

REED HOUSE JACKSONS LANE REED ROYSTON HERTFORDSHIRE (SG8 8AB)

RESPONSE TO HERTFORDSHIRE LLFA COMMENTS REF; 25/00886/FP DATED 07 AUGUST 2025

Introduction

This Note has been prepared in response to the comments issued by Hertfordshire's Lead Local Flood Authority (LLFA) (ref; 25/00886/FP, dated 07 August 2025), regarding the Combined Flood Risk Assessment and Drainage Strategy (FRA & DS) prepared by Civilistix, dated February 2025.

Responses to LLFA Comments

Comment 1

LLFA Comment

Although flooding from sewers is considered, the FRA states that Thames Water manhole cover levels (quoted 152.5m AOD) are at least 2.5m lower than the site. However, a review of the site topographic survey indicates that site ground levels are between c. 152.8 and c. 153.2m AOD (assuming that 'site' refers to the area contained within Reed House and its immediate surrounds). Clarity should be given as to whether 'site' in this instance refers to the area shown in the location plan by the redline boundary or the wider area. If 'Site' in this instance refers to the red line boundary in the location plan, then ground levels are typically between c. 154 and c. 154.9m AOD in the lower parts.

Designer's Response:

The reference to the site being at least 2.5 m above the Thames Water cover levels relates specifically to the area where the proposed plots are located, where ground levels are approximately 154–154.9 m AOD. However, even when considering the lowest existing ground levels near the pond (around 152.8 m AOD), these remain approximately 0.3 m higher than the quoted Thames Water manhole cover level of 152.5 m AOD.

Comment 2

LLFA Comment

Historic flooding on site and the surrounding areas has not been addressed or discussed in the FRA. Historic flooding should be assessed.

Designer's Response:

Review of Hertfordshire Flood Risk Management Viewer shows that there is not historic Flood Incident records in the vicinity of the site. Mapping extract is provided in Appendix I of the revised FRA&DS report.

Comment 3

LLFA Comment

The master site plan layout indicates that a small portion of the proposed storage in the southeast corner of the site (Storage 2) (and its associated ditch/swale) may lie within an area of low-risk surface water ponding. An accurate drawing or figure with the surface water flood extents overlaid, should be provided which either shows that Storage 2 (and its associated swale/ditch) does not lie within surface water ponding, or it should be moved to be outside of surface water ponding, or detailed calculations should be provided justifying that the storage provided is sufficient to attenuate/store the surface water ponding as well runoff from the site.

Designer's Response:

A drawing showing the proposed development and the mapped surface water flooding extents is provided in Appendix I of the revised FRA&DS report. This demonstrates that areas identified as medium or high surface water flood risk lie outside the proposed attenuation storage areas. Only a very small area identified as low risk marginally encroaches into the proposed swale, and this minor overlap has no material impact on the function, capacity, or performance of the swale.

Comment 4

LLFA Comment

The proposals rely on discharging into an existing pond to the immediate southeast of the site. There is no discussion/evidence that the existing pond can accommodate the attenuated site flows, as site topographic survey suggests ground levels fall in a south westerly direction (i.e. there is potential that more runoff will be directed to this pond post development). There is also uncertainty as to whether there is permission from the riparian owner.

Designer's Response:

It is not feasible to quantify the overall capacity of the existing pond, as it forms part of a wider hydrological network with contributing catchments that cannot be reliably defined. However, because the proposed discharge rate is significantly lower than the existing 1 in 100-year greenfield runoff rate from the catchment currently draining to the pond, it is reasonable to conclude that the development will not increase flood risk.

As confirmed by the LLFA in their email dated 04/12/2025, the existing pond forms part of the established local watercourse network and is therefore classified as an ordinary watercourse. The riparian owner is the freehold owner of the land adjacent to the pond, which is the current site owner. The pond already conveys surface water from the wider catchment. The proposed discharge follows the existing drainage pathway and is restricted to greenfield runoff rates; therefore, no additional hydraulic burden or change to the pond's current function is anticipated.

Comment 5

LLFA Comment

The proposed drainage strategy given in Appendix I shows that there will be some land raising to alter the topography of the site (which currently drains from the northeast to the southwest) so that the developed area will now all drain to the southeast corner to the location of the open attenuation basin (labelled Storage 2). The applicant should confirm whether cross catchment drainage is caused due to the proposed land raising and design to mitigate this accordingly.

Designer's Response:

While we appreciate that part of the existing runoff currently drains to the southwest, whereas the developed area is mostly proposed to drain to the southeast, we consider the proposal to offer an improvement over the existing situation. The revised layout reduces the likelihood of runoff reaching the southwest properties, and all flows will be discharged at a highly restricted rate of 1.5 l/s, representing approximately a 50% betterment compared with the existing greenfield QBAR rate.

The reason the existing catchments have not been maintained in their current form is that the CCTV survey of the network confirm that the southwest corner of the site is not positively drained and relies on very shallow redundant ditches for conveyance. Continuing to drain to this location would pose a high risk of flooding.

The proposed regrading is therefore limited to ensuring effective SuDS operation, and exceedance routing continues to follow the natural fall of the land without increasing off-site flood risk.

Comment 6

LLFA Comment

It is inferred from the Causeway Flow manhole schedule that the areas of the basins and the swale (as well as the permeable paving areas) are included in the calculations, although the catchment plan given in Appendix I of the FRA does not indicate where each sub catchment enters the drainage system. It is also inferred that the proposed drainage system will only drain the estimated 0.6ha of impermeable area i.e. it does not include runoff contributions from the permeable areas. Thus, given that the natural greenfield catchment is proposed to be altered to direct all flow to the southeast corner of the site, it is likely that the proposed attenuation systems will be undersized.

Designer's Response:

It was agreed during the meeting with the LLFA on 22/10/2025 that only the central landscape area bounded by the access road will be included in the catchment plan and associated calculations. Table 1 & 3 of the FRA&DS report has been revised with the updated total impermeable area.

The individual catchments draining into each manhole are shown in Drawing No. C-005: Proposed Drainage Catchment Plan, with labels indicating the total area of each sub-catchment.

Regarding the partial alteration of the natural greenfield catchment, refer to response 5 above.

Comment 7

LLFA Comment

There is no information regarding safe access and egress. It is noted that a small part of the proposed cycle/pedestrian access route is subject to low-risk surface water flooding. This is not addressed or discussed.

Designer's Response:

The surface water drainage network and associated storage have been designed to ensure no flooding for all events up to and including the 1-in-100-year event plus 40% climate change allowance. For events exceeding this design standard, any flooding is expected to be localized to the southern portion of the access road, with exceedance routed southwards. As a result, the northern access to the development, remains free of flooding, ensuring safe access and egress.

Comment 8

LLFA Comment

This should be clarified. Ground floor finished floor levels (FFLs) should be a minimum of 300mm above the maximum design water levels from any source and 150mm above proposed external ground levels (whichever is more precautionary). It is noted that freeboards are considered for the two storage basins and for the results provided for the critical 1% plus 40% climate change event, the top water level simulated in storage 1 is 154.511m (providing a freeboard of 0.689m) and in storage 2 is 152.677 (providing a freeboard of 0.523m). A minimum of 300mm freeboard on elements designed to hold water should be maintained within the proposed design.

Designer's Response:

Indicative FFLs have been provided, ensuring a freeboard of at least 300mm is maintained, and finished floor levels will be set 150 mm above the proposed external ground levels. A full detailed level design will be developed at the detailed design stage.

Comment 9

LLFA Comment

Drainage modelling results have only been provided for the 1 in 100yr (1% AEP) plus 40% climate change. Draining modelling results for all events (e.g. 1 in 1 year (100% AEP), QBAR, 1 in 30 year (3.3% AEP), 1 in 30 year (3.3% AEP) plus climate change, 1 in 100 year (1% AEP), 1 in 100 year (1% AEP) plus climate change, 1 in 1000 year (0.1% AEP to provide information on exceedance flows) must be provided.

Designer's Response:

FLOW Calculations for all events quoted added to Appendix I of the revised FRA&DS report.

Comment 10

LLFA Comment

The site lies within the Upper Lee Management Catchment and the relevant upper end peak rainfall allowances should be applied. The correct climate change allowance of 40% has been applied to the 1 in 100 year event (1% AEP). However, for the 1 in 30 year event (3.3% AEP), a climate change allowance of 35% should be used.

Designer's Response:

Calculations revised to show a climate change allowance of 35% for the 1 in 30 year event.

Comment 11

LLFA Comment

FSR has been used in simulations. FEH13/22 must be used. Drainage modelling must be re-calculated using FEH13/22 data.

Designer's Response:

Calculations have been revised using the FEH22 data.

Comment 12

LLFA Comment

The FRA does not discuss which structures will require consent. Consent will be required to discharge to the existing pond in the southeast (with riparian owner identified) and consent will be required to discharge into the 'ditch' running along High Street as well as consent to discharge ultimately to an ordinary watercourse further downstream. In addition, there is an ordinary watercourse along the northern boundary of the site – while no discharge is proposed to this watercourse, development will need to demonstrate that works do not encroach within 8m of the ordinary watercourse or appropriate consent and measures are in place.

Designer's Response:

As confirmed by the LLFA in their email dated 04/12/2025, the existing pond forms part of the established local watercourse network and is therefore classified as an ordinary watercourse. The riparian owner is the freehold owner of the land adjacent to the pond, which is the current site owner. The pond already conveys surface water from the wider catchment. The proposed discharge follows the existing drainage pathway and is restricted to greenfield runoff rates; therefore, no additional hydraulic burden or change to the pond's current function is anticipated.

We do not consider that additional consents are necessary for features downstream of the pond, as the pond is already hydraulically connected to the downstream ditch network—confirmed by the CCTV Drainage Survey—and the proposed discharge does not alter existing flow conditions.

Comment 13

LLFA Comment

Infiltration testing has been completed according to BRE365, dated February 2014 and confirmed site geology primarily consists of clay. Recorded infiltration rates range between 10-7 – 10-9 m/s. However, as the infiltration testing is greater than 10 years old, up to date infiltration testing is required to confirm if infiltration rates have changed. This should include a sufficient number of trial pits to be representative of the whole site.

Designer's Response:

It was agreed during the meeting with the LLFA on 22/10/2025 that the previous ground investigation provides a sufficient basis to rule out the need for additional infiltration testing; therefore, no further testing will be required.

Comment 14

LLFA Comment

Greenfield Rates

Estimated greenfield rates need to be consistent: Greenfield rates have been calculated using the IH 124 method, with Table 1 of the FRA indicating that greenfield runoff rates have been calculated using a site area of 2.07ha, resulting in a QBAR of 8.65l/s. However, Table 3 of the FRA indicates that greenfield rates have been calculated using 0.6 ha (the proposed impermeable area), resulting in a QBAR of 2.51 l/s. For ease of clarity and consistency, Table 1 should be amended in line with Table 3. It is understood that it is proposed to restrict post-development discharge to below this calculated QBAR to 2l/s for all events up to the 1% AEP event. This should be confirmed. In addition, post-development discharge should be restricted up to and including the 1% AEP event plus climate change.

Designer's Response:

Table 1 has been amended to factor the greenfield runoff rates to the proposed impermeable areas. The discharge will be at 2.0 l/s for all events up to and including the 1% AEP event plus climate change.

Comment 15

LLFA Comment

It is understood that the 0.6ha of proposed impermeable area (the area that the greenfield rates have been calculated on) includes the swales and the 2 basins but excludes other green spaces. However, the drainage strategy only includes the 0.6 ha of impermeable area and excludes the other green areas which positively drain to the system. Greenfield runoff rates should be recalculated based on the total proposed contributing area that will positively drain to drainage infrastructure and all these areas (i.e. permeable and impermeable) must be included in the drainage simulations. Currently only impermeable areas are included in the drainage simulations – the drainage simulations must be updated to include all contributing areas (i.e. permeable as well as impermeable).

Clear information needs to be provided to address this, and calculation of greenfield rates must include all areas which would positively drain to the proposed infrastructure (including permeable and impermeable areas). It should also be noted that in the drainage strategy, all of the contributing area (i.e. permeable and impermeable areas) must be accounted for – at present only impermeable area is accounted for in the drainage strategy.

Designer's Response:

It was agreed during the meeting with the LLFA on 22/10/2025 that only the central landscape area bounded by the access road will be included in the catchment plan and associated calculations. Table 1 & 3 of the FRA&DS report has been revised with the updated total impermeable area.

Comment 16

LLFA Comment

Greenfield Runoff Volumes Greenfield runoff volumes have not been calculated. Volume calculations must be provided.

Designer's Response:

Greenfield and proposed runoff volumes have been estimated using Causeway Flow for the 1-in-100-year event with a storm duration of 360 minutes. The calculations indicate an existing (greenfield) runoff volume of 212 m³, compared with a proposed runoff volume of 134.5 m³, demonstrating that the proposed scheme discharges below the existing greenfield volumes. Full flow calculation details are provided in Appendix K.

Comment 17

LLFA Comment

Informative: There is an ordinary watercourse along the northern red line boundary (as defined in the site location plan). However, based on a review of the site's topographic survey, it is agreed that surface water runoff will not drain to this ordinary watercourse. Instead, it is agreed that runoff will fall in a south westerly direction, with (at least part of) the site draining to the existing ditch located along the western site boundary.

Action required: However, it is noted that in the existing drainage plan contained within Appendix D of the FRA, that there is a comment stating that it is not believed that the outfall from this existing ditch is positively drained. There is no further discussion to justify this, and it is required that the existing drainage scenario regarding the ditch's connectivity to wider watercourses is adequately investigated to definitively confirm or disprove this assumption.

Designer's Response:

A CCTV Drainage Survey investigation has been undertaken, which concluded that the western ditch is a redundant ditch, with no positive outfall. The CCTV report is provided in Appendix D of the revised FRA&DS report.

Comment 18

LLFA Comment

The FRA also states that the private pond to the southeast of Reed House (but within its grounds) is connected to a ditch to the south via a 225mm diameter culvert. However, there is no evidence provided to support this, and no information provided on riparian ownership and whether discharge is permitted.

Designer's Response:

A CCTV Drainage Survey investigation has been undertaken, demonstrate the connectivity of the existing pond with the southern ditch. The CCTV report is provided in Appendix D of the revised FRA&DS report.

As confirmed by the LLFA in their email dated 04/12/2025, the existing pond forms part of the established local watercourse network and is therefore classified as an ordinary watercourse. The riparian owner is the freehold owner of the land adjacent to the pond, which is the current site owner. The pond already conveys surface water from the wider catchment. The proposed discharge follows the existing drainage pathway and is restricted to greenfield runoff rates; therefore, no additional hydraulic burden or change to the pond's current function is anticipated.

Comment 19

LLFA Comment

The proposals are not considered to be in accordance with the National Standards for SuDS (June 2025) as:

-The highest priority for runoff destination is “collected for non-potable use”. However, the FRA has discounted rainwater re-use without appropriate evidence that it has been “utilised to the maximum extent practicable”.

It is agreed that the next highest priority, infiltration, is not likely to be considered viable as historic infiltration tests undertaken suggest poor infiltration rates due to the presence of clay, however as per the above comment, as the infiltration testing is greater than 10 years old, further infiltration testing is required to confirm this.

The next highest priority, discharge to a watercourse, is proposed. It is proposed to discharge firstly to an existing pond immediately southeast of the site (but there is no discussion as to whether the existing pond has capacity to receive the attenuated site flows, as site topographic survey suggests ground levels fall in a south westerly direction), then discharge from this existing pond, via a 225mm diameter pipe to a ditch c. 10m south of the site on High Street. The FRA states that this ditch then discharges to an ordinary watercourse maintained by HCC c. 130m to the south. However, the FRA also states that the ditch along High Street does not appear on OS mapping, and it is ‘believed’ to be owned by Highways although no evidence is provided. It is unclear who the riparian owner of the ditch is and whether permission to discharge is possible. It is also unclear at what location this ‘ditch’ discharges into an HCC maintained, ordinary watercourse. Please note that HCC is only responsible for maintaining ordinary watercourses on or adjacent to its land.

Designer’s Response:

Regarding rainwater re-use, the dwellings will incorporate water butts connected to at least one rainwater downpipe for garden irrigation, with overflow directed into the surface-water network. This has been added into the revised FRA&DS report and as a note to drawing no. C-002.

Regarding infiltration, it was agreed during the meeting with the LLFA on 22/10/2025 that the previous ground investigation provides sufficient evidence to discount infiltration as a viable option; therefore, no further infiltration testing is required.

Regarding the ownership and capacity of the existing pond and the downstream network, these matters are addressed in points 4 and 12 of this document.

Comment 20

LLFA Comment

As per Standard 2 of the National Standards for SuDS (June 2025), all developments must provide evidence of interception of the first 5mm of rainfall via a ‘SuDS approach’. This has not been considered in the FRA. In addition, there is limited consideration for source control methods, with many source control options discounted without substantive evidence/justification.

Designer’s Response:

The proposed development incorporates SuDS measures to manage runoff at source and intercept the first 5 mm of rainfall. These include permeable paving, swales, and basins, which collectively attenuate runoff from frequent small rainfall events. In addition, permeable paving has been proposed for the access road and water butts connected to at least one rainwater downpipe will be provided for irrigation, with overflow directed to the surface water network.

The selected combination of permeable paving, swales, basins, and water butts has been demonstrated to provide adequate treatment and management of runoff for the development.

Comment 21

LLFA Comment

Although, permeable paving, a dry swale, a detention basin (with geo-cellular underground storage) and an open attenuation basin are proposed, given that the proposed drainage system has only been modelled to include impermeable areas only and not permeable areas, and that there is uncertainty in greenfield rates, it is believed that water quantity may not be sufficiently addressed.

Designer's Response:

It was agreed during the meeting with the LLFA on 22/10/2025 that only the central landscape area bounded by the access road will be included in the catchment plan and associated calculations. Revised drawings and associated calculations are provided within the updated FRA & DS report.

Comment 22

LLFA Comment

An insufficient water quality assessment is provided. At least three treatment steps are required due to the presence of Source Protection Zone III. In addition, it should be noted that the site's runoff will eventually discharge into a chalk stream c. 2.5km southeast of the site (near Rushing Wells). Tables 4 and 5 of the FRA do not clearly demonstrate how the proposed SuDS features can provide the required mitigation, nor does it demonstrate how the required mitigation indices were determined based on land-use etc.

Designer's Response:

In accordance with The SuDS Manual (C753), a low-pollution-risk classification has been applied to the impermeable central road, as it functions as a low-traffic route. Tables 4 and 5 in the revised FRA & DS report have been updated to demonstrate that the proposed SuDS features deliver treatment levels that exceed the requirements set out in the SuDS Manual.

Additionally, the previously proposed geo-cellular tank has been removed, enabling the main basin (Storage 1) to operate online and provide treatment. Combined with the proposed swales and the secondary basin (Storage 2), the system now delivers adequate treatment and achieves three treatment stages.

Comment 23

LLFA Comment

As greenfield volumes have not been calculated, it is not possible to comment on whether proposed discharge volumes exceed greenfield volumes. Greenfield volumes must be estimated with details provided alongside the estimation for proposed runoff volumes.

Designer's Response:

Greenfield and proposed runoff volumes have been estimated using Causeway Flow for the 1-in-100-year event with a storm duration of 360 minutes. The calculations indicate an existing (greenfield) runoff volume of 212 m³, compared with a proposed runoff volume of 134.5 m³, demonstrating that the proposed scheme discharges below the existing greenfield volumes. Full flow calculation details are provided in Appendix K.

Comment 24

LLFA Comment

The applicant needs to confirm whether the site is a groundwater dominated area.

Designer's Response:

Review of Hertfordshire Flood Risk Management Viewer shows that the site is not within the areas susceptible to groundwater flooding. Mapping extract has been added to Appendix C of the revised FRA&DS report.

Comment 25

LLFA Comment

It is also noted that the drainage simulation results provided are for the critical storm duration for the 1% AEP plus 40% climate change only i.e. the results for individual storms are not provided. It is also not clear what parameter the critical storm has been ranked to i.e. is the critical storm ranked based on highest water level? Or highest discharge rate etc.?

Designer's Response:

The critical storm duration is automatically selected by Causeway Flow based on the maximum water levels in the system, ensuring a conservative assessment of flooding and exceedance routes

Comment 26

LLFA Comment

The FRA states that 10% urban creep has been applied. However, if the total impermeable area is 0.6ha, then 10% of this would be 0.06ha. Hence, one would expect the total impermeable area including 10% urban creep to be 0.66ha. However, Appendix I shows that the total impermeable area to enter the drainage system is 0.633ha. Clarity on how this was obtained should be given. If only residential roof areas have had urban creep applied to them (as referenced in the FRA), this should be clearly indicated on a drawing so area calculations and urban creep application can be checked.

Designer's Response:

An urban creep factor of 10% has been included in the flow calculations under 'Additional Areas, A(%)', which accounts for all impermeable surfaces.

Comment 27

LLFA Comment

Cross section and long section drawings of all the network is not provided.

Designer's Response:

Full network long sections will be produced at the detailed design stage, when levels and gradients are finalized. At the planning stage, the current layout and preliminary levels are considered sufficient to demonstrate the feasibility of the drainage strategy.

Comment 28

LLFA Comment

Cross section of typical pond and dry swales is provided but no long sections provided.

Designer's Response:

Full network long sections will be produced at the detailed design stage, when levels and gradients are finalized. At the planning stage, the current layout and preliminary levels are considered sufficient to demonstrate the feasibility of the drainage strategy.

Comment 29

LLFA Comment

CV is currently set to 0.75 for summer storms and 0.84 for winter storms in the simulation settings. These must both be changed to 1.

Designer's Response:

A CV value of 1.0 assumes that 100% of rainfall becomes runoff, which numerous studies, including the Wallingford Procedure, have shown to be a significant overestimation in most practical scenarios. Typically,

CV values of 0.84 for winter and 0.75 for summer are used to reflect realistic surface runoff conditions, accounting for factors such as initial losses, evaporation, and surface permeability.

Furthermore, in this development, permeable paving has been proposed for all external hardstanding areas, which constitutes a significant proportion of the site's impermeable surfaces. This further reduces the volume of surface water entering the drainage system.

Therefore, we consider CV values of 0.84 for winter and 0.75 for summer appropriate.

Comment 30

LLFA Comment

The 50% AEP event drainage simulation results have not been provided so it is not possible to confirm whether the network surcharges or not. The results for the 50% AEP event must be provided.

Designer's Response:

Calculations for the 50% AEP event plus climate change have been added to Appendix I.

Comment 31

LLFA Comment

The 3.33% AEP event plus climate change drainage simulation results have not been provided so it is not possible to confirm whether the network floods or not. The results for the 3.33% AEP even plus 35% climate change must be provided.

Designer's Response:

Calculations for the 3.33% AEP event plus climate change have been added to Appendix I.

Comment 32

LLFA Comment

Clarification into whether finished floor levels are at least 150mm above proposed external ground levels across the site is required.

Designer's Response:

Indicative FFLs have been provided, and finished floor levels will be set 150 mm above the proposed external ground levels. A full detailed level design will be developed at the detailed design stage.

Comment 33

LLFA Comment

Exceedance flow direction is indicated on the proposed drainage strategy drawing. However, the drawing only currently shows the existing ground levels which currently drain from the northeast to the southwest. The exceedance flows drawn currently go against the existing site slope – proposed ground levels should be provided to justify the direction of the exceedance flow arrows.

Designer's Response:

The full level design will be developed during the detailed design stage. However, indicative levels are shown through the proposed manhole cover levels. These, together with the flooding results for the 1-in-1000-year event, demonstrate that the majority of flooding occurs at manhole SWMH13. This exceedance will be directed southwards through the development via the swales, as indicated by the exceedance arrows.

Comment 34

LLFA Comment

½ drain down times have not been provided.

Designer's Response:

Given that it's not possible to achieve a half-drain time of 24 hours for the 1 in 30-year event plus 35% for climate change, calculations are also provided to demonstrate that the system has capacity to accommodate an immediate subsequent 1 in 10-year rainfall event, in line with The SuDS Manual.

Comment 35

LLFA Comment

No evidence has been provided that a surcharged outfall has been applied during the Causeway Flow simulations.

Designer's Response:

As agreed during the meeting with the LLFA on 22/10/2025, additional storage volume has been provided to allow for a scenario in which the existing ditch is surcharged for a 6-hour period. This volume is provided within the attenuation basin prior to discharge (Storage 2).

Comment 36

LLFA Comment

Whilst a high-level assessment of maintenance for each proposed SuDS feature has been provided, there is no discussion of who will be adopting these features.

Designer's Response:

It is noted within point 5.8 that the SuDS features will be maintained and managed by a private management company, which will be confirmed in due course.

Comment 37

LLFA Comment

Easements are not shown on the proposed drainage strategy drawing.

Designer's Response:

There is currently no intention to offer the proposed drainage networks for adoption.

Comment 38

LLFA Comment

Whilst it appears that there is vehicular access to the two basins and the swale, it is not clear whether off-road parking has been considered.

Designer's Response:

Provision of off-road parking will be reviewed as part of the detailed designed stage.

Comment 39

LLFA Comment

Whilst it is acknowledged that there is no discharge to any watercourses on site, there is an ordinary watercourse along the northern site boundary. Evidence should be provided that the minimum easement requirements are met during construction of the development.

Designer's Response:

It is suggested that this is addressed post-planning as a planning condition.

Comment 40

LLFA Comment

A high-level assessment of how water quantity and water quality will be managed during the construction phase is required. Identifying high level assumptions such as need to discharge to a sewer or watercourse with appropriate pollution measures. The applicant must provide this information.

Designer's Response:

It was agreed during the meeting with the LLFA on 22/10/2025 that this can be addressed post-planning as a planning condition.

Comment 41

LLFA Comment

There is inconsistency in what is defined as the redline boundary of the site. The site location plan and master site plan layout defines the red line boundary to exclude Reed House and its immediate environs. However, the drainage strategies in the FRA define the red line boundary to include Reed House. Section 1 of the FRA states that the total red line boundary is 2.07ha – however the LLFA have reviewed this and estimated this to be c. 1.6ha. The LLFA have also reviewed the blue boundary and have estimated this to be c. 2.1ha. It is advised that this is checked as there is uncertainty in areas mentioned.

Designer's Response:

The redline boundary within the drainage drawings has been revised as per the latest Masterplan, excluding Reed House, and the redline boundary area updated in the report.

Comment 42

LLFA Comment

Section 1 of the FRA also states that 0.13ha of the red line boundary is classed as impermeable area – as per the above, it is unclear as to what impermeable area is being referred to, as according to the red line boundary in the site location plan there is no impermeable area. The FRA and drainage strategy should use a consistent red line boundary with respect to the masterplan site location.

Designer's Response:

The redline boundary within the drainage drawings has been revised as per the latest Masterplan, excluding Reed House, and the redline boundary area updated in the report. An impermeable area of 0.011ha has been identified corresponding to the existing concrete access.

Comment 43

LLFA Comment

An additional storage of 20m³/ha has been applied in the Causeway Flow simulations. This must be removed as it will be providing additional storage which will not be present in reality.

Designer's Response:

additional storage set to 0 in the revised calculations.

Comment 44

LLFA Comment

Plan areas of the 2 storage basins and permeable paving areas have not been provided on the drainage strategy. These should be provided so that they can be cross-checked with the area used in Causeway Flow simulations and to check that there is sufficient room for the basins and permeable paving on the site.

Designer's Response:

The individual catchments draining into each manhole are shown in Drawing No. C-005: Proposed Drainage Catchment Plan, with labels indicating the total area of each sub-catchment.

Comment 45

LLFA Comment

The catchment plan should also clearly indicate the sub catchment areas (and their values) which drain to each manhole.

Designer's Response:

The individual catchments draining into each manhole are shown in Drawing No. C-005: Proposed Drainage Catchment Plan, with labels indicating the total area of each sub-catchment.

Comment 46

LLFA Comment

With regards to the storage 1 basin, it is understood from the proposed drainage strategy drawing and pond schematic drawing that there is a gap between the detention basin's invert level and the top of the geo-cellular storage of 0.45m suggesting that water will enter the structure via pipes connected in at the geocellular storage's invert level and will need to be able to rise up through the 0.45m gap to enter the detention basin. Given that the geology indicates the soil is clay, it needs to be clarified what soil material will be used to allow water to enter the detention basin. However, a review of the Causeway Flow network details indicated that the drainage model has put the invert level of the detention basin at the cover level of the geo-cellular storage. In addition, the top water level is stated in the proposed drainage strategy as 154.8m whereas the Causeway Flow details show this as 154.7m. The proposed drainage and pond schematic drawings must match the details input into the Causeway Flow model. This should be reviewed and corrected.

Designer's Response:

As part of the drainage strategy revision, the attenuation basin has been enlarged and the geo-cellular storage omitted.

Comment 47

LLFA Comment

It is also unclear as to how the geo-cellular storage located beneath the detention basin has been modelled in Causeway Flow. The storage 1 details provided references ring diameter, pit width and pit length. It is requested that a diagram indicating how Causeway Flow models the geo-cellular storage is provided.

Designer's Response:

As part of the drainage strategy revision, the attenuation basin has been enlarged and the geo-cellular storage omitted.

Comment 48

LLFA Comment

It is unclear as to how the swales have been modelled in Causeway Flow. The proposed drainage strategy indicates that conduits 1.006 and 1.008 represent the swales but the network details suggest that 1.006 and 1.008 are pipes as it is believed that roughness is applied via k_s (mm) values (i.e. using the Colebrook White equation) as all conduits are set to 0.6 in the ' k_s (mm) /n' field. A k_s of 0.6mm is a standard value to use for conduits where velocity is expected to exceed 1m/s, hence this is appropriate for surface water drainage pipes. However, a k_s of 0.6mm is not appropriate for swales where the velocity is not expected to exceed 1 m/s. It is usually best practice to use the Manning's n regime when modelling flow through conduits that are not pipes (i.e. ditches and swales). Thus, it is advised to confirm how Causeway Flow is modelling the swales and to update k_s or n values accordingly.

Designer's Response:

The model is not intended to simulate the detailed hydraulic behaviour of the swales but simply to represent their conveyance function within the overall network. For this reason, conduits 1.006 and 1.008 have been modelled using standard pipe roughness values as a proxy for these links.

Because the swales convey relatively small flows at shallow gradients, their detailed roughness has no material effect on the calculated storage, peak flows or the controlled discharge from the system. The current representation therefore remains appropriate for assessing the performance of the proposed drainage strategy.