TOWN AND COUNTRY PLANNING ACT 1990
SECTION 78 APPEAL

APPEAL BY GREAT LAKES UK LTD
REF: APP/C3105/W/20/3259189

CHESTERTON, BICESTER
OXFORDSHIRE OX26 1TE

VOLUME 1
PROOF OF EVIDENCE

OF

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(DRAINAGE & FLOODING)

For

Great Lakes UK Limited

motion

Document Control Sheet

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Appendices

1.0 Introduction – Qualifications and Experience

1.1 My name is Richard Bettridge. I am a Director of Motion Consultants Limited, a Transport Planning and Infrastructure Design Consultancy with offices in Guildford, London and Reading.

1.2 I am a Chartered Engineer and a Chartered Environmentalist and since 1984 have been a member of the Institution of Civil Engineers. In 1982 I became a Member of the Chartered Institution of Highways and Transportation and was made a Fellow in 1994. I became a Member of the Institution of Public Health Engineers in 1983 and I am now a member of the Chartered Institution of Water and Environmental Management. I became a Member of the Society for the Environment in 2005. I hold an Upper 2nd Class Honours degree in Civil Engineering and a Bachelor of Arts degree in Humanities.

1.3 I have acted as Engineer on numerous infrastructure projects over the last 30 years. I have a particular interest in flood defence, drainage and sewer design and construction as well as flood studies and channel and watercourse analysis. I have given evidence on flooding and drainage related matters in the courts and at Planning Inquiries. Further details of my background and experience are provided at Appendix A.

2.0 Scope of Evidence

2.1 A planning application was submitted to Cherwell District Council (CDC) in November 2019 (Planning Ref: 19/02550/F) for development proposals comprising:

"Redevelopment of part of golf course to provide new leisure resort (sui generis) incorporating waterpark, family entertainment centre, hotel, conferencing facilities and restaurants with associated access, parking and landscaping."

2.2 My evidence is provided on behalf of Great Lakes UK Limited, the "Appellant".

2.3 Planning permission was refused at planning committee in March 2020. The Decision Notice in relation to the refusal of planning permission lists six reasons for refusal and I consider that one of those reasons for refusal relate to flood risk and drainage matters as follows:

Reason 5 – The submitted drainage information is inadequate due to contradictions in the calculations and methodology, lack of robust justification for the use of tanking and buried attenuation in place of preferred SuDS and surface management, and therefore fails to provide sufficient and coherent information to demonstrate that the proposal is acceptable in terms of flood risk and drainage. The proposal is therefore contrary to Policies ESD 6 and ESD 7 of the Cherwell Local plan 2011 – 2031 Part 1 and Government guidance contained within the national Planning Policy Framework.

2.4 I consider this matter in the following sections of my evidence and demonstrate that the development proposals do meet the requirements of the NPPF and Policies ESD 6 and ESD 7 of the Cherwell Local plan 2011 – 2031 Part 1 and as a result the proposals are acceptable in terms of flood risk and drainage.

2.5 On that basis, I am of the professional opinion that the development proposals accord with the Cherwell District Council Local Plan and the National Planning Policy Framework (NPPF) and therefore should not have been and should not be refused on flood risk and drainage grounds.

3.0 Policy Framework

3.1 Details of the Policy Framework are included within Appendix D of this report.

4.0 Discussions with the Lead Local Flood Authority

4.1 The LLFA responded initially to the application on 8th January 2020 and raised some issues on which they sought clarification. These were issues relating to:

1. Riparian ownership and consent to discharge to be justified. Ditch condition and capacity to take additional flows to be demonstrated
2. Boreholes/BRE to determine level of groundwater
3. Increase in peak discharge from a greenfield site
4. For a site of this size FEH QMED should be used instead of QBar
5. Default coefficient of Cv was challenged for the calculations
6. Calculations should be re-run for all relevant return periods and critical durations established
7. Sub-catchment approach should be applied to surface water management, with flow controls and site storage
8. Consider groundwater in respect of the proposed tanked attenuation and justify the need for buried attenuation as opposed to surface SuDS and surface water management techniques
9. Flow control from the site to achieve greenfield rates for return periods including 1in10, 1in30, 1in100 and 1in100 plus climate change.
10. Proposal to divert two ditch lines will affect existing pond levels and biodiversity
11. General strategy matters
12. Completion of OCC proforma

Riparian ownership and consent to discharge to be justified Ditch condition and capacity to take additional flows to be demonstrated

4.2 The appellant's consultants (Curtins) responded in February 2020 and clarified the position. The outfall is in the ownership of Bicester Golf Resort and Spa, and currently serves the appeal site (the existing back nine holes). The permission to discharge into the outfall will be secured from the owners in accordance with planning guidance following a grant of planning permission. Since planning guidance requires the discharge to be controlled to greenfield rates, which is established by determining Qbar for the site, there would be no increase in peak discharge. There was no further comment on this from the LLFA until after the refusal of the planning application in March 2020. At the subsequent meeting on the 20th November 2020 Mr. Littler of the LLFA accepted that there would be no increase in discharge because the runoff from the site would be restricted to Qbar. The principle of using Qbar was accepted by email on 22nd July 2019 by Richard Bennett of the LLFA and I believe the matter is no longer an issue.

Boreholes/BRE to determine level of groundwater

4.3 In respect of the request for intrusive soils investigation and infiltration testing, it was pointed out that the site was operated as a 'live' facility and so intrusive testing was not practicable. As such, no intrusive investigations of the type identified in Building Research Establishment Digest 365 for soakaway design or trial pits and boreholes have been undertaken yet, because the golf course remains live. There is nothing unusual about this. Such intrusive investigation can be readily be undertaken if permission is granted and be controlled (in the usual way by condition). However, an aerial survey was undertaken which has demonstrated the depth of groundwater levels. Whilst this form of survey is accurate in itself, further onsite testing will be undertaken to confirm the data in the event of a grant of planning

permission. CDC can secure an obligation for the appellant to conduct geotechnical testing including the determination of infiltration characteristics through a suitable planning condition.

Increase in peak discharge from a greenfield site

4.4 The design calculations used for the scheme were explained in more detail and justified to the LLFA, and it was pointed out that the design calculations had already been accepted by the LLFA in earlier discussions with the previous LLFA officer. The normal use of coefficients as contained within the original submission was explained and justified. As to the catchment, it was pointed out that by using orifice controls to limit the flow from sub-catchments, the upstream SUDs features could be properly mobilised. As such the scheme was considered entirely appropriate and fit for purpose.

4.5 Although the site is a developed site - in that it is a golf course -, the behaviour of surface water runoff would be similar to a natural runoff from an undeveloped site, in that there are no significant impermeable areas. Curtins responded by confirming that the development would discharge surface runoff from the development at no higher rate than Qbar. At the meeting on 20th November 2020, Curtins confirmed that the hydraulic calculations have been based on the Institute of Hydrology 124 method (IoH124) for establishing greenfield rates, including Qbar. The LLFA requested that the model be re-run utilising FEH rainfall data, because the LLFA consider the FEH data to be more up to date and it is specified by the LLFAs and the Environment Agency (EA). The re-modelling was carried out and it was reported at a meeting on 8th December that the results indicated no detriment to the system and the discharge rate did not increase above Qbar for all return periods.

For a site of this size FEH QMED should be used instead of QBar.

4.6 There is no longer any issue over the use of Qbar as the allowable discharge rate.

Default coefficient of Cv was challenged for the calculations

4.7 The default parameters within the model were appropriate and no previous objection had been received in relation to that matter. Curtins explained by calculation that the Cv values were appropriate for the modelling exercise. This was accepted by the LLFA at a meeting on 20th November. I believe that there are no longer any issues on this particular matter.

Calculations should be re-run for all relevant return periods and critical durations established

4.8 The calculations were re-run using the FEH rainfall data and included all relevant return periods and critical durations.

Sub-catchment approach should be applied to surface water management, with flow controls and site storage

4.9 Curtins responded to confirm that orifice plates had been used extensively across the surface water network to make sure excess flows were attenuated within SuDS features that were higher up in the SuDS hierarchy, such as swales, permeable paving and basins. The below ground attenuation tank near the outfall is controlled using a vortex flow control, designed to discharge at a maximum discharge of Qbar. The hydraulic modelling is based on this strategy.

Consider groundwater in respect of the proposed tanked attenuation and justify the need for buried attenuation as opposed to surface SuDS and surface water management techniques

4.10 The choice of the underground tank option was explained in further detail to the LLFA. Again, it was pointed out that the location and depth was selected as a result of outfall location, hydraulic conditions

at the outfall and the size itself was based on the attenuation storage required along with the utilisation of surface water runoff by way of a water harvesting scheme. The pro forma schedule was completed and issued to the LLFA subsequent to the response.

4.11 It was explained that the below ground attenuation tank is designed to function as storm water attenuation storage and provide the ability to take advantage of rainwater harvesting. Curtins issued a statement from SDS Intellistorm which explained how stormwater can be stored for re-use in the tank and how the tank can be emptied prior to a storm, such that attenuation storage is re-created. This was further explained at the meeting of the 20th November 2020 and again on 8th December 2020. Despite this, it appears that the LLFA do not yet accept that this sufficiently justifies the use of an underground tank, as opposed to some other surface water management techniques. This remains an issue. I explain below why I am satisfied that the LLFA's position on this is unjustified and unreasonable.

4.12 The LLFA reiterated this to be an issue in a letter written on 15th December 2020, to which the Appellant's consultant responded. This included producing a project profile indicating how a similar intelligent water management scheme had been delivered for a scheme at Southbank Place in London. This particular scheme had minimised the impact of the scheme's requirement for the supply and disposal of water on the local environment and existing infrastructure, thereby delivering benefits.

4.13 **Flow control from the site to achieve greenfield rates for return periods including 1in10, 1in30, 1in100 and 1in100 plus climate change.**

4.14 The LLFA has accepted that the flow offsite will be restricted to Qbar for all events. This will improve the flood risk for downstream properties by limiting runoff to below that of the natural runoff for higher order events i.e. those with a return period of greater than 2.3 years. As such, the existing runoff for the 1in5, 1in10, 1in30 and 1in100 year events would be reduced, as a result there will be a beneficial impact to downstream properties, because we are reducing the pre-development discharge for those events.

Proposal to divert two ditch lines will affect existing pond levels and biodiversity

4.15 It has been pointed out that the proposed ditch diversion had already been discussed and agreed with the LLFA. The nature of agreement in that respect was re-provided, explaining why it was considered there was a need for the diversion, why it was acceptable, and the nature of the mitigation measures proposed. As identified, the LLFA had already accepted the diversions on the basis that the scheme would permit surface ditches in the car park which had been agreed by the appellant.

4.16 In relation to the suggestion that the scheme would have an adverse impact on biodiversity, I would refer to Section 3.5.5/3.5.6 of the expert evidence produced by James Patmore (CD12-21) which concludes that there will be no net loss of biodiversity as a result of the scheme, but in fact a net gain. This matter is dealt with in more detail in his evidence.

4.17 The appellant's consultants confirmed that the water levels in the existing ponds to the north will be protected. The proposed arrangements for the existing network across the site and existing ditches, are to be designed to protect groundwater levels. JH Groundwater Ltd were commissioned to review the evidence relating to groundwater storage and the impact that the underground tank and changes that the proposed drainage scheme would have on the groundwater regime. Their report is included at Appendix H. The findings of their review are provided from a consideration of the reports by GWP in 2019 "Proposed Great Wolf Lodge resort, Bicester Golf Course geology and water desk studies" and by WSP, in 2018 "GWR Bicester Preliminary Risk Assessment" contained within Volume 2 Appendix 11.1 of the ES (CD1-13) and are matters which will be controlled in the usual way with further geotechnical and hydrogeological surveys and testing which normally informs the design process in the delivery of any scheme following the grant of permission. Groundwater monitoring will take place prior to commencement of development, during construction and after the development has been completed to enable the behaviour of groundwater levels to be checked. It is normal for this information to be collated through such monitoring in the event of permission being granted in order to inform the detailed design

of the scheme. An obligation in respect of groundwater monitoring is easily secured by a suitable condition in the usual way.

General strategy matters

4.18 Although Curtins explained the Drainage Strategy and this was reviewed at the meeting on 20th November 2020 and again on 8th December 2020, the LLFA appear to be suggesting that they are not convinced that the strategy reflects the existing nature of the surface water management at the site and as such they appear to be suggesting that they are unable to accept the drainage scheme. In particular, as I have already noted, it appears that the proposal for the underground tank, as opposed to surface water management features is a point of objection. I regard this to be unjustified and unreasonable. The tank provides the facility for rainwater harvesting and attenuation storage, and better accommodates the high groundwater table in this location and it is a proven method for addressing the issue.

4.19 As to SuDS, the Appellant's consultants pointed out that the site was large enough to accommodate a significant element of SUDs features within the scheme and these have all been incorporated. These features have been designed into the drainage scheme and it was pointed out that they would attenuate the surface water runoff for flood risk and drainage purposes. There is no issue with the principle of seeking to increase the use of SUDs features at the detailed design stage if the opportunity arose.

Completion of OCC proforma

4.20 The OCC proforma has been submitted and accepted.

Planning Refusal

4.21 Notwithstanding all of this, the application was refused by the Planning Committee on 12th March 2020, whilst discussions were still taking place. On the 24th March the LLFA were advised that the reason for refusal had been given (i.e. reason 5 of the Planning Refusal) and were asked if further comments were to be expected. The LLFA officer stated in an e mail dated 24th March 2020 that:

"I was reviewing the information we had. I was not impressed by the drainage strategy so I am happy to go with your refusal."

This did not provide any particulars of any issues with the strategy. Following the planning decision and the decision to appeal, it was agreed that discussions should continue to try to resolve any outstanding issues.

4.22 A meeting was held on the 20th November 2020 to make progress on any outstanding issues and the minutes of this meeting are included at Appendix B. As a result of that meeting, I identified that the LLFA were seeking further information on the following:

1. A request for calculations to be re-worked so that instead of using FSR data (Flood Studies Report), calculations would be re-worked using the FEH Rainfall data. (Flood Estimation Handbook). This was required because the current method of calculation preferred by the Environment Agency and the LLFA's was that based on the FEH data.
2. A further justification for the underground tank
3. Further details of the inclusion of the rainwater harvesting system as part of Flood Attenuation storage.
4. Information on the effect of changes to the natural drainage of the site

4.23 It was generally agreed that work should be done to agree suitable wording of conditions and that further meetings should be convened to resolve any outstanding issues which would result in the LLFA withdrawing their objections.

4.24 A further meeting was held on the 8th December 2020 after Curtins checked the design using FEH Rainfall data (as the LLFA had requested). The results confirmed that that the revised input showed that there was no change to the way in which the proposed system operated. It demonstrated that the protection against increased flood risk at the site and for downstream properties delivered by the proposed development was in fact maintained under the proposed scheme. Moreover, the attenuation storage in the form of the tank provided would enable discharges to be limited to 'greenfield' rates (i.e. assuming against the appellant that the existing site was not subject to any existing development even though it is a golf course). Furthermore, it demonstrated that by limiting the discharge to Q bar (31.1 l/s) across all rainfall events, the surface water discharge downstream would in fact be reduced. This in turn would increase flood protection for downstream properties above the current level, so delivering a significant benefit as part of the development.

4.25 Curtins also provided further information relating to the Rainwater Harvesting system. They provided information that the SDS Intellistorm is a system designed to manage and control storm water attenuation systems in an intelligent responsive manner by enabling local storm water re-use. The system monitors the weather so that it can activate the emptying of stored water prior to a rainfall event in order to create attenuation storage for that event. The system has the particular advantage in that it reduces the stress on water supply infrastructure by using stored rainwater. It therefore represents another benefit of the scheme.

4.26 Thames Water's planning guidance "Planning your wastewater" is included in Appendix E. It reiterates the need to achieve greenfield runoff rates and advise that surface water runoff is managed in accordance with a 7 stage hierarchy, which indicates that the storage of rainwater for later re-use is number one on that list. Therefore, the proposed drainage system is also fully in accordance with Thames Water's guidelines, which recognise the importance of reducing water demand and the volume of surface water runoff.

4.27 At the meeting the further information relating to the design calculations were accepted and agreed. The only remaining issue for the LLFA at this time was the choice of the use of an underground attenuation tank to deliver attenuation rather than the use of surface water management system. However, the rationale behind the tank has been previously explained at these meetings in some detail, but to assist with progress a letter outlining the factors affecting the choice was sent which fully justifies the system proposed.

4.28 A further letter was received from the LLFA dated 15th December 2020 which appears to repeat the LLFA concerns. At that point, the LLFA questioned the level of the outfall at Manhole EXSW1. The outfall level was confirmed by site measurement on 21st December 2020. The model was rechecked to establish if the different level had made any significant difference to the calculations and the efficacy of the surface water drainage scheme. The re-modelling exercise proved that the proposed scheme would still operate as planned. This and other points were specifically dealt with by my letter dated 23rd December 2020. The areas covered in that correspondence are described in the following sections:

Proposed Attenuation Tank

4.29 The tank is proposed as part of a site wide scheme to attenuate surface water flows off site at the agreed rate of Qbar. The storage of surface water is part of an 'active' system to harvest surface water runoff for use on site and to provide attenuation storage. The system will be designed to empty in order to accommodate runoff prior to a rainfall event by virtue of intelligent controls linked to daily automatic rainfall predictions. The tank will enable run off from the site to be limited to predevelopment levels in such a way as to improve flood risk downstream by limiting the runoff to the Qbar level. I attach a project profile relating to a similar installation by SDS Water Infrastructure Systems which shows that these systems are being used to minimise the impact of development on the supply and disposal of water. The rainwater harvesting system reduces the mains water usage of the proposed development and reduces the volume of runoff from the site post development and is in accordance with Thames Water's guidelines, as stated above and is a desirable and sustainable approach to this development.

Outfall

4.30 The site outfall is an existing 450mm pipe situated at the southern end of the appeal site which discharges into the existing system serving the golf course south of the site. The depth of the outfall has been established at a level of 79.60mAOD and the model has been re-run to check against the confirmed level of the outfall. The original modelling was based on an assumed depth of pipe and the original outfall level was used in the calculations. The remodelling exercise confirms has shown that the system remains effective in restricting the discharge to Qbar whilst at the same time utilising the attenuation tank as intended.

Topography

4.31 The proposed outfall from the network is to EXSW1. The drainage strategy report included the topographical survey as an appendix which clearly showed all information around the proposed outfall. As the proposed outfall was not known precisely at that stage an assumption was made for the purpose of modelling the upstream attenuation. Following confirmation of the existing manhole level, the MicroDrainage model has been rerun to show that the recorded level of 79.60m can indeed be achieved by the network. The outfall does not drain to the local ditch but to a pond within the golf course some 120 m south of the site.

4.32 The assumptions made prior to the submission of a planning application where site surveys are not sufficiently detailed is reasonable and common. Moreover, we have established the level of the outfall from site measurement and the model has been re-checked to reflect this revision.

Groundwater

4.33 The system has been re-simulated to reflect the precise level of the outfall. The outfall connects to a pond some 120m downstream of the site and the discharge conditions have been established in accordance with the NPPG. The current discharge rates have been calculated. The current system operates well to discharge the existing site runoff. By restricting the proposed runoff to Qbar the new proposals will apply an upper limit to discharge from the site that is not in place at the moment. The current proposals restrict the flow to a maximum of Qbar which is less than the predevelopment runoff for rainfall events of a return period greater than 1 in 2.3 years. As such any flooding that currently occurs downstream will be improved. The area directly downstream is not subject to flooding to my knowledge. The Environment Agency Flood Maps for Planning included in Appendix G shows that the location of Flood Zone 3 is south of the A41. Wendlebury village is in fact vulnerable in respect of surface flooding with a probability of 1 in 30 years or less and also lies within Flood Zone 3b, which is the functional floodplain (fluvial flooding with a probability of 1 in 20 years or less). However, as I have indicated, the Proposed Development and its measures will serve to improve the position and therefore reduce any such flooding if it is does occur.

4.34 The groundwater table is shallow at this point, but the system will be designed to exclude groundwater from entering the surface water drainage system, the outfall for which is the existing pond some 120 m south of the site. The Invert level of the outfall to this pond is about 78.90mAOD.

Tank Design

4.35 The approach to discharge rate from site and the outfall were set by the LLFA in an email dated 22nd July 2020 addressed to Curtins:

"we will expect the drainage strategy to mimic the existing drainage regime and therefore discharging at greenfield to the current outfall point."

4.36 As stated previously, the outfall invert level had been assumed, but the remodelling exercise based on the actual outfall level has shown that the system is capable of operating efficiently. The capacity of the downstream network can be assessed if required and this could be achieved through a suitable condition

to ensure that the modelling of the receiving drainage system would not be adversely affected by discharging surface water runoff at Qbar, however this does not change the principle contained in the NPPG to restrict post development discharge to Qbar.

4.37 As to maintenance matters, these are covered under the Construction (Design and Management) Regulations (CDM) which stipulate that a proper risk assessment relating to the construction and maintenance of construction projects will be carried out at the concept stage. The applicant will secure a suitable maintenance regime utilising advice and guidance from CIRIA C753 The SuDS Manual.

Anchorage

4.38 All structures where the whole or part of the works lies below ground will have to accommodate hydrostatic pressures relating to groundwater fluctuations. Often the structure uses its own dead weight to provide a suitable factor of safety against flotation. However, in the case of structures like tanks or pumping stations where the facility may be empty on occasions at a time when the groundwater levels are high, measures are taken to ensure the stability of the structure. This is not unusual in situations where underground tanks are installed. The proposal is for the tank to be laid at a shallow depth where their effect on and influence of groundwater will be minimised. The tank also provides surface level car parking as part of the scheme.

4.39 A further consideration in choosing the underground tank option is that the tank will be designed to empty to provide capacity for flood storage. This would have no visual impact at all because the tank is underground. The LLFA suggestion to construct an equivalent pond will result in the pond drying out to create flood storage unless a standing water body was required, and this would be expected by the LLFA as I understand it. Such a facility would need to be over dug to provide a sensible depth of standing water below the flood storage zone, and this would require much deeper excavations which would need to accommodate increased hydrostatic uplift pressures resulting from the high water table. This problem would not occur if a tank were used and this further justifies its use as opposed to a pond.

Rainwater Harvesting

4.40 The statement that rainwater harvesting does not contribute to the overall attenuation volume is not correct. Traditional systems do not permit the rainwater harvesting volume to be used as attenuation, however the proposed system is designed as an active system which enables the attenuation tank to be utilised fully as part of the requirements for attenuating the surface water discharge downstream. This is outlined in Table 11.1 and section 11.3.4 of the SuDS Manual. Included at Appendix E are the details for a similar Rainwater Management System used in a project for Southbank Place in London, which utilises a SDS 'Intellistorm' system which is intended for this development. The rainwater harvesting system reduces the mains water usage of the proposed development and reduces the volume of runoff from the site post development.

LLFA general comments

4.41 The existing drainage regime for the site is suitable for the current development it serves. The site is not a natural undeveloped site but is a golf course where all of the drainage provisions consist of land drains, some ponds and ditches. The drainage network on site is artificial in that although it may give the appearance of natural drainage, it is in fact designed to render the golf course useable. Golf is an all-weather sport, and the system would normally allow play during even bad weather. Commonly on such redevelopment sites, the discharge limits are set a Qbar irrespective of the existing runoff from the site. The NPPG requires that surface water flows be restricted as discussed earlier in this correspondence.

4.42 The proposals are not for a new golf course but for a different development. As such the surface water drainage system cannot remain unchanged given the new proposals. The drainage system shows that it has embraced the requirements of the NPPG in terms of maintaining flood protection for the development and downstream properties, as well as incorporating SuDS techniques in the design.

4.43 This letter and the minutes of the above meetings are included at Appendix B.

5.0 Drainage Proposals

Sustainable Drainage Overview and Hierarchy

5.1 Current planning policy guidance requires developments to employ SuDS techniques where feasible. In general, careful design of SuDS features can ensure that the sites surface water drainage closely reflects the natural hydrology and hydrogeology of a site.

5.2 SuDS will attenuate and treat surface water run-off quantities at source (source control) in line with National Planning Policy Framework (NPPF) and the LLFA policies.

5.3 As a matter of principle, the use of SuDS is needed to replicate the pre-developed conditions of a site so as not to increase flood risk to the site or surrounding sites by managing excess run-off at the source.

5.4 The key benefits of SuDS are as follows:

1. Improving water quality over a conventional piped system by removing pollutants from diffuse pollutant sources (e.g. roads);
2. Improving amenity through the provision of open green space and wildlife habitat; and
3. Enabling a natural drainage regime which recharges groundwater (where possible).

5.5 The SuDS Manual CIRIA C753 states that the SuDS approach should following the following where possible:

1. Use surface water runoff as a resource;
2. Manage rainwater close to where it falls (at source);
3. Manage runoff on the surface (above ground);
4. Allow rainwater to soak into the ground (infiltration);
5. Promote evapotranspiration;
6. Slow and store runoff to mimic natural runoff rates and volumes;
7. Reduce contamination of runoff through pollution prevention and by controlling the runoff at source; and
8. Treat runoff to reduce the risk of urban contaminants causing environmental pollution.
9. The guidance states that 'depending on the characteristics of the site and local requirements, these may be used in combination and to varying degrees'.

5.6 The SuDS Manual promotes the concept of the 'SuDS Management Train', where a sequence of components work together to provide control the frequency of runoff, the flow rates, volumes of runoff and reduce pollution to acceptable levels.

5.7 The SuDS system suitability has four general objectives:

Water Quantity – Control the quantity of runoff;

Water Quality – Manage the quality of the runoff to prevent pollution;

Amenity – Create and sustain places for people; and

Biodiversity – Create and sustain better places for nature.

5.8 Ideally, any designed SuDS system should be multi-functioning, fulfilling as many of the areas as possible.

SuDS Treatment Trains and Maintenance

5.9 The SuDS treatment train can be defined as an integrated sequence of measures in a SuDS scheme which, taken together, control volumes of run off and reduce pollution before discharge. These measures are designed to mimic the natural catchment processes.

5.10 The hierarchy of techniques that should be considered in developing the management train are as follows:

Prevention – the use of good site design and site housekeeping measures to prevent surface water runoff and pollution (e.g. sweeping to remove surface dust and detritus from car parks).

Source control – control of surface water runoff at or very near its source (e.g. soakaways, other infiltration methods, green roofs, permeable pavements).

Site control – management of water in a local area or site (e.g. routing water from building roofs and car parks to a soakaway, detention basin or tank).

Regional control – management of surface water runoff from a site or several sites, typically in a balancing pond or wetland.

5.11 As part of the drainage strategy for the site this development would seek to adopt methods of Prevention, Source Control and Site Control in order to reduce pollution and the rate and volume of surface water run-off from the site. This will be achieved through a surface water drainage system using the principles of Sustainable Drainage Systems (SuDS).

SuDS Proposals

5.12 The proposed drainage arrangements are detailed within the Drainage & SuDS Strategy report prepared by Curtins (Ref: 068435-CUR-00-XX-RP-C-00002 revision P02).

5.13 Following the hierarchy set out in paragraph 5.4 above (and Thames Water's guidelines at Appendix E) it is proposed to capture and re-use water within the proposed development. This is the essence of a sustainable drainage strategy. Given an anticipated high groundwater table, infiltration is not proposed (although this could occur if the groundwater table is lower than anticipated) as part of any changes at the detailed design stage. The strategy is based on drainage connecting to the existing outfall located to the south of the proposed development.

5.14 It is relevant to note that the site is already in use and subject to a manmade drainage scheme. It is in use as part of a golf course with drainage, which is designed to protect the golf course and flooding consequences. The proposed development will in fact significantly improve the existing situation.

5.15 The proposals for the development incorporate the following SuDS techniques:

1. Rainwater Harvesting;
2. The use of Green roofs;
3. The use of Detention Basins;
4. The use of Swales;
5. The use of Permeable Paving; and
6. The use of Attenuation Tanks.

5.16 The above SuDS and their location on the proposed development can be seen on the schematic SuDS plan located within Appendix C.

5.17 The following paragraphs consider the individual SuDS components and the benefits that they bring.

Rainwater Harvesting

5.18 One significant benefit of the proposed development is the introduction of a rainwater harvesting system. In simple terms, this is a system which will allow the storage of water and allow it to be re-used within the development.

5.19 Such a system offers the following significant benefits:

1. It means that one can meet some of the development's water demand, so reducing the development's mains water usage;
2. It enables the reduction of the volume of runoff from the existing site with the development in place; and
3. It Reduces the volume of attenuation storage required on the site.

5.20 The rainwater harvesting proposals will incorporate an 'active' rainwater harvesting system that monitors weather forecasts and empties the tank to provide storage to attenuate surface water.

5.21 Details of the proposed rainwater harvesting system and how it works can be found Appendix E.

5.22 The rainwater harvesting system proposed and has been used in several locations and one such site was at Southbank Place in London. In this instance the rainwater harvesting was utilised to provide storage of rainwater for re-use within the building, as well as providing attenuation storage to allow runoff from the site to be controlled to the agreed rate with the GLA and Thames Water. Full details of this scheme are included within Appendix E.

5.23 Attenuation tanks provide underground storage to temporarily store water and control runoff from the site. The tanks will help reduce the peak runoff rate from the site.

Green Roofs

5.24 Green roofs are systems that incorporate living vegetation on top of buildings. The soil layer will store water, which is then absorbed by the vegetation. Such green roofs provide the following benefits:

1. They help reduce peak runoff, by holding water in the substrate;
2. They reduce runoff volumes for small events by absorbing the first 5mm of rain (Interception), through absorption and evapotranspiration;
3. They improve water quality, by filtering pollutants entrained within the rainwater; and
4. They promote biodiversity, by providing habitats for insects, birds, and other organisms.

Detention Basins

5.25 Detention basins are vegetated depressions that store and treat runoff from the development. They provide the following benefits:

1. They reduce the peak runoff rate, by storing water temporarily within the basin;
2. They reduce runoff volumes for small events by absorbing the first 5mm of rain (Interception), by allowing the water to soak into the topsoil and then evapotranspiration;
3. They improves water quality, through Interception and allowing particulates to settle in the basin;
4. They provide opportunities for amenity, when the basins are dry; and
5. They promote biodiversity, by providing habitats and food for invertebrates and birds.

Swales

5.26 Swales are vegetated channels which can be planted and are used to convey and treat runoff from the development. They provide the following benefits:

1. They reduce the peak runoff rate, by storing water temporarily within the channel;
2. They reduce runoff volumes for small events by absorbing the first 5mm of rain (Interception), by allowing the water to soak into the topsoil and then evapotranspiration;
3. They improve water quality, through Interception and allowing particulates to settle in the swale;
4. They provide opportunities for amenity, when the swales are dry; and
5. They promote biodiversity, by providing habitats and food for invertebrates and birds.

Permeable Paving

5.27 Permeable paving will be utilised in the car parks and allow water to soak through the surface to the underlying sub-base where the water is stored. The structure of the pavement treats the water through filtration, adsorption, biodegradation, and sedimentation. The permeable paving will provide the following benefits:

- It reduces the peak runoff rate, by storing the water within the sub-base of the pavement;
- It reduces runoff volumes for small events by absorbing the first 5mm of rain (Interception), by allowing the water soaking into the pervious surface, laying course and sub-base, and then it is released through evapotranspiration; and
- It improves water quality, through filtration, biodegradation, adsorption and settlement of solids.

Site Wide System

5.28 The above SuDS measures work together to reduce the volume of runoff, improve water quality, provide amenity and promote biodiversity across the development, as recommended by The SuDS Manual.

5.29 The system has been designed to control runoff at source, with the majority of the storage provided within the first five SuDS measures set out in 5.13 above. The remainder of the storage is provided within the tank at the end of the system, which will also double as storage for the rainwater harvesting system. The range of SuDS features used provides significant benefits to the development and the wider area.

6.0 Scheme Compliance with SuDS Guidance

Non-statutory Technical Standards for Sustainable Drainage Systems (March 2015)

6.1 This document has been published by DEFRA and sets out the non-statutory technical standards for SuDS and should be used in conjunction with the NPPF and PPG. It confirms that the following technical standards should be applied to new development

i) The peak runoff rate from developments to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rates post development.

ii) Where reasonably practicable, for greenfield developments, the runoff volume should not exceed the 1 in 100 year, 6 hour rainfall event post development.

iii) Where it is not reasonably practicable to restrict the volume of runoff in accordance with 6.2 and 6.3 above, the runoff must be discharged at a rate that does not increase flood risk onsite or downstream.

iv) The drainage system must be designed so as there is no flooding on any part of the site for the 1 in 30 year event.

v) The drainage system must also be designed to hold and/or convey water for the 1 in 100 year event so as not to cause flooding to any building, including a basement; or any utility plant susceptible to water, such as a pumping station or electricity substation.

vi) The design must ensure that flows from a rainfall event above the 1 in 100 year event, as far as reasonably practicable, are managed in exceedance routes to minimise risks to property and people.

6.2 The Drainage Strategy for the development complies in full with the above requirements, by restricting discharge rates to the existing Qbar rate (1 in 2.3 year event) for all events up to and including the 1 in 100 year event plus a 40% allowance for climate change.

6.3 The proposed SuDS system incorporates a number of interception components which will reduce the runoff from the site for first 5mm of rainfall, thereby reducing the runoff from the site for the lower order events.

6.4 Rainwater harvesting has also been incorporated into the system which will reduce the runoff volume for the higher order events.

6.5 The drainage system has been designed to contain all flows and volumes within the SuDS components so as no flooding occurs for any events up to and including the 1 in 100 year event plus 40% for climate change.

6.6 Exceedance routes for flows above the 1 in 100 year event plus 40% climate change will be provided onsite through level design and directing flows away from people and the proposed properties, including utility plant susceptible to water (e.g. pumping stations or electricity substations).

Oxfordshire County Council (OCC) - Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire

6.7 This document sets out the OCC's surface water drainage requirements for Major Developments. The guide sets out the standards that will be applied by the LLFA for new development in Oxfordshire and reflect the National Non-Statutory Technical Standards for SuDS.

6.8 The guide includes guidance on the use of the following SuDS features:

1. Green roofs;
2. Rainwater Harvesting;
3. Infiltration SuDS, including soakaways;
4. Underground Storage;
5. Filter Strips;
6. Infiltration and Filter Trenches;
7. Swales;
8. Detention Basins and Retention Ponds;
9. Permeable and Pervious Pavements;

6.9 A number of the above SuDS measures have been incorporated into the Drainage Strategy for the proposed development, as set out in 5.13 above.

6.10 The following provides a summary of the SuDS features that are being incorporated into the proposals for the site and how they relate to the OCC standards.

Green Roofs

6.11 The OCC guide recognises that green roofs provide betterment by provided a habitat for animals and water quality. Additionally, it confirms that the component provides Interception, by removing the first 5mm of rain.

Rainwater Harvesting

6.12 The guidance states that the Thames River Basin District is one of the driest in the UK and recommends that developers should consider opportunities for incorporating rainwater harvesting in water stressed areas. As such the proposals have incorporated a rainwater harvesting system and the tank on the site will be used for storing water for use in the system.

Underground Storage

6.13 The standard confirms that underground storage can be used on a development, but states that it must be justified due to the additional maintenance burden this type of storage requires and the lack of additional benefits. In this instance the use of the tank has been and is fully justified as the underground storage tank is also doubling as storage for the rainwater harvesting system and therefore providing additional benefits by reducing the water demand of the development and reducing the volume of water leaving the site.

Swales

6.14 The guide confirms that swales can be used for conveying flows and storing water, as well as removing pollutants from the water. A number of swales have been incorporated throughout the site to convey flows and provide storage.

Detention Basins

6.15 As recommended by the standards two detention basins have been incorporated into the scheme, which will be kept dry to provide additional amenity space. The basins will be used to store and attenuate runoff from the site.

Permeable Pavements

6.16 The guide confirms that permeable pavements can be used most developments and as such they have been incorporated into the proposals in the proposed car parking areas.

Peak Flow and Volume Control

6.17 The guide confirms that the proposals should be in accordance with the national standards, as set out above and provides additional guidance on peak flow and volume control. It confirms that where infiltration cannot be utilised on site the additional volume must be stored on site and released slowly. The standards provide two options, as set out below:

1. Simple: Limit discharge rates for rainfall events up to and including the 1 in 100 year event (including climate change allowances) to the agreed QBAR rate (or 2l/s/ha whichever is greater) and 1 in 1 year event to the corresponding green field event; or
2. Complex: For the greenfield volume, provide variable discharge rates to meet the equivalent greenfield 1 in 1, 1 in 30, and 1 in 100 rates, and either infiltrate or provide Long Term Storage for the additional volume of runoff produced by the development (The difference in runoff volume pre- and post-development for the 100 year 6 hour event)

6.18 In this instance the 'Simple' method has been utilised and therefore all flows will be restricted to Qbar for all events up to and including the 1 in 100 year plus 40% for climate change.

Water Quality

6.19 The local standards state that at least one feature should be deployed within the drainage system which helps improve water quality. As set out previously within this document a number of SuDS features have been incorporated into the system which provide water quality benefits.

6.20 Local standard L11 and L20 confirm that there should be at least 1m between groundwater and the base of an infiltration system. This is to ensure that there is available capacity within the SuDS features to cope with the design storms, but also to protect groundwater quality. Although, it is not currently proposed to utilise infiltration, all SuDS features will be lined to ensure compliance with these local standards in any event, as a result of the anticipated high groundwater across the site.

Ecology

6.21 The LLFA has asserted that the scheme does not reflect the existing drainage and biodiversity, however the local standards confirm that 'the LLFA will not comment on nature, landscape, visual impact, and historical aspects, unless they appear to impact on the performance of the SuDS'. Furthermore, the local standards confirm that 'the primary function of SuDS is flood prevention' and the scheme as designed reflects this need.

The SuDS Manual CIRIA C753

6.22 C753 provides detailed guidance on the use of SuDS and therefore the OCC standards make cross references to The SuDS Manual for more detailed information on the design and construction of SuDS features.

6.23 In particular, this document provides further guidance on below attenuation storage tanks and rainwater harvesting systems.

6.24 It confirms that attenuation tanks do provide benefits in terms of the high storage they can provide and flexibility and although they do not provide any treatment benefits in and of themselves, they can be integrated with the overall treatment strategy for the site.

6.25 The SuDS Manual provides much more detailed guidance on rainwater harvesting systems and states the following:

Rainwater harvesting (RWH) is the collection of rainwater for use. Runoff can be collected from roofs and other impermeable areas, stored, treated (where required) and then used as a supply of water for domestic, commercial, industrial and/or institutional properties. RWH systems have a number of key benefits:

1. *They can meet some of the building's water demand, delivering sustainability and climate resilience benefits.*
2. *They can help reduce the volume of runoff from a site.*
3. *They can help reduce the volume of attenuation storage required on the site*.

6.26 It also recognises the benefits of 'active systems' where the storage in the tank is actively managed by monitoring weather forecasts and therefore the tank can also be utilised for attenuation purposes, as well as reducing the water demand of the development. This is the system that is proposed on this development.

7.0 Reason for Refusal 5

7.1 Reason for refusal 5 states the following:

"The submitted drainage information is inadequate due to contradictions in the calculations and methodology, lack of robust justification for the use of tanking and buried attenuation in place of preferred SuDS and surface management, and therefore fails to provide sufficient and coherent information to demonstrate that the proposal is acceptable in terms of flood risk and drainage. The proposal is therefore contrary to Policies ESD6 and ESD7 of the Cherwell Local Plan 2011-2031 Part 1 and Government guidance contained within the National Planning Policy Framework."

7.2 In flood risk and drainage terms I consider that the two primary allegations are as follows:

1. A contention that *"The submitted drainage information is inadequate due to contradictions in the calculations and methodology";* and

2. A contention that there is *"Lack of robust justification for the use of tanking and buried attenuation in place of preferred SuDS and surface management".*

7.3 My evidence addresses each of these points in turn and I demonstrate that the points are unfounded, and the Appeal scheme will not just be acceptable in terms of flood risk and drainage but deliver significant benefits. My evidence demonstrates that the Appeal scheme accords with the principles of the NPPF and the Cherwell Local Plan.

8.0 Treatment of Objections

Cherwell District Council – Rule 6 Statement of Case

8.1 Section 9 of CDC's Statement of Case relates to the Reason for Refusal 5 of the planning decision and my responses are set out below (utilising the paragraph numbering system in the SoC).

Paragraph 9.1:

"Policy ESD6 of the Cherwell Local Plan Part 1 2011-2031 sets out that to manage and reduce flood risk in the District, a sequential approach to development will be taken. This follows national guidance as set out in the NPPF. The Policy sets out that development should be safe and remain operational and proposals should demonstrate that surface water will be managed effectively without increasing flood risk elsewhere. Policy ESD7 requires the use of Sustainable Urban Drainage Systems (SUDs) to manage surface water run-off. SUDs are beneficial in reducing flood risk and pollution and provide landscape and wildlife benefits."

8.2 The Sequential Test is the means whereby planning authorities can ensure that development can be permitted on land which has a low risk of flooding in preference to land at high risk. The appeal site is wholly within Flood Zone 1 and therefore the test is fully satisfied in such circumstances. It is unclear why CDC has therefore identified this.

8.3 In addition, the drainage scheme proposed will in fact restrict the surface water runoff from the site to 'green field' rates thereby ensuring that there is no increase in flood risk to downstream properties. This is the case even though the existing site is in fact subject to development already.

8.4 The restriction of offsite flows to Qbar (31.1 l/s) also ensures that there will in fact be an improvement to flood protection downstream by reducing the existing pre-development runoff under the higher order rainfall events (those with a return period of greater than Q Bar i.e. 1 in 2.3 years).

8.5 The design also ensures that the proposed development is not itself at risk under the criteria specified within the planning guidance. The drainage scheme incorporates Sustainable Drainage Systems (SuDS) in the form of Green Roofs, Swales, Surface Water Storage Basins, and Permeable Paving areas. The scheme also allows for the direct use of rainwater water through a Rainwater Harvesting System.

Paragraph 9.2:

"In this case, the application site is less than 1ha in area and in flood zone 1 so a flood risk assessment is not required. However, a drainage and SUDs strategy was included as part of the application documentation and Chapter 12 of the Environmental Statement covered Water Resources, Flood Risk and Drainage."

8.6 As I have already noted the site lies within Flood Zone 1. The site is in fact larger than 1 hectare in area contrary to what is stated, so it did require a Flood Risk Assessment. This was produced by Curtins along with a Drainage and SUDs strategy.

Paragraph 9.3:

"Oxfordshire County Council as the Lead Local Flood Authority objected to the detail of the proposed scheme and the lack of information provided, as they had in their original pre-application advice, in particular due to contradictions in the calculations and methodology and a lack of robust justification for the use of tanking and buried attenuation in place of SUDs and surface management. Reason for refusal 5 was included on the notice of refusal of planning permission to address the County Council's unresolved concerns, which remained and still remain unchanged from the pre-application submission."

8.7 I have already addressed the LLFA's comments and the considerable detail of information that was provided in order to reach agreement with the Lead Local Flood Authority in respect of the calculations

and methodology. These matters are covered in more detail in Section 4 'Discussions with the Lead Local Flood Authority'.

8.8 In addition, the applicant has provided a robust justification for the use of 'tanking and buried attenuation in place of SUDs and surface management'.

8.9 The proposals do not replace 'SUDs and surface management' as alleged, as the drainage scheme includes SUDs features. As part of this the tank provides flood storage which protects both the development and downstream properties from flooding and is one part of the overall SuDS strategy. The justification for the tank is addressed in detail in Section 7 'Justification of Underground Tank'.

Paragraph 9.4:

"A meeting has taken place recently with representatives of the Appellant to explore whether the outstanding concerns can be addressed and the technical reason for refusal resolved by the attachment of conditions to any grant of planning permission. The Council will continue to respond constructively with the Lead Flood Authority and the Appellant with a view to securing, if possible, resolution of the outstanding concerns relating to drainage, which can be referenced in any Statement of Common Ground. Any amended arrangement may impact upon the development site layout and/or the layout of the remainder of the site and there may need to be a re-consultation to ensure interested parties are informed."

8.10 The outstanding issues raised by the LLFA have all been satisfactorily addressed, with only the use of the tank remaining a point of contention but in circumstances where the use of a tank is fully justified and beneficial. The justification for the tank is addressed in detail in Section 7 'Justification of Underground Tank'.

Paragraph 9.5:

"If no additional information is provided to demonstrate an acceptable drainage arrangement, then the Council will demonstrate, with reference to the requirements of the policies referred to and the Oxfordshire County Council document titled 'Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire' that the information submitted for determination did not provide a sufficient, coherent basis on which to demonstrate that there would be an acceptable impact in terms of flood risk and drainage. On this basis, it will be shown that the proposals would be harmful in raising the risk of flooding on and off site and in providing a drainage solution which does not manage surface water in a sustainable way. The Council's evidence will therefore show conflict with the policies referred to in reason for refusal 5."

8.11 Leave aside the detail of the information that had already been provided and agreed with the LLFA, I have summarised above the issues relating to flood risk have been agreed with the LLFA and the only remaining issue relates to the choice of attenuation storage facilities. I have no doubt that the use of underground storage system is appropriate given the high ground water table and it delivers benefits for this site the issue of flood risk to the development and to downstream properties is not only fully resolved, but the scheme will deliver significant benefits in this respect.

Chesterton Parish Council and other Parish Councils – Response to Application 19/02550/F

8.12 Paragraph 3.17 of Chesterton Parish Council's response relates to concerns about Flood Risk. The following extract asserts that:

"Turning to the water impacts of the proposals, and whilst it is acknowledged that the site is entirely in Flood Zone 1 – the lowest level of flood risk – the site is 18.6 Ha and as such is accompanied by a flood risk assessment. However, this assessment pays little attention to the 'downstream' effects that a proposal of this nature would have. The introduction of significant amounts of hard standing and built form to an area will increase the amount and Response to application reference: 19/02550/F Page 10 of 26 speed of water runoff. The applicant might be able to manage the effects of this run off on its own site, and the inclusion of attenuation ponds / sustainable drainage in the proposals is welcomed. However, the Parish Councils consider that there is insufficient consideration of the impact on the Wendlebury Brook and the village of Wendlebury which is a short distance down-stream. Wendlebury has been the unfortunate focus of recent flood events, and the Environment Agency, Oxfordshire County Council (Lead Flood Authority) and Cherwell District Council have all engaged and invested significant time a resource in managing and seeking to mitigate these event that will be at serious risk if a proper assessment of the proposal and its potential cumulative impacts with other local developments is not undertaken. The Parish Council's note that the Lead Flood Authority has raised objections to this proposal."

8.13 The contention of the Parish Councils is that the proposals would adversely impact Wendlebury Brook and the village of Wendlebury which lies downstream of the appeal site. I understand that there have been reports of historic flooding at Wendlebury which lies within Flood Zone 3 which denotes a high probability of flooding (1 in 100 year or less). The 100 year flood plain lies generally to the south of the A41 and is indicated by the EA Surface flooding Maps and the Flood Zone map included at Appendix G. The surface water map indicates that the village is susceptible to surface flooding on a more frequent basis than that of 1 in 30 years and the Flood Zone map indicates that the village is also in Flood Zone 3b which is the functional flood plain and is liable to flooding under rainfall events of a 1 in 20 year or less return period.

8.14 The concern of the Parish Council is fully addressed by the development which will in fact deliver benefits to the surrounding area. As explained, the drainage proposals for the site have been designed to incorporate SuDs features which effectively restrict the flow downstream of the site post development. By restricting the flow across all rainfall events to Q bar, the predevelopment runoff from the site for rainfall events of greater significance than a 1 in 2.3 year event are capped at 31.1 l/s. As such the proposals improve the situation for downstream properties. Furthermore, the proposals include a scheme for rainwater harvesting which will form part of the system for reducing the downstream flood risk by reducing the volume of water of water passing downstream.

8.15 Accordingly, far from the development causing any concerns in this regard, the proposed development will in fact deliver a significant benefit to assist in reducing downstream effects.

8.16 Paragraph 3.18 refers to the pressures on the water supply for this area and the proposals include for the use of rainwater by storing surface water runoff in a Rainwater harvesting System. In this way water demand would be reduced whilst at the same time helping to reduce flood risk for downstream properties.

Parishes Against Wolf (PAW) (Carter Jonas)

8.17 The matter of Flood Risk and drainage is addressed by PAWS in the section entitled 'Other Matters'. The document states:

"PAW remains acutely concerned about the increased flood risk which the proposals pose. The NPPF at paragraph 155 states: "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas of the highest risk, they should consider the cumulative impacts in or affecting local areas susceptible to flooding."

8.18 This point appears to imply that the appeal site would fail the 'sequential test' required under the NPPF, which asks that sites of low flood risk be considered for development before sites of higher flood risk. This point is misconceived. The appeal site is within Flood Zone 1 as indicated in the Environment Agency's Flood Maps for Planning. This is the lowest flood risk category. As such the comment is invalid since on a flood risk basis no other sites would be preferred.

8.19 A further concern appears to be raised of the same type raised by CPC which I have addressed above:

"PAW notes correspondence between the Lead Local Flood Authority (Oxfordshire County Council) and appellants (dated 18 February 2020) in which it states: "Discharge via ditched to Wendlebury Brook. Discharge to be in third party land to the south of the proposed site" PAW supports the decision of Cherwell District Council to refuse the application on the basis that the applicants drainage proposals are site specific and the mitigation works proposed by the applicant will not address the flooding risk to both Little Chesterton and Wendlebury."

8.20 The planning guidance requires that the drainage system results in no increase in flood risk for the development itself or other properties. The proposals include the construction of a system which will achieve exactly that. However, although there is no requirement to do so, the system will in fact improve the flood risk to property downstream because it restricts the pre-development flow from the site under the higher order rainfall events and incorporates a rainwater Harvesting Scheme which will utilise surface water runoff which hitherto would have flowed on downstream to the villages of Little Chesterton and Wendlebury. As such there is no increased flood risk to downstream property and the method of assessing this has been accepted by the LLFA but there is also a significant benefit delivered by the development in this respect. (See Section 4 'Discussions with the Lead Local Flood Authority')

Planning Review for Cherwell District Council – Tyrens Report (0345-RPT-01) 26th February 2020, Section 4 – Drainage and Surface Water

8.21 I understand that CDC commissioned a report from the consultant Tyrens, the aim of which was to provide a review of the applicant's proposals. I have dealt with this review as it relates to flood management and drainage for the purposes of completeness. My responses are set out below:

8.22 Comment:

Reference should be made to the OCC "Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire".

8.23 Response:

Reference has been made in section 5.1.2 of the Flood Risk Assessment and the document was used to guide the development of the Drainage Strategy. The delivery of a drainage strategy for the proposed development has been carried out alongside discussions with the LLFA, using appropriate guidance where required. The final proposed scheme was also discussed at length with the LLFA and updated following comments to ensure that it was appropriate.

8.24 Comment:

In designing the Drainage Strategy for the scheme, it is unclear whether pre-application discussions have taken place with the LPA and OCC (i.e. the LLFA). This should be confirmed.

8.25 Response:

The Drainage Strategy was based on information and discussions with the LLFA and OCC (Section 1.1). Section 4 outlines what was agreed in these discussions in terms of discharge rate Table 4 states that additional swales were included following a meeting with the LLFA states that a land drain diversion was agreed with the LLFA in a pre-application meeting. I understand that much of the constructive discussions with the LLFA were during face to face meetings and that, as a result, there is no record in the document. Confirmation of the LLFA stating they wish to see QBAR rates was however included with the SuDS Pro-forma that was sent to CDC and OCC.

8.26 Comment:

Infiltration testing to BRE365 and seasonal groundwater monitoring from dedicated piezometers should be conducted to demonstrate that infiltrating SuDS are not suitable for this scheme.

8.27 Response:

The FRA describes in Section 3.6 that a UAV survey was conducted across the site and concluded that groundwater levels across the site are near the surface. This is reiterated in the Drainage Strategy throughout. The extensive land drainage across the site also shows this is the case, along with anecdotal evidence from site maintenance staff. Intrusive surveys cannot be carried out until planning permission is granted, as the site is to remain operational as a golf course. This is discussed at various sections through the two documents.

8.28 Comment:

As this is essentially a large greenfield development, it is unclear why the applicant has had to rely on the provision of a very large (2000 m3) underground storage tank; furthermore, no mention has been made of petrol interceptors or other pollution prevention devices to accommodate surface runoff from the majority of the car parking area. There should have been ample room to provide above-ground solutions such as infiltration/detention basins and swales, which are easier to maintain and provide inherent water quality treatment features. Even without modifying the proposed car park layout, there appears to be landscaped areas along the south-eastern boundary of the site where such basins and swales could potentially be located.

8.29 Response:

As described in Table 1 of the Drainage Strategy, the tank is also to be used for rainwater harvesting representing one of several important sustainability measures incorporated into the proposed development. The details of the water saving resulting from this can be found in the water resource documents that were also reviewed. The proposed inclusion of the tank was discussed at length with Richard Bennett from the LLFA in a pre-application meeting. It was agreed that its inclusion was required as the site topography and layout did not allow for the inclusion of a pond. Further constraints include high groundwater table which meant that a pond of adequate volume would suffer from groundwater ingress, thereby reducing its capacity. Other lined ponds on the site have required amending according to site maintenance staff due to hydrostatic groundwater pressure pushing up the lining. By contrast, it is feasible to anchor the tank to avoid uplift in such circumstances. The landscaped area described in the comment above is used for the bund. The SuDS manual mitigation and hazard indices outline that the permeable pavement is sufficient to treat commercial car parks. The drainage strategy layout also includes a bypass separator near the outfall for added protection. Swales are also used along the access roads upstream of the bypass separator.

8.30 Comment:

Even the use of shallow modular permeable pavements with inherent water treatment elements (e.g. filtration, siltation, absorption and biodegradation) would have been preferential and, depending on the results of the groundwater monitoring/infiltration testing, could perhaps have been used as infiltration devices.

8.31 Response:

There are potential floatation issues with this option because of the high groundwater levels. In addition, modular permeable paving systems are not considered to offer the same levels of water treatment as granular sub-base systems. As run off from the car park is treated by the permeable paving, water quality was the driver for the permeable pavement design, not water storage.

8.32 Comment:

Consequently, the use of such devices should be explored and the reasons for not using them fully justified.

8.33 Response:

The concept of shallow infiltration devices has properly been discounted due to the high groundwater levels.

8.34 Comment:

Calculations should be shown to demonstrate how the SuDS provisions will meet the DEFRA Non-Statutory Technical Standards, as per OCC guidance.

8.35 Response:

Pre-application discussion and reviews of the Drainage Strategy with the LLFA did not raise this point. However, Curtins has issued calculations demonstrating that the proposals meet the requirements set out within the Non-Statutory Technical Standards, as set out in section 6 of this report.

8.36 Comment:

OCC guidance states that "Calculations proposed values of impermeable area should include a 10% allowance for Urban Creep". Evidence should be presented to demonstrate that this allowance has been included in the calculations.

8.37 Response:

This has not been allowed for in the calculations. It was also not requested to be included when the results of the calculations were discussed with the LLFA and the Draft documents were sent to them prior to the application going in. Furthermore generally, 'urban creep refers to the risk that developments especially housing developments may expand the impermeable area and hence rainfall runoff by enlarging at domestic level the areas of hardstanding around homes for example. The development will be and remain in single ownership and I do not believe that an allowance for 'urban creep' would be necessary or appropriate. The OCC SuDS guidance states that Urban Creep should only be used for residential developments.

8.38 Comment:

The Drainage Strategy should refer to Sewers for Adoption 8th Edition (August 2018) and the requirements therein, particularly with reference to the design and construction of SuDS

8.39 Response:

Sewers for Adoption 8th Edition, newly produced Design and Construction Guidance has not been fully implemented yet, however, more importantly there are no proposed adoptable sewers on this site.

9.0 Precedents Set by Other Planning Permissions

9.1 The following section includes a review of other permitted developments within the administrative areas of CDC and OCC, and how the treatment of the surface water drainage and SuDS compares with the proposals at this site.

Bicester Heritage, Buckingham Road, Bicester (Application No.: 18/01253/F)

9.2 The proposals consist of the erection of a new hotel and conference facility, with associated parking, access and landscaping. The site is located on part of the former RAF Bicester Airfield, to the north of Bicester.

9.3 A Drainage Strategy was prepared to accompany the planning application and incorporated SuDS in the form of pervious paving and a large below ground cellular storage soakaway.

9.4 During consultations with the LLFA on the Great Wolf development the LLFA has apparently maintained that underground storage should be avoided, and they would maintain their objection unless the tank was removed. For the Bicester Heritage application neither the LLFA or LPA raised any objections to the large underground cellular storage tank. It is obvious that given the available space on the site an infiltration basin could have been utilised to deal with the surface water runoff in principle, but neither LLFA nor the LPA raised any issue with the use of a tank (rightly so given the benefits that they can deliver as in this case). Further details of the Drainage Strategy for the Bicester Heritage site and associated LLFA correspondence is included in Appendix F.

Bloxham Grove Academy, Bloxham (Application No.: 20/01031/DISC)

9.5 The proposals consist of a new school academy and include a new teaching block, a new MUGA and hard and soft landscaped areas.

9.6 A Drainage Strategy was prepared as part of the original planning application (19/00617/F) and a subsequent discharge of condition application was made in relation condition 8, which states the following:

"No development shall take place until a detailed design and associated management and maintenance plan of surface water drainage for the site using sustainable drainage methods has been submitted to and approved in writing by the Local Planning Authority. The development shall not be implemented other than in strict accordance with the approved details and shall be fully implemented prior to the use of the building commencing."

9.7 The Drainage Strategy submitted as part of the original planning application and subsequent discharge of condition application included permeable paving and a large cellular storage tank. No objection was raised by either the LLFA or LPA in relation to the cellular storage tank on this scheme at either the planning application stage, or in relation to discharge of condition 8. Further details of the Drainage Strategy for the Bloxham Grove Academy site is included within Appendix F.

10.0 Summary and Conclusions

10.1 My evidence is provided on behalf of Great Lakes UK Limited, the "Appellant" and has considered the flood risk and drainage matters associated with the Appeal scheme.

10.2 My evidence demonstrates that the Appeal scheme is supported by a comprehensive Drainage Strategy and Flood Risk Assessment. On that basis the Appeal scheme accords with the principles set out in the Cherwell Local Plan and the NPPF.

10.3 On that basis, I am of the professional opinion that the development proposals accord with the Cherwell Local Plan and the NPPF and therefore should not be resisted or refused on flood risk or drainage ground.