

Nicola Spencer

From: Tybie House [REDACTED]
Sent: 27 June 2026 18:41
To: Neil Crowther
Cc: Karl Roberts
Subject: A/44/26/PL
Attachments: Revised Drainage Review.pdf

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Dear Mr Crowther,

Following the recent submission of additional documents relating to surface water drainage, please find attached my analysis of that information.

I would be grateful if this could be added to the application file and taken into account in the determination of application A/44/26/PL.

Kind regards,

Dr Tym Huckin BSc(Hons) FIAP MBCS

Analysis of the revised drainage information

Executive summary

The author finds the inclusion of the FoS 5 “sense check” difficult to reconcile with the applicant’s continued reliance on FoS 1.5 as the design basis. If the applicant considers FoS 1.5 to be appropriate, it is not clear why a FoS 5 calculation has been included as a supplementary assurance exercise. Conversely, if FoS 5 is considered relevant to addressing the Engineer’s concerns about the consequences of soakaway failure, it is difficult to understand why FoS 5 has not been adopted throughout as the design standard.

In that context, the continued insistence on FoS 1.5 does not appear to provide a logical or robust response to the Engineer’s concerns.

It is difficult to see how the proposed design, based on a Factor of Safety of 1.5, is a sustainable proposition. The author’s main concern is that, if the sensitivities set out in this report are realised, the system as proposed may fail or require remedial action.

Given that the Special Purpose Vehicle used by the applicant — the site-specific company with which the majority of purchasers contracted — may no longer exist by that time, the practical and financial responsibility for correcting the system could fall upon the residents. Without wishing to overstate the position, if this design does falter, there is a risk that the only effective solution may be off-site discharge, which would be very expensive for the residents to implement. In light of the concerns raised in this document, if the proposed design later demonstrates that infiltration is not an adequate long-term drainage mechanism for this site, then it should be the developer, not the residents, who bears the cost of rectification.

The author therefore respectfully requests that the planning officer gives particular attention to this future responsibility when determining the application, rather than focusing only on whether the proposal can be made to appear acceptable in the immediate decision-making context.

Point-by-point comments on Odyssey response dated 16 June 2026

0.5 – LLFA recommendation for conditions

Odyssey states that the submitted design is sufficiently detailed to support a grant of planning permission without the need for drainage conditions requiring later approval. That position ought not to be accepted without caution. The drainage strategy is not a conventional pre-construction design; it is a retrospective remedial proposal for an already constructed and occupied estate, where the drainage system has already been the subject of repeated refusals, appeal findings and further technical objection. It is also material that the drainage system as constructed has not been demonstrated to comply with the necessary regulatory and technical requirements. Where ADC's own drainage consultant has identified matters requiring clarification before approval, those matters ought to not simply be deferred or assumed to be resolved.

It is also difficult to see how this application could be granted without drainage conditions. Any grant of permission would presumably need to secure delivery of the approved remedial design within a specified timescale. That makes the inclusion of drainage conditions highly likely, if not inevitable. Odyssey's suggestion that no further drainage conditions are required is therefore difficult to reconcile with the retrospective and remedial nature of the application.

0.6 – Reliance on three years without reported flooding

Odyssey relies on the statement that the existing system has been installed and working satisfactorily for approximately three years without flooding issues. With respect, that is not a valid test of a system required to perform for a 1 in 100 year event plus climate change.

A short period without reported flooding cannot demonstrate compliance with the design standard. Nor does the absence of observed notable flooding mean that the system has necessarily performed as designed. A system may technically surcharge, back up, rely on unplanned storage, drain down slowly, or otherwise operate outside its intended parameters without that necessarily being observed or reported as a flood event.

That assertion should also be considered in the context of residents having previously reported waterlogged gardens to the developer. According to the revised Appendix F of the FRA, those gardens form part of the catchment area which SA1 is now intended to accommodate.

The fact that there has been no reported flooding simply shows that the particular rainfall events experienced to date have not exposed a reported failure. It does not validate the system against the required design storm, climate-change allowance, groundwater assumptions, drawdown assumptions, blockage risk, maintenance risk or exceedance behaviour.

0.7 – SA1 infiltration testing and BRE365 compliance

Odyssey asserts that the SA1 ground was extensively tested at the correct depth and that four BRE365-compliant tests were undertaken, with the worst result used in the design.

That assertion remains disputed and ought not to be accepted without a clear technical explanation. The ground beneath / around SA1 is not straightforward undisturbed natural ground in the ordinary sense, given the existing soakaway context. The Council ought to require the applicant to demonstrate precisely how the test pits, test depths, ground conditions and infiltration pathway satisfy BRE365 requirements.

Further, the “sequential testing” issue remains unresolved. The applicant has not explained how a 12-day gap in the three-fill testing sequence can properly be treated as BRE365-compliant sequential testing. The Council ought not to accept a bare statement of compliance where the testing sequence, antecedent conditions and ground disturbance are central to the reliability of the infiltration rate now being used for the whole-site solution.

1.1 – Water butts

The introduction of water butts raises a deliverability and enforceability issue. It may be possible for the applicant to install water butts at vacant properties, as those properties remain under its direct control. However, the position is materially different for existing occupied dwellings in private ownership. Odyssey states that, for occupied properties, water butts would be delivered to homeowners for them to install. That is not the same as the applicant installing, securing and maintaining them. It also leaves unclear who would bear the cost of installation, future maintenance, repair or replacement, as the applicant does not appear to address the financial or practical implications of this proposal.

If water butts form an integral part of the drainage strategy, one would expect the applicant to demonstrate that they can be installed, retained, connected, emptied, inspected, maintained, repaired and replaced for the lifetime of the development. The applicant does not appear to have demonstrated legal control over existing owners’ properties, or any mechanism by which homeowners can be compelled to install and maintain water butts in perpetuity. If water butts are not hydraulically relied upon, they ought to be disregarded and not be treated as assisting the adequacy of SA1 or the wider drainage strategy.

3.1 – SA1 as the whole-site infiltration solution

It is noted that Odyssey states SA1 will be updated so that it can alone cater for the entire site, assuming the other installed infiltration features were not present. This is a significant point. On the applicant’s own case, SA1 is the ultimate infiltration solution for the whole development. The other features may remain physically present, but the applicant’s case is that the hydraulic design does not depend on their infiltration potential.

That means the robustness of the proposal turns primarily on SA1, its tested infiltration rate, the selected factor of safety, the storage available before exceedance, the overflow basin, and the ability of the wider network to convey water to SA1 without detriment or flooding. In practical terms, SA1 becomes the single point of failure within the whole-site drainage strategy.

3.2 – Factor of Safety

The apparent discussion on 12 March ought not to be treated as determinative. That meeting appears to have concerned the outline approach before the detailed revised model had been fully assessed. It was also a closed meeting and, in the absence of publicly available minutes or a detailed record of the discussion, only limited weight can safely be placed on what may or may not have been agreed at that stage. In any event, ADC's drainage consultant subsequently identified the core problem: the current factor of safety does not appear to account for the consequences of failure of the soakaway.

That is the central technical issue.

SA1 is not a small isolated domestic soakaway. It is proposed as the effective whole-site infiltration solution for a completed residential estate. If SA1 performs worse than assumed, blocks, silts, draws down more slowly, or fails, the consequences could include flooding of roads, private areas and potential off-site exceedance. In that context, a FoS of 1.5 would not appear to be adequately justified merely by saying the worst infiltration test was used. The consequences of future failure would not be borne by the decision-maker, and may ultimately fall upon homeowners, landowners and/or the management company through remediation costs, service charges, disruption and loss of amenity. That makes the adequacy of the safety factor a practical and financial risk issue, not simply a modelling preference.

The drawings still present SA1 as a FoS 1.5 design. The additional FoS 5 modelling appears to be a supplementary sensitivity run, not the design standard shown on the submitted drawings. The applicant ought not to be permitted to rely rhetorically on FoS 5 while retaining a FoS 1.5 design. The FoS 1.5 design must stand or fall on its own merits.

3.3 – SA2, SA3 and SA4 assumed full

Odyssey says SA2, SA3 and SA4 have been modelled using a 1% void ratio to represent rapid filling of these soakaways, with the soakaways assumed to be full during the design storm. If those features are assumed full, they ought not to then be treated as meaningful additional storage or infiltration capacity within the design.

At that point, SA2, SA3 and SA4 are effectively being treated as conveyance / overflow elements rather than functioning attenuation or infiltration features. The ultimate storage, exceedance and discharge burden remains with SA1 and the overflow basin.

3.4 – SA2

It is unclear what purpose is served by referring to SA2's individual Factor of Safety in circumstances where Odyssey's own design case appears to exclude reliance on SA2 as an independent infiltration feature. If SA1 is to provide the total infiltration solution for the site, then the critical question is whether SA1 is adequate. SA2's individual FoS does not answer that question and ought not to be presented as evidence of robustness in the revised whole-site strategy.

3.5 – SA3 and SA4

The same point applies to SA3 and SA4. The applicant's case is that these features are not relied upon as independent infiltration features, because the system ultimately connects to SA1. Any infiltration from SA3 or SA4 is therefore incidental benefit, not a reliable design component.

It is also noted that concerns remain about SA4 drawdown. Previous testing established, and the Inspector subsequently recorded, that SA4 did not reliably drain down. In those circumstances, SA4 cannot sensibly be relied upon as a dependable infiltration or storage feature. The Council ought not to treat the mere physical presence of SA3 and SA4 as evidence of hydraulic robustness where the applicant's own model excludes reliance on their infiltration potential.

3.6 – Permeable paving

Permeable paving appears no longer to be credited as an infiltration feature, but it is still being used within the updated hydraulic arrangement as linked storage and conveyance. That distinction matters. If permeable paving is not being counted for infiltration, it cannot be used to support the infiltration adequacy of the scheme. If it is being used for storage / conveyance, then its construction, levels, connectivity, maintenance access, silt management and long-term performance remain material.

This is particularly important given previous concerns about maintainability. A feature ought not to be treated as irrelevant for infiltration purposes while simultaneously being used as part of the linked storage and overflow mechanism without clear evidence that it is properly constructed, maintainable and hydraulically connected. If the reason for discounting permeable paving as an infiltration feature is connected with maintenance or long-term performance, the applicant ought to explain why the storage volume within that same feature can nevertheless be relied upon for the lifetime of the development, given that without adequate maintenance its effective storage volume may reduce through siltation, blockage or loss of hydraulic connectivity. Without that assurance, it appears that permeable paving is being excluded where it is inconvenient to rely upon it as infiltration, but included where its storage volume is needed to support the hydraulic model.

3.7 – SA1, exceedance level and “infilling” of the overflow basin

Odyssey's response appears to rely on a modelling distinction rather than a physical one. SA1 has no modelled storage above the top of the infiltrating gravel blanket. Once water rises above that level, it is no longer being stored or infiltrated within SA1 itself; it is being routed into the overflow basin.

Describing this as “infilling” of the basin does not alter the hydraulic reality that SA1 has exceeded its functional storage / infiltration body and is then relying on a separate contained exceedance area. The fact that the model can be configured to report this as basin infilling rather than SA1 flooding ought not to be treated as evidence that SA1 itself has additional capacity or that SA1 can, by itself, discharge the surface water runoff for the whole site.

The Council ought to therefore distinguish between SA1's actual infiltration/storage capacity and the temporary containment provided by the surface overflow basin.

3.8 – FoS 5 model and “other infiltration features”

Odyssey states that further hydraulic modelling using a FoS of 5 shows no flooding from SA1 or any other infiltration feature. That statement requires qualification.

First, the submitted drawings still identify SA1 as a FoS 1.5 design, not a FoS 5 design. The FoS 5 model appears to be a supplementary check, not the design standard shown on the drawings.

Second, on the applicant's own design case, SA1 is the only infiltration feature being relied upon hydraulically. SA2, SA3, SA4 and the permeable paving may physically exist, but the applicant states that SA1 is to provide the total infiltration solution and that the other features are not relied upon for their infiltration potential. It is therefore potentially misleading to refer to “any other infiltration feature” as though the updated design relies on a distributed infiltration system. On the applicant's own case, it does not.

Third, the FoS 5 model ought to be examined on its actual outputs, not simply described as showing no flooding. If the FoS 5 model still relies on extensive surcharge, basin storage, linked permeable-paving storage and Flood / Flood Risk results in parts of the network, it would not appear to demonstrate a comfortably robust drainage strategy.

3.9 – Conveyance to SA1 “without flooding”

Odyssey states that the updated hydraulic model demonstrates that water is able to be conveyed between installed features up to the redesigned SA1 without flooding. That statement is not supported by the model outputs without significant qualification.

The surcharge results show that the proposed “overflow” network is not simply passing spare water calmly towards SA1. It is relying on parts of the system backing up and operating under hydraulic head. The FoS 1.5 model shows widespread surcharge in the 1 in 100 year +45% event. The SA1-to-overflow-basin pipes are marked Surcharged in the 480-minute winter event. Several permeable-paving-to-SA1 and SA2/SA3/SA4-to-permeable-paving links are also marked Surcharged.

More seriously, the FoS 1.5 model identifies pipe 6.000 as Flood Risk, pipe 1.000 as Flood Risk, pipe 7.000 as Flood, and pipe 7.001 as Flood Risk. The FoS 5 model does not remove that concern: pipe 7.000 is again marked Flood and pipe 7.001 is again marked Flood Risk in the FEH22 100 year +45% event.

Those results appear to be inconsistent with an unqualified assertion that the linked network conveys water to SA1 “without flooding”. A surcharged pipe does not automatically mean surface flooding, but a network reliant on surcharge and containing Flood / Flood Risk flags does not appear capable of being fairly presented as a free-draining, non-flooding overflow arrangement. The Council ought to require the applicant to explain those model outputs before accepting the claim that the revised network conveys water to SA1 without flooding.

Independent review of the applicant's hydraulic calculations

The applicant's revised drainage case ought not to be accepted merely because the InfoDrainage model reports "OK" against certain features. It would be expected for the model outputs to be read alongside the applicant's stated design case and the submitted drawings.

The applicant's position on the need for further drainage conditions is addressed above. The following comments focus on the hydraulic calculations themselves.

The submitted drawings continue to identify SA1 as a Factor of Safety 1.5 design. This is notable because the initial drainage calculations submitted under application A/155/22/DOC used a FoS of 2. All later applications adopted FoS 1.5, without any apparent explanation as to why the previous allowance was reduced. If FoS 2 was considered appropriate for this drainage feature at the discharge-of-condition stage, the Council ought to require a clear technical justification before accepting the reduced FoS 1.5 approach now.

SA1 is shown as a granular infiltration blanket with IL 7.07 m AOD, plan area 846.5 m², depth 2.05 m, 30% voids, contributing area 0.824 ha including 10% creep, and soil infiltration rate 8.13×10^{-6} m/s. The applicant's FoS 5 model appears to be a supplementary sensitivity run, not the design standard shown on the drawings.

The applicant's case is that SA1 will provide the total infiltration solution for the site. However, the applicant's own FoS 1.5 model does not appear to demonstrate that SA1 alone can cope. In the FEH22 100 year +45% 480-minute winter event, the model reports SA1 resident volume of 520.768 m³ against total SA1 storage of approximately 521.856 m³, leaving only 0.208% available. That leaves a residual margin of approximately 1.088 m³. For a whole-site infiltration feature serving an already occupied residential estate, the author does not consider this a robust margin; it could readily be lost through ordinary construction tolerances, sediment accumulation, void-ratio variation, minor level differences or reduced infiltration performance.

More importantly, the same FoS 1.5 event also uses 55.570 m³ in the overflow basin and 159.484 m³ in the permeable paving. The model is therefore not demonstrating that SA1 alone caters for the whole site. It is demonstrating that SA1 becomes effectively full and the wider linked storage system is then required to avoid a formal flooded-volume result.

A simple storage-balance check using the applicant's own figures leads to the same conclusion. SA1's approximate storage is $846.5 \text{ m}^2 \times 2.05 \text{ m} \times 30\%$, or about 520.6 m³. Allowing for infiltration over a 480-minute storm using the applicant's infiltration rate and FoS 1.5 gives approximately 132 m³ of infiltration during the event. The 100 year +45% 480-minute FEH22 event has an equivalent rainfall depth of approximately 107 mm, producing a gross runoff volume of approximately 882 m³ over the stated 0.824 ha catchment. After allowing for approximately 132 m³ of infiltration through SA1 during that storm at FoS 1.5, approximately 750 m³ still requires storage. SA1 provides only approximately 522 m³, leaving a shortfall of approximately 228 m³ before reliance is placed on the overflow basin and linked permeable paving storage.

The FoS 5 model does not appear to resolve this concern. In the FEH22 100 year +45% 5760-minute winter event, the FoS 5 model reports SA1 resident volume of 520.822 m³, leaving only 0.198% available. It also reports the SA1 Overflow Basin as “Flood Risk”, with resident volume of 218.735 m³ and percentage available of -88.911%. The permeable paving is also effectively exhausted, with resident volume of 236.462 m³ and percentage available of -0.020%.

This is material because the overflow basin control summary identifies a total volume of 115.788 m³ when allowing 300 mm freeboard. The FoS 5 model stores 218.735 m³ in that basin, exceeding the freeboard-compliant volume by approximately 103 m³. The FoS 5 model therefore does not show a comfortably compliant system. It shows the basin being used beyond its freeboard allowance and being flagged as Flood Risk.

The calculation package therefore does not appear to demonstrate a robust whole-site drainage strategy. To the author, it demonstrates a system operating at the edge of its modelled capacity, dependent upon SA1 becoming virtually full, the overflow basin being used as contained exceedance storage, the permeable paving acting as linked storage / conveyance, and parts of the pipe network operating under surcharge. The Council ought not to treat this as evidence that SA1 can reliably cater for the entire site at FoS 1.5.

The drainage calculations presented with this application are based on an area of 846.5m² under SA1 through which the water will infiltrate, and a storage depth above that of 2.05m at 30% voids, giving a volume of 520.6 m³.

The problem with this design which appears to have been overlooked, is that the construction detail of SA1 in drawing number 21-254-502 shows an inspection chamber at each end. This results in a loss of infiltration area and storage volume. Given the stated dimensions of the chambers, internal diameter of 1200mm and minimum of 150mm concrete surround, both the area and the volume need reducing by the space taken up by the chambers. Allowing conservatively for 80 mm chamber wall thickness gives an effective external diameter of approximately 1.66 m as a minimum.

Consequently, the infiltration area needs reducing by 4.328 m² and the storage volume by 2.662 m³.

In short, the calculations ought to be based on an area of 842.172 m² and the storage of SA1 ought to be 517.936 m³.

With an effective infiltration area of 842.172 m², an adopted infiltration rate of 8.13×10^{-6} m/s, and a factor of safety of 1.5, SA1 can drain at:

$$8.13 \times 10^{-6} \times 842.172 \div 1.5 = 0.004566 \text{ m}^3/\text{s}$$

This is equivalent to:

$$0.004566 \times 3600 = 16.43 \text{ m}^3/\text{hr}$$

If the applicant's model has not accounted for the inspection chambers, it overstates both the area available for infiltration and the storage volume within SA1. Using these corrected figures, the following calculations use the same benchmark outside-SA1 storage from the Odyssey 480-min critical event.

Using the designed FoS 1.5

Duration (hours)	Rainfall depth (mm)	SA1 infiltration rate m3/h	Rainfall volume over 0.824ha	FoS infiltration (m3)	Storage needed (m3)	SA1 storage capacity (m3)	Shortfall	Outside- SA1 storage ¹	Surplus/Deficit
6	101.01	16.432	832.322	98.592	733.730	517.936	-215.794	217.224	1.430
12	115.42	16.432	951.061	197.184	753.877	517.936	-235.941	217.224	-18.717
24	130.18	16.432	1072.683	394.368	678.315	517.936	-160.379	217.224	56.845

¹ Outside-SA1 storage used in Odyssey's 480-min critical run.

Using the “sense check” FoS 5.0

Duration (hours)	Rainfall depth (mm)	SA1 infiltration rate m3/h	Rainfall volume over 0.824ha	FoS infiltration (m3)	Storage needed (m3)	SA1 storage capacity (m3)	Shortfall	Outside- SA1 storage ²	Surplus/Deficit
6	101.01	4.930	832.322	29.5776	802.745	517.936	-284.809	217.224	-67.585
12	115.42	4.930	951.061	59.1552	891.906	517.936	-373.970	217.224	-156.746
24	130.18	4.930	1072.683	118.31	954.373	517.936	-436.437	217.224	-219.213

² Outside-SA1 storage used in Odyssey’s 480-min critical run.

These tables show

- Against Odyssey's own 480-minute outside-SA1 storage benchmark, FoS 1.5 is borderline for the 6-hour storm and fails the 12-hour storm duration.
- The FoS 5.0 given by the applicant as a sense check actually fails all three storm durations.

The above tables continue to credit the outside-SA1 storage used in Odyssey's 480-minute critical run. However, for the reasons set out above in relation to permeable paving, there is a further sensitivity which ought to be considered.

Odyssey's own 480-minute critical run uses 217.224 m³ of storage outside SA1. However, that figure includes 159.484 m³ within the permeable paving. If permeable paving cannot be relied upon as dependable long-term storage because of unresolved maintenance, siltation, blockage or hydraulic-connectivity concerns, then the available outside-SA1 storage reduces to approximately:

$$217.224 - 159.484 = 57.740 \text{ m}^3$$

On that basis, the position changes materially:

FoS	Duration	Outside-SA1 storage needed	Outside-SA1 storage excluding permeable paving	Revised surplus/deficit
1.5	6 hr	215.794 m ³	57.740 m ³	-158.054 m³
1.5	12 hr	235.941 m ³	57.740 m ³	-178.201 m³
1.5	24 hr	160.379 m ³	57.740 m ³	-102.639 m³
5.0	6 hr	284.809 m ³	57.740 m ³	-227.069 m³
5.0	12 hr	373.970 m ³	57.740 m ³	-316.230 m³
5.0	24 hr	436.437 m ³	57.740 m ³	-378.697 m³

This sensitivity check is significant. It shows that, if permeable paving is not treated as dependable long-term storage, the FoS 1.5 case no longer merely appears borderline; it fails the 6-hour, 12-hour and 24-hour storm durations by substantial margins. The FoS 5.0 sense check is worse again.

This reinforces the concern that permeable paving cannot rationally be discounted where its infiltration function is inconvenient, but credited where its storage volume is needed to support the hydraulic model. If the applicant wishes to rely on that storage volume for the lifetime of the development, the applicant ought to provide clear evidence that the permeable paving is properly constructed, maintainable and hydraulically connected, and that its effective storage volume will remain available in perpetuity.

This new proposal has done nothing to allay the author's concerns as to the long-term sustainability of this design.

The 6-hour storm at FoS 1.5 appears to only just pass when permeable paving is credited as dependable storage, and even then the calculation assumes that SA1 is constructed perfectly as per the drawings. It is already known from the Inspector's report at the Enforcement Notice hearing that the current SA1 contains anthropogenic material, reducing its effectiveness, not to mention the building rubble encountered when the test holes were dug. There is nothing in the use of FoS 1.5 which accounts for construction tolerances, silting, or degradation of SA1 itself.

Putting this in real terms, a reduction in effective SA1 capacity of just 0.28% would remove the 1.430 m³ surplus for the 6-hour storm where permeable paving is credited. If, for the reasons given above, permeable paving is excluded altogether as dependable long-term storage, the position is materially worse: the FoS 1.5 case fails the 6-hour, 12-hour and 24-hour storm durations by approximately 158.054 m³, 178.201 m³ and 102.639 m³ respectively.

The author does not regard this as a sustainable proposition, and it is the residents who would ultimately be responsible for future rectification of a failed system.