of the protocol).** **Other organisms** **No alien/introduced species present at levels likely to be detrimental to the characteristic biological community.** **Absence of non-native crayfish.**	Non-native species constitute a major threat to many river systems. For example, species such as signal crayfish have been responsible for much of the decline of native crayfish through competition, habitat damage and the introduction of crayfish plague. Note: 'Introduced species' include species that are native to the UK but outside of their natural range. **The SERCON scoring system for naturalness of aquatic and marginal macrophytes is used to assess alien plant species.** Note**: This protocol applies to negative indicator species of the channel and channel margins. Negative indicator species found on banks and the riparian zone are assessed as part of the naturalness of banks and naturalness of riparian zone assessment and form part of the CSM structure attribute.** **Himalayan Balsam *Impatiens glandulifera* and Japanese Knotweed *Fallopia japonica* have become established along the River Kent and tributaries. The aim should be to target the eradication of both species through a strategic plan working downstream from the upstream extent of both species.** Expert judgement will be needed to determine whether there is sufficient evidence to generate an unfavourable condition assessment. For example, for signal crayfish, presence alone would constitute unfavourable condition.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
		from anglers and public. Specific crayfish surveys in catchments thought to be at risk.	**Absence of rainbow trout and brook trout in Borrans Reservoir and Dubbs Beck and any other non-native species that may impair juvenile densities of brown trout/sea trout.**	Once non-native crayfish species are established in a water body, native populations are usually eliminated quite rapidly, if not by competition and predation then by crayfish plague. If already present in a SAC, measures should be taken to control the spread of alien species and, reduce their numbers. Rainbow trout and brook trout are resistant to glochidial infection and are not, therefore, suitable host species for freshwater pearl mussel reproduction. Stocking of these species in Borrans Reservoir and Dubbs Beck will create competition with native brown trout and reduce host opportunities for glochidia and must not be permitted. Bullhead densities have been found to be negatively correlated with densities of non-native crayfish in the River Great Ouse, suggesting competitive and/or predatory-prey interactions.	
Rivers and Streams	**Negative indicators**: **Barriers to migration and movement through SAC**	Strategic assessment of barriers affecting the characteristic species of the SSSI.	No artificial barriers significantly impairing characteristic migratory species from essential life-cycle movements, including between reaches.	Barriers may take the form of weirs, or intakes/off-takes that entrain characteristic species. Species may be anadromous (e.g. salmon, sea and river lamprey), catadromous (e.g. eels) or migrate over relatively short distances within the river system (e.g. bullhead, brook lamprey and invertebrates without flying life stages). Lamprey can pass some potential barriers by attaching themselves to structures of river banks by their suctorial discs and creeping up by strong bursts of swimming.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				A range of data sources may be used and brought together to make this assessment. Specific studies may be required in relation to some barriers where impacts are uncertain and remedial costs are potentially high. All suitable habitat should be accessible above man-made weirs. Fish passes may be used to make artificial barriers accessible to migratory species where the impact of the removal of a barrier is assessed as undesirable and/or impractical. Natural barriers to potentially suitable spawning areas should not be circumvented. Vertical drops of >18-20 cm are sufficient to prevent upstream movement of adult bullheads. They will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes, and will also lead to constraints on genetic interactions that may have adverse consequences. New instream structures should be avoided, whilst the impact of existing structures needs to be evaluated Intakes/off-takes should be adequately screened where there is potential to impact on the designated species. Bridges and modified stretches of river, particularly at high water, can prevent passage along the river corridor. These stretches	

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			Maintenance and enhancement of connective corridor along river for otter movement. No net loss in quiet river stretches not affected by access or other disturbance activities such as lighting and noise.	should be identified and measures taken to remedy the problem. Otters are found in close proximity to public areas, but they do require areas for nesting and breeding. Disturbance due to human activity, such as light and noise, particularly at times of day when otters are most active, can also prevent passage.	
Rivers and Streams	**Negative indicators**: Fish introductions	Assessment of stocking consents in relation to guidance on acceptable stocking levels.	Fish introductions should not interfere with the ability of the river to support self-sustaining and healthy populations of characteristic species. No introductions, or stocking of other species or sub-species, at excessively high densities.	Many characteristic species can be affected by fish introductions, through increased predation, competition or genetic introgression, or through disease transfer. Guidance is being generated on the levels of stocking deemed to be ecologically acceptable within SSSIs. The presence of artificially high densities of other fish creates unacceptable high levels of predatory and competitive pressure on characteristic species including juvenile salmon, lamprey and adult and juvenile bullhead.	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
			Absence of rainbow trout and brook trout and any other non-native species that may impair juvenile densities of brown trout in Borrans Reservoir and Dubbs Beck.	See comments above about the importance of not introducing Rainbow trout or Brook trout to Borrans Reservoir and Dubbs Beck. Rainbow trout and brook trout are resistant to glochidial infection and are not, therefore, suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia. Stocking fish from waters uninfected by Signal Crayfish and crayfish plague is vitally important to protect the native population. No stocking/transfers of lampreys unless agreed to be in the best interests of the population. It is uncertain whether there are significant genetic differences between lamprey populations of the same species. The degree of fidelity to natal spawning grounds is unclear. Any agreed introductions should involve local stock as a precaution.	
Rivers and Streams	**Negative indicators**: signs of disturbance	Visual assessment	No disturbance of existing mussel beds by instream activities	Relevant activities including survey and monitoring along the stream bed and prevention of stock access. Engineering works that disturb river beds can be disastrous for mussel populations, so every effort needs to be made to leave them undisturbed. As a minimum, existing areas should be safeguarded, whilst habitat lost	Yes

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
				through engineering works should be reinstated.	
			No fishing for pearl mussels.	Pearl mussel fishing is already prohibited under the 1981 Wildlife and Countryside Act.	Yes
			No stocking/translocation of pearl mussel unless agreed to be in the best interests of the population	Translocation is not generally recommended as a conservation tool. It is a technique that has been little used, and must still be considered experimental. It is also an expensive activity and is likely to be unsuitable for juvenile mussels. Translocation (if feasible) should therefore be seen as a last resort. Little work has been undertaken on pearl mussel genetics. However, given the sedentary nature of pearl mussels, genetically discrete populations are likely.	Yes

Audit Trail
Rationale for species population attributes (Include methods of estimation (measures), and the approximate degree of change which these are capable of detecting).
10.1.1 Rationale for site-specific targets (including any variations from generic guidance)

Other Notes

Species depth and substrate habitat requirements:

Species	Spawning Habitat		Nursery Habitat		Adult Refugia
	Substrate	Water Depth	Substrate	Water Depth	Water Depth
Bullhead	Unsilted gravel/pebble/cobble dominated. Spaces beneath larger stones on a hard substrate are used to attach sticky eggs that are guarded by males				>5 cm depth Slack water refugia important in high flows e.g. pools, submerged tree roots and marginal vegetation
White-clawed crayfish	Spaces beneath cobbles, boulders and within the river bank. Submerged aquatic/emergent plants and overhanging riparian vegetation				
Freshwater pearl mussel	Clean, coarse patches of sand in stable conditions amongst large stones or boulders				

Annex 4 Minutes from meetings regarding water quality issues

Job Title	South Lakeland Site Allocations DPD HRA			Job No.	
Subject of Meeting	Water Quality Issues	Meeting No.	01	Date & Time	15.11.11
Attendees	Lorayne Woodend (SLDC) Damian Law (SLDC) Alastair McNeil (SLDC) Jeremy Pickup (EA) Paul Glading (NE) Judith Bennett (EA) Bill Butcher (TEC) Orlando Venn (TEC)	Venue	South Lakeland House	Notes by	Orlando Venn
Distribution: All attendees and United Utilities					

Item No.	NOTES	ACTION
1)	**Background to Site Allocations DPD. Work to date and proposed timetable to adoption** Timeframe for DPD – final document to cabinet by mid Jan. Planning to submit plan in April 2012. Period for current plan is up to 2025. May be revised to 2022 Change in plan period sought in line with localism bill. Allows for a fresh look at targets in the CS. Advice being sought from CLG and PAS. Development phasing would change as a result. Three phases may become two phases: 2012 – 2017 and 2017 to 2022. Current approach to phasing reflects infrastructure approach.	
	Approach to HRA, work done to date – introductions to issues to be resolved and proposed mitigation. BB set out background to HRA work. Screening report 2010. Sub set of sites that were not screened out taken forward to Main AA. Two European sites affected, River Kent SAC and Morecambe Bay SAC,SPA,Ramsar. EA – requested a map of the proposed sites and European sites to be included in the report. EA concerned with the language around the crayfish sensitivities and water quality. TEC to re visit for final version of the report	TEC TEC
	River Kent SAC – Potential water quality issues, capacity of WwTW, sewage	

	infrastructure. Avoidance/ mitigation options to address this.	
	Majority of sites are Greenfield sites on the edge of Kendal. SLDC Aware of sewage constraints at Kentrigg and Burneside.	
	Overarching concern is the capacity of the WwTW - Issue is water quality, and breaching of limits set in the conservation objectives.	
	An increase in population will see in increase in volume of sewage the WwTW needs to handle. The discharge quality can be met but the volume of effluent will increase leading to a decline in water quality. Discharge consent needs to be lowered and appropriate technical investment to avoid a decrease in water quality with an increase in Vol.	
	Assumed that Vast majority of Kendal feeds to Kendal WwtW. SLDC to ask UU to provide network sewerage map.	SLDC/ UU EA
	High level of certainty required that mitigation will be delivered and effective (see case law notes below)	
	Suggested way forward:36	
	1. EA will clarify whether capacity of volume (headroom) exists within the discharge consent in place at the moment? There may be capacity to accommodate a number of small developments.	EA
	2. EA to investigate whether modelling on this issue (effect of population increase on water quality) can be brought forward.	EA
	3). Subject to modelling conclusions there may be a need to re examine the discharge consent in place.	EA
	4). Question to UU on whether they are modelling this issue and also to comment whether improved technology available (or likely to be in next few years) to meet a lower discharge level?	UU
	5). UU to also confirm whether volume is the issue? Can diverting surface water from combined sewers help?	UU
	6). For AA purposes need clear commitment that there will be investment built into next AMP and a re-assessment of the discharge consent. In addition if there is a clear written commitment, will also need a caveat in the relevant plan policies that development in Kendal can not go forward until the improvements to the WwTW are in place and until EA and UU can confidently provide statement that water quality won't worsen as an effect of new development.	EA/UU
	NOTE: This may have ramifications for the phasing of housing in the plan and what is considered viable and deliverable by an inspector at EiP. The shortening of the plan may cause issues. The AMP6 is 2016-20. The improvements might not occur until the end of this period. SLDC to consider.	SLDC
	NOTE in the meeting on 5th September - UU note that could not agree to significant development until after 2015. UU to provide comment	UU
	Burneside and Kentrigg.	
	UU notes set out that investment currently sought.	
	UU commitment to undertake improvements.	
	In the plan SLDC will put relevant sites into 2nd Phase and include caveat in the plan that can't go forward without improvements in place..	SLDC
	Relevant Case Law mentioned in relation to the certainty required at this stage for mitigation and the decision on adverse effect on integrity :	

	Hurstleigh Park (Application By Berkeley Homes (Oxford And Chiltern) Ltd Hurstleigh Park, Coronation Road, Ascot, Sl5 9ey Application Ref: 10/00930/Full "The Secretary of State does not consider that there is a sufficient degree of certainty about the timing of provision of SANG for him to be able to grant permission on the basis of its future provision". **C-127/02– "Waddenvereniging and Vogelbeschermingsvereniging")** "The competent national authority needs to be satisfied that there remains no reasonable scientific doubt that the plan or project will not adversely affect the integrity of Natura 2000 sites".	
	River Kent SAC – Loss of supporting habitat and pollution trapping function of this land. Proposed mitigation TEC explained approach and mitigation measures. Attendees approved these with one change. Action: TEC to re-examine and add in additional proposed sites that are adjacent to the other tributaries of Natland Beck – add 10 m buffer zones either site of the Beck.	TEC
	Potential effects on Morecambe Bay SAC/SPA/Ramsar and proposed mitigation Discussion on specific of SUDS and applicability to all sites. Action – TEC to ensure that SUDS included as obligatory on all sites in Kendal.	TEC
	Next steps Action points agreed at the meeting UU to be requested to provide response to meeting notes of Sept 5, interim AA of the DPD (TEC) and these notes, if possible in advance of meeting on December 13th, so that potential solutions can be identified at the December meeting. All parties to meet with UU at South Lakeland House on December 13th 1pm (apologies from Judith Bennett, EA Water Quality specialist to attend, apologies from Paul Glading, NE substitute to attend).	All SLDC / UU All

NOTE TO RECIPIENTS:

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Job Title	South Lakeland Site Allocations DPD HRA			Job No.	
Subject of Meeting	Water Quality Issues	Meeting No.	01	Date & Time	13.12.11
Attendees	Lorayne Woodend (SLDC) Damian Law (SLDC) Dan Hudson (SLDC) Jeremy Pickup (EA) Paul Glading (NE) Andrew Frankish (EA) Andrew Seward (EA) Bill Butcher (TEC) Orlando Venn (TEC) Janine Hawkins (UU) Ken Shaw (UU)	Venue	South Lakeland House	Notes by	Orlando Venn
Distribution: All attendees					

Item No.	NOTES	ACTION
1)	**Background to Site Allocations DPD. Work to date and proposed timetable to adoption** SDLC updated all on proposed timetable. There is a political push to get the LDF adopted and in particular address the affordable housing issues. This has led to fairly high allocations of housing in most settlements. Major consultation on preferred options was between Jan and April. SLDC recognise that Kendal is constrained environmentally and as a result allocations are less than might be expected otherwise. SLDC now are sticking with Same plan period as the Core Strategy i.e. 2003-2025 Aim to provide a final portfolio of sites to full council or 18th January. This means a draft DPD needs to be completed by 18th Jan. The AA report will also be needed for that date. SLDC will leave itself open to Planning by Appeal If there are delays in adopting the Land Allocations DPD as currently have very few residential sites allocated.	None
2	**Approach to HRA, work done to date – introductions to issues to be resolved and proposed mitigation.** BB set out background to HRA work. Screening report 2010. Sub set of sites that were not screened out taken forward to Main AA. Two European sites affected, River Kent SAC and Morecambe Bay SAC, SPA, Ramsar. For Kendal, effects on the River Kent SAC (indirect and direct) was key. Particular concerns on the effects of water quality on Crayfish were considered to be	

	unfounded. To protect water quality from surface runoff and loss of supporting habitat a 50m buffer zone has been proposed for Natland Beck and a 10m buffer zone either side of the main river. In addition the EA requested that a 10m buffer zone was provided for the tributaries of the Beck even though they are outside of the SAC to protect the interests of the SAC. 50m has been selected for Beck as size of stream much smaller and more vulnerable to effect of pollution, due to presence of crayfish in the Beck and as wet marshy areas offer supporting habitat. SLDC raised concerns about the extent of the buffer zone around Natland Beck. **Actions:** Damian Law to check how much space is needed to allow the development sites either of the Natland Beck need to be viable. Damian Law also to examine the previous correspondence with Natural England with regard to buffer zones. TEC to re-examine the size of the buffer zone in specific relation to the protection of the interests of the River Kent SAC. It was noted that there may be other ecological reasons which are not specifically assessed by the HRA for the protection of the habitat around the Natland Beck.	DL (by 16th Dec) DL (by 16th Dec) TEC (by 7th Jan)
3	**River Kent SAC – Issues regarding capacity of WwTW** Overarching concern raised in the AA report is the capacity of the WwTW - Issue is water quality, and breaching of limits set in the conservation objectives. Concern previously raised was that an increase in population will see in increase in volume of sewage the WwTW needs to handle. The discharge quality can be met but the volume of effluent will increase leading to a decline in water quality. It was previously proposed that discharge consent needs to be lowered and appropriate technical investment to avoid a decrease in water quality with an increase in Vol. EA provided a revised view on the situation in a letter dated 12th December 2011. In this they state that there is a confusion between SRP and TP and that this may change the conclusion drawn about the capacity of the Kendal WwTW to receive the increased flows resulting from projected development. Data on SRP shows the levels in the river to be considerably less than 0.06mg/l. EA stated that OrthoPhosphate – is the measurement of phosphate that should be examined in this instance. TEC referred back to the data which shows that the level of orthophosphate is currently at around 0.035 – 0.04 mg/l (below the threshold of 0.06 mg/l). This appears to provide headroom for the River Kent to receive more Phosphate and therefore allow for a certain amount of development in Kendal EA – conclusions drawn were the same – seems to be some headroom but need to know reason why before the green light can be given? Potential reasons include that either the flow levels are lower than the estimates used in the modelling or that the discharge from WwTW is better than expected. Which ever reason EA acknowledge that there is better WQ downstream than expected. Once the reason is understood the EA will be able to establish how much capacity that is in the system. **EA response:** Correct, the current ortho-P concentration downstream of Kendal WwTW is within the Habitats Directive limit of 0.06mg/l and lower than previous modelling predicted. However, it is slightly misleading to refer to this as headroom which infers it can be fully utilised up to the limit. From a review of the flow data, the dry weather flow at Kendal WwTW is within its consent limits and suggests there may be some additional capacity. However, United	EA to confirm

	Utilities would need to determine what capacity was actually available. This would explain the lower than predicted ortho-P downstream, although if the WwTW operated at its consented flow, the downstream water quality would be as previously modelled. EA & UU agreed they need to check flows against consented flows. (see actions below) **UU -** In all cases removal of surface water, entering the sewage network would be beneficial. There will be a regulations change next year so developers will not have right to connect surface water to the mains. Separate systems will be required. UU are only required to accept Foul flows into the sewer network. If surface water could be removed from the sewer network, this would free up further capacity within the sewer. New development has to come up with a Surface Water Management Plan as standard. Flows in excess of permitted flows to full treatment go to storm tanks. If these are filled – the excess above these has to go out to river. This overflow is just screened. SLDC clarified that they understand that there is some headroom available but the capacity of Kendal WwTW and the Network needs to be verified.There is unlikely to be enough headroom for the full quantum of development in the plan. Therefore a technological fix has to be planned for. **Actions going forward** 1).. The EA agreed that there is some headroom at the WwTW and that they would explore reasons for this - EA will clarify through modelling what capacity of volume (headroom) exists within the discharge consent in place at the moment. Done 2). UU to look at roughly what an additional 2000 houses would do to volumes expected at the WwTW - to investigate the effect of population/housing increase on water quality. UU has undertaken some Network modelling on the sewer network, together with a capacity assessment at Kendal WwTW. As a result it has been determined that there is lack of capacity in the Burneside area of Kendal and any development should be undertaken in Phase 3 to provide sufficient time for United Utilities to address the capacity issues at this location. For development in Kendal generally, it has been identified that there is sufficient capacity, both at Kendal WwTW and in the sewer network. United Utilities would request that SLDC adhere to the phasing as currently scheduled. In addition Unite Utilities will insist on:- • Foul flows only into the sewer network. • Separate systems of drainage. • Surface Water Management plans to be developed and produced prior to construction and agreed with UU. • Sustainable drainage systems to be implemented for all Development. • No detriment to existing serviceability. As a result of this SLDC will be able to understand what quantum of housing could be accepted before further investment needed. Accepting that further investment will be unlikely to be enough headroom for the full quantum of development in the plan: 3). TEC will investigate examples policies used in other plans which aim to ensure that there is no additional total volume to network. There will be a need to retrofit to ensure no net flow increase from new development and water efficiency measures are likely to be required as standard. 4). SLDC – policies in the DPD will need to ensure strong measures as outlined in point 3 plus link into the AMP6 process. For AA purposes need clear commitment	EA (by 23rd Dec) UU (by 23rd Dec) TEC (by 6th Jan) SLDC (by 18th Jan) SLDC

	that there will be investment built into next AMP and a re-assessment of the discharge consent. In addition to the clear written commitment, will also need a caveat in the relevant plan policies that development in Kendal can not go forward until the improvements to the WwTW are in place and until EA and UU can confidently provide statement that water quality won't worsen as an effect of new development. 5). This may have ramifications for the phasing of housing in the plan and what is considered viable and deliverable by an inspector at EiP. To be considered by SLDC. Of additional interest: UU provided a document on their position on planning appeals: (UU to confirm this be referred to in the HRA and as a mitigation measures) Criteria to be considered includes: (a) no net flow increase from new development Or (b) time to deliver increased asset capacity. This approach might possibly be considered for policies in the DPD Other options considered: BAT - is better technology coming forward? Perhaps within period of plan but no BAT to consider at this stage. Tackling other sources of Phosphate in the catchment. A diffuse pollution plan is being brought forward by NE and EA. However, phosphate loading further up catchment is considered to be low. Also lack of certainty on to what extent diffuse pollution can be tackled. Correct, ortho-P concentrations upstream of Kendal are low. Questions from TEC for clarification (addressed to EA and UU). 1. What factors could cause a deviation from the simple linear relationship between the number of people living in the Kendal WWtW sewerage "catchment" and the phosphorus loading, and hence Total Reactive Phosphorus levels, in the lower River Kent? Broadly, the phosphorus *load* is related to population. By removing surface water from the system, this would provide capacity within the sewer/WWTW for additional flows of foul drainage. Removal of surface water would increase the *concentration* of the influent at the WwTW, but assuming the consent limit was met, the effluent loading would remain the same. 2. Can such deviations be quantified? (e.g. the proportion of phosphorus loading of the lower River Kent arising from incomplete treatment of foul sewage at Kendal WWtW that can be attributed to excessive surface water in the sewerage system is X%. Therefore the removal of Y% of the surface water flowing through the sewers will reduce the phosphorus loading by Z%, and effectively increase the foul sewage capacity at the WWtW with no increase of phosphorus loading by A%. see above	EA / UU By 16th Dec EA / UU By 16th Dec
4	**Issues regarding capacity of sewage network at Burneside and Kentrigg.** TEC - Current mitigation proposal is that in the plan SLDC will put relevant sites into 2nd Phase and include caveat in the plan that can't go forward without improvements in place .- Is this acceptable? UU - Burneside currently cannot accept any more development UU have recently had modelling done. Source of water leaking into the sewer is at Cowan Head and potentially on the Steeles Row side of the river. Work going on to free up capacity in network here. UU are currently monitoring the result of these works. However, UU consider it highly unlikely that the works will free up enough capacity to bring further development forward in this location. The works	

	aim to solve the current overflow issues. Similar situation at Bridge End. There are also downstream issues at Kentrigg and a solution at Burnside may make Kentrigg problem worse. Problem development sites which will be affected include: M38 and R489M. Further development in this area risks exacerbating problems of illegal discharges into the River Kent. AND solution being sought will only stop the system from overflowing, will still be at capacity. UU need to monitor over time to understand capacity gained. Risk to SAC is from foul sewer overflow. New mitigation proposal is that in the plan SLDC will put relevant sites in Burneside, Steeles Row, Kentrigg into 3rd Phase and include caveat in the plan that further development in these location can't go forward without sewage network improvements in place. UU and EA will continue to meet to discuss and try and reach and solution to the capacity issues at Kentrigg, Burneside, and Steeles Row.	
5	**Issues regarding capacity of sewage network generally.** UU – there are specific sewage network capacity issues throughout Kendal. Near the WwTW (south kendal) issues are not as bad. Risk to SAC is from foul sewer overflow and illegal discharges Loading and flows on the WwTW is one thing then there is also piece meal development affecting parts of the system. UU recommended that in the plan the following should be included "UU must be consulted on each site going forward". UU – will look at doing simple broad brush modelling to examine the whole of the Kendal network to see where pinch points are – UU to provide a date for when this can be done. UU - Need lead in time to provide solutions to the problems. Mitigation proposed: • Policies in the DPD to ensure that SUDS are obligatory on all sites in Kendal and water efficiency measures are incorporated. • In line with mitigation addressing issues affecting WwTW will expect no net increase in flows from new development • Developer contribution to retro fit sewage network improvements and separate systems in existing developments • UU must be consulted on each site going forward The modelling being undertaken by UU may allow for refinement of this proposed mitigation.	UU – Date to be agreed

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