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13 June 2011

Dear Jenny

**North West Bicester Eco-Town, Oxfordshire
Environment Agency Planning Comments**

Thank you for considering and responding to the planning application for the first phase of the NW Bicester Eco-town, Oxfordshire. This letter provides further information in response to the Environment Agency letter dated 26th May 2011 (their ref. WA/2011/109125/02-L01) to address concerns raised regarding the Water Cycle Study in order that appropriate conditions can be set.

The following list of comments and requests for further information is taken from the aforementioned letter together with the additional information provided, which is shown in *italics*. Two Memorandums have also been enclosed and are referenced where appropriate below.

EA: "The study has been updated since the previous submission. Reference to water quality and the Water Framework Directive (WFD) is made as is water neutrality as previously requested.

However, there are a number of statements made within the study which have not been assessed and fully investigated and it is therefore impossible to determine how effective and successful they will be in meeting WFD objectives and water neutrality.

We support the four options outlined in section 4.6.3 on water neutrality. However, it needs to be made clear how each of these options will be implemented and how feasible each option is likely to be. Reference is made of a contribution to Thames Water to enhance their existing water efficiency campaign. Again we support this but further feasibility analysis is needed along with inclusion in any S106 negotiations to secure the contribution.

There is an indication that following the implementation of water efficiency measures and re-use mechanisms, the water neutrality gap would be 82m³ per day. As shown earlier within the study, the sewage effluent and re-use options from this have not been determined and we therefore have no calculations on what flows from any discharge could be used, especially in light of other statements for effluent options which indicate that any water could be used for keeping green features wet through dry periods and not



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for reuse in houses. As such if they are planning for effluent reuse as part of achieving water neutrality this needs to be properly assessed."

Response: See separate enclosed Technical Note (ref. 7511-UA001881-01).

EA: "Section 5 of the study discusses water quality. The relevant waterbodies to the site are included, although they are only failing for Phosphorus and not Nitrates. Additionally, the site is situated on the Bicester Otmoor cornbrash which is failing standards for Phosphorus and should ideally be referred to as well.

Although it is technically true that the entire Eco-Town site will lead to a reduction in agricultural runoff, there is no evidence included to show whether there is currently a significant input and how much of a reduction will be seen alongside how much this will contribute to water quality improvements. A statement of this nature needs to be supported by suitable evidence and assessment.

We have also previously requested that an investigation into the possibility of improving flows within local watercourses to improve their ecological status be carried out. Section 5.1 of the study refers to this opportunity but no assessment of the potential has been made. It is also very concerning that our review of other reports confirm there is likely to be a reduction in flow due to restricted discharge rates for surface water run-off and infilling operations and both bridges along the watercourse. This means the residence time for any nutrients within the watercourse will increase and therefore so will the chance of water quality deterioration."

Response: Comments made relating to reductions in discharge to watercourses are in relation to the large storm events, during which flood risk is the prevalent concern. As confirmation, peak discharge rates from the developed site will be significantly lower than pre-development site, providing a desirable reduction in flood risk.

However, as set out within the drainage strategy, flood risk assessment and Water Cycle Study, to address the desired improvement in water quality and to specifically mitigate the concern outlined in the comments above, during smaller, more frequent events, discharge to the watercourses will be increased to provide more frequent and larger discharges. The improvement would be provided by reducing the residence time of nutrients within the watercourses and would be achieved by directing runoff from some areas to the SuDS features and flow controls.

The SuDS network would respond to rainfall by discharging a larger quantity of runoff than the predevelopment site during regular events, thereby providing the desired improvement in flow regime, whilst providing reduced discharge rates during larger rainfall events when compared to predevelopment rates.

The issue of water quality is complex but the objectives outlined above can be achieved through appropriate design of flow control devices. We agree that water quality monitoring would be an appropriate part of the assessment and we look forward to developing our proposals in consultation with the Environment Agency, from whom we are currently awaiting guidance. We note that the ephemeral nature of the existing watercourse limits the ability to monitor water quality at the site. In the meantime, the idea of improving the flow regime has been committed to as part of the proposal and details of this aspect can be conditioned.

EA: "While not relevant to the exemplar site, we have also noticed that there is no reference to an Integrated Constructed Wetland option for sewage treatment in Section 4.5.2. We would like to see this option pursued for consideration for partial or full treatment of sewage. If not pursued or proven to be unfeasible for this situation we would like to see evidence why."

Response: As highlighted above, this option will be considered as part of the wider Masterplan site application and does not immediately affect the Exemplar site.

The further information provided above addresses the concerns raised and information requested regarding the Water Cycle Study to allow appropriate conditions to be set. We believe that details of these proposals can be developed post-planning as the detailed design stage commences and in consultation with the Environment Agency and other relevant parties.

I trust that the information provided addresses the concerns raised.

Yours sincerely

A handwritten signature in black ink, appearing to read "M Pearson".

Michael Pearson
Hyder Consulting (UK) Ltd

Enc. 7511-UA001881-01

TECHNICAL NOTE

Date 01 June 2011
Reference 7511-UA001881-01
From Michael Pearson
To Sarah Green - EA
 Jenny Barker - CDC
Copies Iain Painting - Barton Willmore
Subject **Water Cycle Study - Water Neutrality - Clarification Information**

This note provides clarification and response relative to the EA comments (ref X) "We support the four options outlined in section 4.6.3 on water neutrality. However, it needs to be made clear how each of these options will be implemented and how feasible each option is likely to be. Reference is made of a contribution to Thames Water to enhance their existing water efficiency campaign. Again we support this but further feasibility analysis is needed along with inclusion in any S106 negotiations to secure the contribution.

There is an indication that following the implementation of water efficiency measures and re-use mechanisms, the water neutrality gap would be 82m³ per day. As shown earlier within the study, the sewage effluent and re-use options from this have not been determined and we therefore have no calculations on what flows from any discharge could be used, especially in light of other statements for effluent options which indicate that any water could be used for keeping green features wet through dry periods and not for reuse in houses. As such if they are planning for effluent reuse as part of achieving water neutrality this needs to be properly assessed. As it stands there is no evidence to prove to what extent they can achieve it." In response to these comments we would like to clarify the following:

The remaining water neutrality gap for the Exemplar site will be in the order of 82m³ per day – this is calculated following the EA Water Neutrality Advice Note:

EA guidance			Calculated WN gap
1	Identify number of new homes and buildings, multiply by occupancy	EXAMPLE 1000 new homes x 2.4 people per home = 2400 people	393 homes x 2.6 (av occupancy) = 1022 people 1022 people x 80 l/person/day = 81760 l/day Circa 82m³
2	Forecast household consumption, aggregate to development/area level	1200 people at 115 l/person/day (Code Level 3 plus external water use) + 1200 people at 89.5 l/person/day (Code Level 5 plus external water use) = 245,400 l/day (245 m ³)	
3	Water neutrality gap	245m ³	

The calculated water neutrality gap is already an improvement of circa 33% against typical building standards (which would result in circa 118m³ water neutrality gap).

The CSH level 5 water efficiency standards of 80l/per person/ per day will be achieved in the Exemplar site homes through low flush / use fixtures, fitting and appliances and rainwater harvesting as detailed within the WCS. The remaining water neutrality gap of circa 82m³ will be met through the following approaches:

1. Water efficiency campaign in existing stock - in line with build out appropriate contribution to Thames Waters water efficiency campaign will be made. The EA Water Neutrality Advice note provides guidance relative to the average savings made relative to various water efficiency measures; as shown below.

Table 1: Water efficiency measures in existing homes

Appliance	Average saving (l/household/day)	Description	Cost (£)
Variable flush retrofit device	24.65	Variable flush device retrofitted to existing WCs	8
Ultra-low flush WC replacement	53.1	WC replacement	140
Low-flow showerhead	12.9	Showerhead replacement	15
Low-flow taps	2.7	Tapmagic inserts	5

By applying variable flush retrofit devices, low flow showerhead and low flow taps a saving of 40.25 l/household/day can be achieved in existing stock at an approximate cost of £28, plus an installation cost that can range between £50 and £70. Based on these water efficiency measures alone, approximately 2,030 homes would require retro fitting at an estimated cost of ranging from £158,000 to £200,000.

However, recent case studies (ref: Waterwise Evidence Base for Large Scale Water Efficiency February 2011) indicates that such measure can be realistically installed at costs of between £40 to £50. This would result in a total retrofitting water efficiency campaign cost of between £81,000 and £101,000.

In addition savings can be achieved through the installation of water butts and metering which can provide between a 10 and 15% reduction in overall water consumption. Should water metering be part of the water efficiency campaign then the overall number of homes requiring retro fitting would likely be around 920 households. This is based on an average home consuming circa 390 l per day being reduced by 12.5% to 341 l per day, which provides a saving of 48.75 l per day. When this saving is added to the other measures mentioned above the total saving per household per day would be 89 l per day. Based on metering alone, approximately 1,680 homes would require retro fitting.

We have confirmed with Thames Water that we would be able to contribute to existing water efficiency campaigns to achieve this water neutrality off-set.

2. As and when the masterplan strategic re-use solutions become available, then any remaining water neutrality gap may be either reduced or met through connection and/or off setting via the proposed solution which is likely to include grey water recycling and/or black water recycling (for non potable uses).
3. If any other off-set water efficiency measures become available in the future then this may be implemented provided there is sufficient evidence to support the water savings it will generate.

Note: It is also worth noting that water efficiency retrofitting also achieves a range of between 0.031 and 0.187 kgCO₂ per property per day of carbon emissions saving.