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Our ref: NE/2013/117483/01-L01
Your ref: L31753Cxxx
Date: 30 April 2013

Dear John,

Draft Water Framework Directive assessment for the redevelopment of the West Herts College site, Hemel Hempstead.

Thank you for providing us with the draft Water Framework Directive (WFD) assessment for the redevelopment of the West Herts College site in Hemel Hempstead. We continue to have serious concerns that the proposals would lead to a severe deterioration of the River Gade through the site.

It is for you to demonstrate that the development proposals will not cause a deterioration of the River Gade through the site, and that the proposals will contribute towards the River Gade achieving 'good' ecological status. The proposed infilling of the River Gade and substitution with a replacement, artificially lined channel would be an ecological deterioration under the WFD. The proposed development is not significant enough to warrant an exemption under Article 4.7.

If planning permission was granted whilst we maintained an objection on WFD grounds, we would be highly unlikely to grant flood defence consent (FDC) because of non-compliance with the WFD. Works carried out without FDC could become an enforcement matter. We will be seeking legal advice on this matter.

There are a number of shortcomings, issues, errors and queries that we have identified in the report that will need to be addressed if you insist on development proposals that involve realigning the river. These are listed in Appendix A at the end of this letter. A key concern is that the alternative options are limited, have been dismissed too readily, and do not provide adequate justification for realigning the River Gade. We do not agree that insufficient parking is adequate justification for moving the river.

It may be possible to design the proposals so that they do meet WFD objectives, but at this point we strongly urge you to direct your attention towards progressing option 3 within the report. We feel that it will be far easier to find a solution around the number of car parking spaces that need to be provided on site rather than find a way of making the realignment of the river acceptable.

We also wish to clarify our position regarding the petrol filling station on the site. Our revised *Groundwater Protection: Principles and Practice (GP3)* document



states that we will oppose the above ground storage of large volumes of hazardous substances within Source Protection Zone 1. Given this, we would object to the current proposals on basis of the petrol filling station, despite the mitigation measures proposed.

Proposed realignment issues

The proposed option 4 would cause a severe deterioration of the existing chalk river habitat and ecology at this site. We strongly disagree with your statement in paragraph 3.4.1 that a new river channel would be beneficial.

The proposal involves the diversion of a 275 metre length of river. This will have a significant impact on the best quality stretch of the River Gade through Hemel Hempstead. It will lead to the destruction of a morphologically functioning stretch of chalk river with a naturally sealed bed and associated diverse ecological communities. This includes several high scoring Biological Monitoring Working Party (BWMP) species, contrary to the reported low diversity in your report.

The cost of reinstating a chalk river channel at the current level of hydro-morphological functionality with the existing diverse ecological communities will be disproportionately high. The resulting high risk of causing an overall deterioration to the chalk river habitat at this site within WFD time frames, cannot be defended using Article 4.7 and is therefore not deemed acceptable.

Moving the channel to a new location carries a very high risk of long term deterioration of the hydrological conditions, i.e. the loss of stream flow until the bed naturally seals itself. It would require a lengthy period of recovery to present conditions in the current channel. The dimensions of a new channel (as shown in figures 3.4 and 3.5) are entirely inappropriate for a chalk river, which leaves little confidence that the overall scheme has been designed or considered appropriately.

We have serious concerns about the proposal to seal the new channel to prevent leakage into the underlying ground. We would expect any new channel to be replicated to exactly the same specifications as the current channel. The proposed design using a clay liner to retain low flows is unacceptable for a chalk river and represents a morphological deterioration compared to current conditions. The introduction of non-locally sourced substrate materials within a new channel would risk a change in character and biological diversity.

Lining would also prevent the future formation of a hyporheic zone (a region beneath and alongside a river bed, where there is mixing of shallow groundwater and surface water). In doing so, a vital part of the food web is removed. Meiofauna (including early instar macro-invertebrates, such as caddis flies) live in the sediment and have interactions with groundwater i.e. refuge at low flows. Moving the channel to an inappropriate position and lining the channel would wipe out the meiofaunal community and prevent these interactions, as connectivity to the groundwater would be lost. Even if connectivity with the groundwater was maintained it could take several years before the meiofauna could recolonise to form a stable community.

Proposed wetland areas

The proposed wetland areas are inappropriate for a chalk river environment. The Gade frequently suffers from low flows as a result of over-abstraction. We would

therefore not want any of the flows diverted to online features as it is more beneficial to retain these flows in-channel. Wetland areas can be beneficial and we would expect these to be provided on the site, but they should only be fed by high flows and high groundwater levels, so would be suitable in areas of floodplain. These features could also provide additional flood storage capacity.

Buffer zone and planting regime

As discussed at our meeting on 4 April, a minimum of eight metres needs to be left as a natural buffer zone on both sides of the river, measured from the bank top. The eight metres is our minimum requirement, but a larger buffer zone may be required to allow suitable chalk river habitats to flourish and as an important part of Hemel Hempstead's green infrastructure. The buffer will definitely need to be increased if there are tall buildings proposed. The buffer zone should be free of all built development, including roads, paths, fences or any other structure. The current plans show a number of developments within the eight metre buffer zone. The buffer zone should be managed sympathetically to allow marginal plants to colonise and thrive within the river corridor.

The proposal includes the removal of a number of tree features on the river bank, such as submerged root features. These features provide a valuable habitat and would take many years to develop within a new artificial channel.

The river and buffer should be intrinsically dark (0-2 Lux) to prevent disturbance to species that use the corridor. This should be achieved by using lighting that is adequately set back and directed away from the corridor. Using shrubs and trees to screen lighting could result in excessive shading and reduce the growth of bankside, marginal and in-channel vegetation.

The report suggests that you would introduce in-channel planting. However, we do not see this as necessary given the previously choked nature of the channel. There is an ample seed base from upstream that will establish itself over time into a natural community. It should be made clear who will be responsible for ongoing monitoring and vegetation management where required.

Groundwater protection

Whilst there is some information included about groundwater, the need for protection of the groundwater WFD body from pollution throughout the life of the development has not been considered in as much detail as the potential impact on the River Gade.

It is difficult to comment on existing contamination at the site without seeing a full site investigation report. However, human health screening levels will not be acceptable for assessing the risks posed to groundwater quality from existing land contamination. It is useful that some absolute concentrations of contaminants are included in the data published. However, it is unclear why the report includes a summary of the risk to human health, as this is irrelevant to a WFD assessment. There is no mention that a Controlled Waters Risk Assessment will be included.

We have very serious concerns about the proposed petrol filling station (PFS) on the development site. The proposed fuel storage tanks are sited within metres of a public drinking water abstraction borehole, and wholly within Source Protection Zone 1 – an area of high groundwater vulnerability. Should any incident occur

throughout the life of the development, the impact on the water supply abstraction would be almost immediate. There would be very little time to respond to the incident and protect the public water supply.

Whilst above ground fuel tanks pose less of a risk to the groundwater than underground tanks, there is still an intrinsic high risk to the public water supply from storage of large volumes of hazardous substances so close to a water supply abstraction. Our guidance document for the protection of groundwater, *Groundwater Protection: Principles and Practice (GP3)*, has been revised since initial discussions on this site. It is a key document that has not been referenced in this WFD assessment.

The new GP3 (2012) states on page 69, "*A new development involving large-scale above ground storage of hazardous substances as may occur at a chemical works or at a petrol filling station would be opposed within SPZ1.*"

Consequently, we would maintain an objection to any planning application for this site that includes a PFS. If Dacorum Borough Council informed us that they were minded to approve the proposed development, in spite of our objection, then we may provide comments on any proposed mitigation measures.

For the reasons set out above, we cannot agree with the conclusions presented in Section 8 of the assessment. The assessment has not referred to GP3 - a key groundwater protection document. The mitigation measures proposed may reduce the likelihood of an impact but are unlikely to reduce the severity and the water supply could be impacted before the operator could respond to the incident. The intrinsic risk of storing fuels adjacent to a public water supply abstraction is unacceptable where no significant geological barrier is present.

The site and River Gade today

The River Gade is a chalk river and as such is designated as a priority biodiversity habitat in the UK. It is therefore a priority under the WFD that there is no deterioration to the condition of the existing chalk river habitat within the River Gade. The Gade through the site flows on or very close to the historic river bed along the valley floor as indicated by the 1766 map shown in your report (Figure 2.1). As such, it should be considered as a natural heritage feature that pre-dates the Water Gardens downstream and should be conserved and rehabilitated. These factors have not been adequately assessed in the report.

The two weirs mentioned in paragraph 2.1.38 of the report are no longer in place. There may be remnants of the weirs left in the bed, but they are not impounding or altering flows. The wooden bank protection is still visible in several locations, but is in very poor condition as the river has eroded around the protection. As it is, this is not causing a major problem and most of it would be extremely easy to remove.

The issues around low flows are likely to be a result of the abstraction borehole and the flood relief culvert on the site. However, as of April 2013, new boards have been installed at the weir at the southern end of Gadebridge Park. Therefore flows through the development site have been significantly improved. In order to increase flows into the Gade further, additional boards could be added to the weir, although this would require a detailed flood risk assessment.

We have commented on a number of different masterplans or applications for this site over many years. All of these plans considered the River Gade to be a constraint for appropriate, sustainable development of the site. The previous proposal was acceptable because the River Gade was left in place with an adequate, development-free buffer zone provided, and the proposed buildings adequately set-back from the channel. However, now there is an excessive amount of development in a much smaller area, which has led to unacceptable proposals, including the realignment of the River Gade and a petrol station in Source Protection Zone 1.

Drainage / sustainable drainage systems (SuDS)

The proposed drainage strategy fails to maximise the use of SuDS. As a result of this, the development only achieves a 25% betterment in runoff rates against the current site. Furthermore, clean surface water flows are to be diverted into the storm relief culvert, rather than being used to supplement flows in the River Gade.

SuDS should be implemented to benefit biodiversity and water quality. On a previous scheme, both green roofs and green walls were proposed. These are excellent SuDS features to incorporate at this site, where space is so limited, and infiltration techniques may not be feasible because of the public drinking water abstraction on the development site, but this option should be explored further. We expect this proposal to incorporate green roofs and walls.

Green roofs constructed with a suitable substrate will offer water attenuation benefits, which will help in reducing the runoff rates from the site. Also, green roofs or walls should be planted with a diverse range of vegetation, offering improved biodiversity habitats, as well as other benefits such as improved air quality and a reduction in the urban heat island effect.

Yours sincerely,

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cc Yvonne Edwards – Dacorum Borough Council

att: Appendix A

APPENDIX A

Specific errors/queries/issues identified in the report

There needs to be further detailed investigations to establish what the current river channel bed consists of, such as channel bores and freeze samples. This would be required in order to demonstrate that these conditions can be replicated in a re-aligned channel. You may find that it is not possible to replicate the conditions.

The existing macro-invertebrate community of the River Gade within the development stretch is poorer than the upstream, control site. Two sites at the development area have sensitive caddis flies present suggesting that factors other than organic pollution are having an impact on macro-invertebrate community. The lower number of taxa indicates that there are issues with a lack of habitat, sedimentation and water quality at the most downstream site. The lower Average Score Per Taxon (ASPT) scores suggest that there are water quality issues. However, you need to undertake further analysis using HEV plots that look at other indices such as LIFE and PSI to provide evidence for flow issues and sedimentation. The presence of invasive species and runoff from the urban area has a detrimental effect on ecology and needs to be taken into account.

The details of the main bridge state that abutments will be set back by one metre. This is insufficient given the scale of the bridge. The abutments need to be set back at least eight metres from the top of bank on both sides of the river. The current design means that the bridge will effectively culvert an 18 metre section of the River Gade, resulting in excessive shading that will prevent vegetation growing and severely degrade the river habitat. Additionally, two other bridges are marked on the drawings, but only one five metre footbridge is mentioned in the report. The impacts of any structure over the river must be considered as part of the assessment.

Paragraph 2.1.24: The WFD data quoted in the report is taken from the 2009 classification. There is data available up to and including 2012 from us. Please contact our External Relations team for the latest data; their e-mail is NETenquiries@environment-agency.gov.uk. The overall waterbody is moderate status in 2012, but the site at Water End upstream of the site is high status in the 2012 classification.

Table 2.1 and paragraph 2.1.49: The Gadewater Nurseries site is not a designated WFD site and is therefore not routinely measured for all WFD elements. It is not suitable for a WFD assessment.

Paragraphs 2.1.34 and 3.1.7: You discuss relative water levels and draw the conclusion that there is no hydraulic continuity because the river water level is higher than the groundwater. However, there are other factors that have not been considered:

- the river could be a 'losing stream', so some infiltration to ground occurs along its length but it does not lose all its flow;
- the hydraulic relationship between the river and the groundwater could vary seasonally;
- the hydraulic relationship could vary annually.

The document does not state when the water level data was collected. Groundwater levels were declining in 2011 to abnormally low levels at the start of 2012, followed by recovery to abnormally high levels by the end of 2012. The normal levels could be obscured by this variation. All of this has been missed from the WFD assessment.

Paragraph 2.1.48: The report states that there are no discharges to the river between the control site and the development site. However, road and urban runoff is present. You need to demonstrate that runoff is not affecting the development site results.

We believe there are several outfalls through Gadebridge Park that may be discharging water of poor quality.

Paragraph 2.1.52: The WFD limit for ammoniacal nitrogen should be used here. The WFD standard is 0.6 milligrams per litre.

Table 2.2: The data in the table starts from 2007. However, there is data from 2006 when the first classification was calculated, and this should be included.

The WFD standard for pH is 6-9, not 7-9 as stated in the table.

There are WFD standards for temperature, so it should not read "N/a" under the EQS column. The wrong documentation appears to have been used for the standards.

Both sites in the table are upstream of the development site. If any pollution is occurring downstream of these sites, it will not be picked up in the data.

Paragraph 2.3.14: You should not use the term 'southerly direction'. Southerly means from the south, what is meant is southwards - towards the south.

Paragraph 3.2.3: You will need to consider the runoff of polyaromatic hydrocarbons (PAHs) from both the petrol station and the car park areas. PAHs are assessed as part of WFD.

Paragraph 3.2.12: It is not clear why chalk groynes are proposed for deflectors. There are more appropriate in-channel measures for chalk rivers, such as woody debris. However, whilst these may be suitable as a river restoration technique on the River Gade, they should not be used as a means of making a new channel function correctly.

You should state what material the old channel could be infilled with.

Paragraph 3.3: It is correct that only clean roof drainage is suitable for discharge to ground within SPZ1. Such infiltration should only take place in areas of clean ground. All other surface water and foul drainage must not infiltrate to ground.

Paragraph 3.4.8: You should state what the gradient is through the site.

Paragraphs 4.1.6 and 4.1.9: Your report states that there is no mechanism by which the river diversion would be likely to have an effect on nutrient conditions. However, if there are nutrients in the sediment on the route of the new channel, this could be a potential future source. Sediment quality should be checked as

part of the assessment. This also applies for any chemical contaminants that may affect the dissolved concentrations and pH levels.

Specifically in paragraph 4.1.9 we do not agree that specific pollutants and priority substances should be scoped out at this stage. These should be included together with the details of any controls and mitigation measures to be implemented.

Paragraph 5.1: This does not appear to consider the risks of a PFS in close proximity to the abstraction borehole in 'weaknesses'.

Section 6: Does not mention groundwater at all.

Paragraph 6.1.2: There is an unfinished sentence on the second bullet point.

Section 7: It should be made clear who will be responsible for ongoing monitoring, for how long, and the ongoing responsibility if a realigned river were to require regular or continuous management.

We may discuss groundwater monitoring and operational maintenance if Dacorum Borough Council is minded, against our advice, to approve a proposed development that includes a PFS.

Appendix 1: The appendix lists the 2009 WFD data, which has been superseded with annual data up to and including 2012.