

**To: Byron Shire Council  
Re: DA 10.2021.114.1  
FED SHEDS**

**Lot 10, DP 790630  
467 Federal Drive  
Federal NSW 2480**

**Submission to Byron  
Shire Council**

**September 2022**

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## **FCCSG Submission to Byron Shire Council**

To the General Manager, Byron Shire Council

### **RE: DA 10.21.114.1 'FED SHEDS' at 467 Federal Drive, Federal.**

The Federal Community Centre Steering Group (FCCSG), has been formed with representatives from the following four key groups:

- Federal Community Centre
- Federal Masterplan Steering Committee
- Federal School of Arts Association Inc (FSAAI), Jasper Corner facility
- Coachwood Court and nearby residents' group

We are unanimously in support of smart, thoughtful development in Federal, and are pragmatic about the development and zoning of this site. However, we have serious concerns about several elements of this proposed DA. We regard the proposal as overdevelopment of this un-serviced site, in a prominent and sensitive location in the village.

In an email of 26th August, Chris Larkin, Council's Manager Sustainable Development, said: "If you have further points to raise in terms of Council's Assessment, please send a further written submission in to enable staff to review and consider, and provide comment back to the Council meeting in October". This submission is our response, containing an overview of our main concerns, and detailed appendices. Also attached is a letter sent to Gavin Elterman on 23/08/2022 outlining our concerns and proposing recommendations.

We have engaged with the developer as suggested by Councillors and additionally have commissioned independent reviews of some technical aspects of the application and Council's processes, at our own expense. We continue to hold concerns and have included expanded reports on these in this submission.

We also hold serious concerns about Council's process. Through questioning of staff we discovered important documents had not been uploaded to the DA portal, thus were not available for Councillors or the community to review when considering the DA or the staff's recommendation. This procedural failure led to the community briefing its consultant reviewers with outdated information, resulting in added expense, time wasted and re-briefing required.

We believe this submission should play a role in convincing staff to change its recommendation to Council on this DA. Most importantly, our priority statement is that given the size and impacts of this development, it is not appropriate for staff to recommend approval of the development while only including acceptance of the unorthodox wastewater treatment system as a condition of consent. Our strong preference is that the suitability of this element be proven sufficiently to deliver confidence to both the professionals assessing it, and the community, before Councillors approve this development, or before any recommendation to approve be made. This is critical to the success of the development.

Thank you for your consideration of our concerns and questions. We look forward to your response and strongly request that in light of the above, staff rescind their recommendation for approval of this DA in its current form.

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- Appendix 2A. Independent peer review of the OSMS (Attached)
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- Appendix 7. Fed Sheds Footprint Study and Fed Sheds Section Study

## **1. Concerns and questions regarding the Onsite sewerage management system (OSMS)**

[Refer to Appendix 1 for full report, details and analysis and Appendix 2 A&B Independent peer reviews of the OSMS](#)

Detailed below are concerns that we have with the proposed OSMS. All the evidence suggests that it is a high-risk system, with no reserve LAA in place, making it unsuitable on an un-serviced site, for a development this large, with industrial usage, in a residential setting.

The main issues are:

1. The proposal is non-compliant with Australian Standards, NSW regulations and Byron Shire Council guidelines. No system like this - subsurface irrigation area sealed and covered by concrete - is known to have been installed or approved in NSW or covered in any NSW or Byron Shire Council guidelines or regulations. Both authorities require subsurface irrigation (evapotranspiration) in a land application area that is vegetated, and reserve areas to be set aside.
2. The OSMS is not peer reviewed as the peer reviewer Whitehead was involved in the design from the start. Effectively, no arms-length peer review was submitted with the OSMS proposal– as disclosed by Dylan Brooks in the workshop with the developer.

Dylan Brooks: Transcript from the mediated meeting with the developer.

*“So I rang Joe Whitehead and said ‘I might be getting involved with this, what do you think?’. The nature of the conversation was ‘This has been done elsewhere Dylan, have a go at it and we’ll review it’. So I basically relied on his expertise and his support as well to keep pushing ahead with it” ... “So I’m relying then on Joe Whitehead’s ‘no, we’ve done this before’.” ... “me relying on Joe saying this has actually been done with waste water. So I myself don’t have personal experience in doing this. I’ve been guided by Joe to say. He’s done it on X Y Z property and it works. That’s all I can say” See references In Appendix 1 for full transcript*

The OSMS and the peer review are based on ‘existing site conditions’ or ‘site constraints’ to justify the approach, while it is not site related nor a constraint, as it is only due to the overcrowding of the site with building and built-up areas. Removing one building would remove those ‘constraints’ and ‘conditions’.

3. Proposed OEM’s don’t support the application:
  - a. Taylex, the proposed OEM for the AWTs have “never encountered this type of application” referring to the application of their WW sub-surface under a sealed carpark and “don’t know if it is feasible”. The accreditation of the Taylex AWTs is also only for single domestic premises and thus, not applicable here.
  - b. Ausdrain, the supplier of the drainage cells, have not heard of their 50mm cells being installed in four layers or contained on top and sides by concrete.



- c. Watercore, the proposed blackwater treatment OEM is closing down and does not build the example MBR. They highlight the need for on-site personnel for daily inspection and frequent membrane cleaning as small MBRs need as much operator attention as large plants as well as its costs (>\$75k).
4. The OSMS treatment system is only conceptual with no assertion guarantee that it will work and all responsibility pushed to Council and Section 68 approval. The alternative MBR proposal All details (MBR, membranes) show that it is not thought through or applicable. MBR (and other membrane processes) will have sludge removal, noise, odour, operational, management and other undisclosed issues. DAF is not suitable for grey water as it removes only solids (predominantly grease, oil and fat) and is a separation device without biological treatment.
5. Soil testing indicating soil permeability testing provided is unreliable and not based on state of the art practise. Three of the four samples are out of range - not deep enough when excavation of the site for the carpark is taken into account. (1, 2 and 3m deep samples, so I don't agree) The unsuitability of the approach is confirmed verbally by Council Staff (during the stormwater audit)
6. The Byron OSMS Design Model is not applicable. BSC explicitly says that this model is 'for household design, not commercial designs'. Dr Anthony McCardell (SCU), originator of the models for both Lismore and Byron Councils confirms this. The model is designed allowing for **total** nitrogen (TN) uptake in the root system of the LAA and thus, is not applicable here.
7. The developer has been asked to provide examples of these newly introduced industrial systems to prove their suitability for this site first 11<sup>th</sup> Aug 2022 [DB1].
8. **Leading experts in the field from both, industry (leading wastewater and environmental health consultants) and academia (UQ & SCU), conclude that the proposed approach is too risky. Evapotranspiration is recommended as compliant and safe method while also further evaluation is essential with methods, technologies and designs used partly not appropriate or applicable, including Ian Law (Consultant), Prof. Jurg Keller (UQ), Taïsa Baars (Environmental Health Scientist) and Dr. Tony McCardell (SCU)**

**Appendix 2A and 2B, independent peer reviews, contracted by FCCSG lists all the risk factors and concludes that the sewage management proposal is too high risk.**

## **2. Concerns and questions regarding the Stormwater Plan**

[Refer to Appendix 3 for full stormwater report](#)

### **Major Stormwater Concerns**

1. The Hydraulic Impact Assessment which has been undertaken on behalf of the developer is optimistic and fails to consider the range of design flood events which is required to assess the adverse impact caused to downstream adjacent/nearby properties as a direct result of the development.
2. The average rainfall depth of 1,563 mm which was quoted in the report was incorrect and was based on a rain gauge/s in Alstonville, which is ~20 km away and receives significantly less rainfall than Federal. Since 2009, Federal has received an annual average of 1,960 mm per year (> 25% more).
3. By not adequately considering longer duration storm events the SMP has underestimated the most likely key source of flooding. Due to the large development footprint and increase in effective impervious area, increased rainfall depths from longer duration events will likely produce significant excess volumes of runoff which will impact downstream residents (~ 377m<sup>3</sup> to 740m<sup>3</sup> for a 1% AEP 72hr event as an example). It is likely that during large events the ability for the proposed Rain Garden / Detention Basin to discharge through the reinforced concrete pipe RCP as described will be compromised. Rain Garden Vegetation / debris can easily block the outlet pipe and/or orifice pipe. Given that the 2 m wide emergency weir is at a lower level to the Pit Crest, blockage of the outlet structure will result in all excess runoff discharging as overland flow from the southern corner off the site through downstream properties, adversely impacting the flooding through these blocks. Based on the above runoff volumes, the proposed detention volume of 39 m<sup>3</sup> seems minor and does not satisfy council requirements to cause no adverse flooding impacts to surrounding residents/properties.

This is of particular concern with it's potential impact on Stoney Creek. Impacts on the ecology of Stoney Creek and on resident platypus and threatened frog species have not been adequately considered. Below is a link to a video taken by a Coachwood Court resident of active platypus on their property last week. This pond is negatively affected already by storm water run off.

[https://www.youtube.com/watch?v=Uok7KI\\_fiao](https://www.youtube.com/watch?v=Uok7KI_fiao)

### **Recommendations re Stormwater**

1. More work needs to be done by the developer to demonstrate that the development is not causing adverse impacts. Showing evidence (with no background to what calcs/events have been considered) that the peak flow rate has been reduced to pre-development conditions does not do this. Flood modelling needs to be undertaken for the full suite of rainfall durations (and temporal patterns) to assess the impact of the development.

2. An assessment of the full suite of events is required to assess the hydraulic impact of the proposed development, in line with the AR&R 2019 guidelines (Ball *et. al.* 2019). This should include hydraulic modelling to determine flowpaths from the site and better identify the areas/properties which suffer adverse impacts as a result of the flooding. Consideration of Storm Durations of 12, 24, 36, 48, 72, 96 and 168 hours is required as a minimum.
3. The MUSIC Stormwater Quality assessment (or any assessment that relied on the Alstonville rainfall data) should be redone using the increased average annual rainfall volume available for Federal.
4. Adequacy of the proposed detention basin needs to be established for the longer storm events. This should also include a precautionary risk assessment of the influence of pipe blockage and associated detention volume requirements. A detailed stormwater infrastructure maintenance schedule needs to draft as part of the SMP to mitigate risks of operational failure.

### **3. Concerns and questions regarding the risk with liquid trade waste**

With uncertainties on separation of liquid trade waste and wastewater from sinks in the units, additional truck movements and difficulty to police tenants' responsibility for quality and quantity of liquid trade waste combined with the developer's disclosed tenants or usages being all '*dry*', we question the efficacy of the proposed system to deal with trade waste adequately?

#### **4. Concerns with the DA documentation and Council's recommendation to approve the proposal**

The community is concerned about the quality of the documentation that was submitted with the development application. There was no coordination or clear cross-referencing between the planner's Statement of Environmental Effects, the various supporting reports and the drawings. It is generally the planner's responsibility to make sure this confusion does not occur.

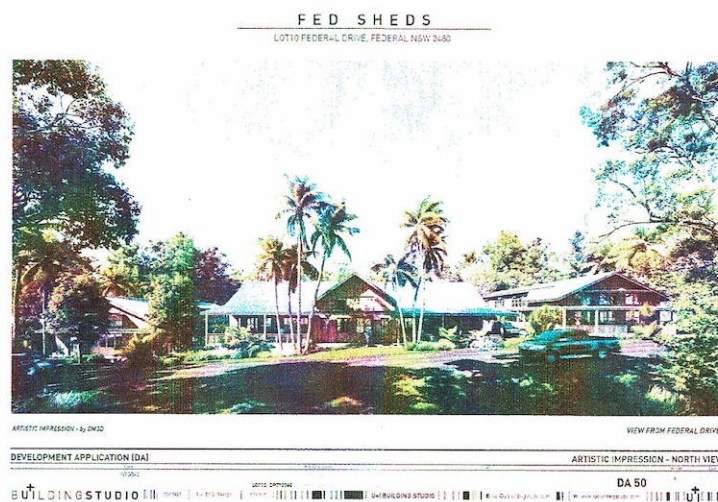
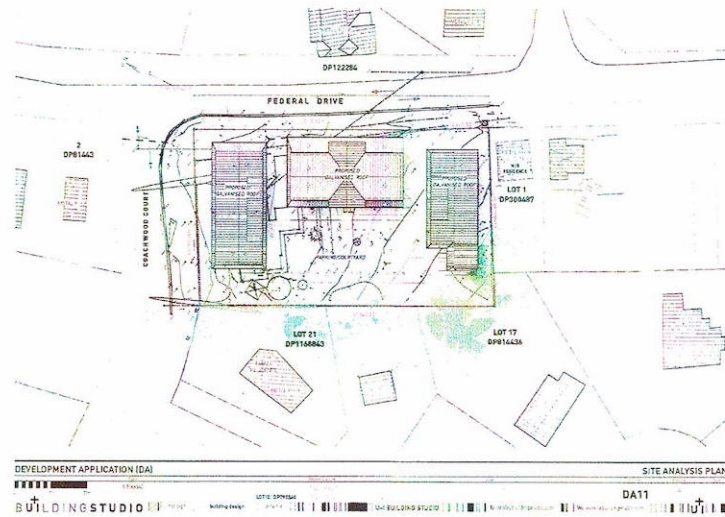
As a result, the recommendation to approve the proposal appears to have 'cherry-picked' wording to support the proponent's assertions. For instance, the wording in the Heritage Impact Assessment (HIA):

*"The HIA provides a comprehensive assessment for the context and setting of the proposed development, incorporates a similar setting and or site planning (sic) as the heritage items opposite the site. The proposed three low gabled buildings are similar in form, materiality and are widely spaced on the site to provide a similar setting to the heritage items."*  
(Page 41 of the Statement of Environmental Effects.)

The drawing DA11 (see below) shows the roof plans of all the surrounding cottages and the heritage buildings, relative to the size of the roof plans of the proposed buildings. It also makes clear how close the proposed buildings are to each other. Drawing DA 50 (see below), the 'Artistic Impression, North View' is taken from an eye level that the buildings would never be seen from. A truthful rendering would show how the high open gables of the development would loom over the street.

This description in the HIA contradicts the reality of the bulk and scale of the proposal in comparison to the actual streetscape, but this description was not challenged by Council staff that were assessing the application. The community are concerned that Council staff did not take notice of the valid objections that were raised in the submissions against the proposal. The Staff Report 13.11 in the August 11th Agenda has five pages commenting on the submissions, all of which are dismissed using language from the reporting attached to the Development application.

## FCCSG Submission to Byron Shire Council



**Above are Drawings DA11 and DA50**

## **5. Concerns with the Heritage Report and Council's heritage advisor**

### **Weir Phillips Heritage report submitted with the DA**

1. The Heritage consultant makes no mention of the size and character of the existing cottages on the same side of the street as the proposal.
2. 'Low intensity of the proposed design'. The proposed design could not be described as low intensity unless compared to buildings in an urban industrial development. The building footprints cover approximately 1768 square metres of the 4003 square metre site. The scale of the footprints of the surrounding buildings is shown on site plans attached to both the application and the planner's recommendation for approval.
3. 'Incorporates the streetscape'. The proposal completely dominates the streetscape. It does not incorporate it. The ridgelines of the proposed buildings are more than twice as high as the cottages on Albert Street.
4. 'the three low gabled buildings...widely spaced...' Parts of the proposed ridgelines are nine metres above natural ground. The walls are four metres high above the floor and up to two metres high from the natural ground to the floor. This cannot be described as 'low'. The single lane three-metre-wide driveways are the only factor affecting the spacing of the buildings.
5. 'The proposal...consists of three single storey buildings.' The floor plans show a first floor in each building, three metres above the ground floors.
6. The reference to 'wide verandas' is not demonstrated on the drawings, except at the entrance to Building B. The verandas are almost all 1.6 metre walkways just wide enough for people to comfortably pass each other and not wide enough to deliver equipment, products or shop-fitting materials through the relatively narrow doorways unsuited to light industrial use.

### **Heritage advisor to the Council planner**

1. The Height, Scale, and resulting Bulk of the proposal relative to the existing buildings was not sufficiently demonstrated on the drawings submitted for approval. These only show the relationship between the height of the lowest building (C) and the highest building on Jasper Corner - the Church. The

photographs, using a wide-angle lens are not a true view of the street. This appears to have misled the Heritage consultant and the Heritage advisor who recommended consent.

2. The advisor endorses the findings of the Weir Phillips Heritage Impact Assessment that ignored the 100-year history of the buildings on Jasper Corner.
3. A drawing showing the height of Building B in relation to the Hall is attached. The photograph shows the height of the ridgelines of Buildings A and B relative to the footpath. Any visitor to the site can use the height of the electricity cables at the power pole as a guide to verify this.
4. Council's heritage advisor considers the development 'sympathetic to the context' and 'not likely to have any adverse impacts upon the setting of the Federal School of Arts and the ...Church.' It does not take a great effort of imagination to know that the Bulk and Scale of the development will have an adverse impact not only on these buildings, but all the surrounding cottages which make up the context of the site.
5. The consultant and the advisor and the heritage committee have misread the value of the character of Albert Street. The buildings are unpretentious but not unloved. It is the community's intention to engage in the process that will recognise the heritage value of the street through the Masterplan process.



## **6. Concerns over impact on the community amenity - the Hall and Church at Jasper Corner**

See Appendix 7. For Fed Sheds Footprint Study and Fed Sheds Section Study

1. **The Jasper Corner facilities** The Hall and the Church buildings directly opposite the proposed development are owned and operated by the community, for the community. These buildings are the heart of Federal and are managed by the Federal School of Arts Association Inc. (FSAAI) Committee. These facilities are extensively used by the community on an almost daily basis for multiple purposes as documented in the initial submission from the FSAAI. These include large events such as markets, weddings and film nights, and smaller activities such as yoga, pilates and the Hinterland choir.
2. **Noise and parking** We strongly believe that a Light Industrial use as proposed is clearly in conflict with our community use directly opposite. Noise from Light Industrial uses, parking and traffic issues generated and the bulk and scale of the proposed development will all serve to dramatically affect the amenity of the Federal Hall and Church.
3. **Size and scale comparison** Every proposed building on Lot 10 has a larger footprint than either the Church or the Hall and the total building footprint is more than three times the combined footprints of the Hall and the Church.

The total building footprint on Jasper Corner is 447 sq.m compared with 1768 sq.m on Lot 10. Jasper Corner site is approximately 2625 sq.m, while Lot 10 is 4000 sq.m.

The percentage of the site covered by buildings at Jasper Corner is 17%. The percentage of the site covered by buildings with the Fed Sheds proposal would be 44.2%. Refer to the attached drawing in Appendix 7.

We note that a mandated floor space ratio is not required in the RU5 zone, but when all the hard surfaces on Lot 10 are complete, and only minimal spaces available for landscaping, the visual impact on the relatively small community buildings will be profound.

### **4. Traffic impacts**

If the turning 'pockets' indicated in the development application are required, this will have a massive impact on availability of parking in front of the Jasper Corner facilities – the application indicates that approximately 100 metres of street front currently used for parking, will be lost.

There will be additional loss of parking spaces due to the addition of a 2<sup>nd</sup> driveway, with associated restrictions on parking in the immediate area.

## **FCCSG Submission to Byron Shire Council**

Given the high usage of the Jasper Corner facilities, and the existing pressures on parking in the village including for use of the Jasper Corner facilities, it is unacceptable to approve a development that reduces available parking.

The Jasper Corner managers are asking Council to confirm that there is no need for the turning pockets that were proposed in the Traffic Impact Assessment due to the increase in traffic volumes (not just turning circles of trucks), in accordance with Austroads *Guide to Road Design Part 4A (2017)*?

## **7. Concerns with exacerbation of traffic volumes and parking issues in Federal as a result of this DA.**

[Refer to Appendix 4 for a full report on the findings of the Masterplan in relation to traffic and parking.](#)

There are considerable concerns regarding the impact of this development proposal on traffic volumes and parking in Federal.

1. The Masterplan has clearly identified through extensive research and community consultation, that Federal currently has safety issues in relation to traffic and unresolved issues in relations to parking. The Council has itself commissioned a report considering these findings in a design for the main street aimed at improving safety and amenity. There is no congruency between the parking provisions of the Main Street design funded in the Master Plan process and the sketch forwarded to us from Council.
2. Has Council considered that there will be an increase in traffic associated both with the construction and ongoing use of the development, exacerbating existing congestion and safety problems in the main street? We query the developer's assessment of the impact and discuss this in detail in appendix 4.
3. In light of parking concerns already in Federal and particularly in light of this DA's position opposite the well-used community amenity, the hall and church, and being on the corner of a residential street that school buses and parents use for pick up and drop off, we strongly feel that all parking required for staff and visitors needs to be available onsite.
4. We are concerned by the suggestion that the developer made during council planning meeting that spaces in the proposal could be subdivided into smaller units of as little as 36 sq.m. could not be approvable since additional parking spaces would have to be provided. Usage of this development seems to have changing goal posts from the developer. We are concerned that this will ultimately come back on community to live with and police.
5. The on-site parking would be of more benefit to the development and the community if it were to be immediately visible and accessed from the street, not at the back of the site. This will mean it is clearly visible and visitors are not using already stretched community space to park
6. The community needs assurance that this development will not impact on already pressured parking availability for the Hall and Church, the surrounding residential areas and the village in general. What assurance will Council give the community that this is the case?

**8. The context of the Masterplan in this DA recommendation.**  
**Community led planning and its relationship with the DCP and LEP and the fear of litigation**

[Refer to Appendix 5 for full report](#)

We argue that the Council should not approve this DA based on the fear that the proponent will take the matter to the Land and Environment Court for determination. Further we do not believe that the outcome of any potential Land and Environment Court action is a clear cut as some Councillors have suggested and therefore the fear of court action should not drive decision making.

## **9. Concerns and questions regarding Council's legal obligations requirements**

[Refer to Appendix 6 for full report regarding Fed Sheds Cost of Works Estimate](#)

1. **Full Disclosure:** Why was the complete DA with all up to date documents not available to the public during the community consultation process? This brings into question the validity of Council's action in relation to the assessment of this DA. Our community group engaged experts to investigate elements of this proposal at great expense to the community in terms of voluntary time and money based on what turned out to be irrelevant documents.
2. **Cost of Works:** We have concerns regarding the submitted 'Cost of Works' document. Why did staff not request a review of this document from the developer, after checking the claimed GFA figures, and an update considering the commonly known sharp increase in building costs since the DA was submitted to Council, particularly considering the original estimate being very close to the 0.5% developer contribution threshold?
3. **The recommendation for approval,** agenda item 13.11 on the August 11 agenda pages 225 to 229 says it all in the first item outlining 'Submission Objections' that lists six serious concerns in relation to 'perceived degradation of intrinsic village value' and does not support one of them - all the 'Comments' support the developer even denying that the buildings are two storey and that having mezzanine floors is somehow commonplace in Federal and doesn't amount to a second storey.
4. **Community consultation and submissions:** There was no analysis done by staff on the 'community' consultation done by the developer using Survey Monkey before the DA was submitted. This was a not an impartial survey - most of the respondents were not locals and gave no reasons for supporting the proposal. Yet it was quoted by Council staff to support their recommendation for approval at the August meeting. The figures relating to the valid objections that were made during the public exhibition period in March 2021 are not even reported in the planner's recommendation for approval. Page 228 under 'Confidence in Community Consultation' column gives no importance to the objectors, only accuses these respondents of complaining that the developer's Survey Monkey 'consultation' was 'not an accurate reflection of the consultation/community perception'. This would seem to infer that the community's input was of little value to the assessment process. As was the case. The concerns of most submissions against the DA in its current form were dismissed.

5. **Coachwood Court:** The serious concerns of the Coachwood Court community regarding stormwater and flooding that were raised in their submissions were dealt with by staff who did not respond to their request for a site meeting while the assessment was in process.
6. **Site meeting protocol:** At the onsite meeting on the morning of August 11th, it was inappropriate from the community's point of view that the developer had clear monopolisation of the process, and rather than the community being invited to the attend the onsite meeting, they were made out to be a nuisance by some Councillors for being present and for making contact via email in the week prior. This gives a perception to community, correct or incorrect, that the developer has direct access to Councillors and community members don't.
7. **Developer's credentials:** What investigation has been done by council into the developer's credentials, initial internet searches present little information on successfully completed projects?
8. **Shifting narrative:** Is Council concerned about the developer's shifting narrative in relation to usage? The developer appeared to change intended usage during the August planning meeting to suit the questions Councillors were asking regarding usage. He mentioned that in fact he was going to partition the units into 6x6m units, this is not in the DA of course changes the amount of people that will be onsite and has obvious flow on effects in terms of OSMS and parking. Will Council be investigating this?
9. **Those Easements:** Numerous households in Coachwood Court have been approached by the developer and told different stories regarding usage, this has been used to secure easement through their properties, has Council approached residents to investigate?

**10. Miscellaneous concerns regarding General questions and concerns regarding Council's approach to planning and the DA**

1. THE DA stipulates that there are no air conditioners, with windows closed to limit noise. We question the feasibility of this considering the subtropical temperatures and light industrial usage?
2. Why was the Lizray Rd Industrial Zoned land removed from the DCP by staff, because of foreseen issues with using unserviced land as Industrial and yet Fed Sheds which has the same issues recommended for approval by staff?
3. What are Byron Shire Council doing to engage, attract and build relationships with the type of developers who will act not only in their commercial interests but also in the interest of the community? We believe it is Council's proactive role to work with the developer and community to seek good outcomes for all. In this case, when there is a significant amount of community concern regarding a DA recommendation, then surely an assessment is made that staff need to investigate and engage with community to assist to resolve? It concerns us that the onus is on the community to step up (again) and fend for ourselves, in an environment where the developer may have all the skills and resources. What happens in communities where they don't have the same level of organisation or skills, and a DA of this size, with this potential long-term impact on a place, and with this level of yet seemingly unresolved questions over its appropriateness is proposed? We are fortunate to have architects, water experts, long term community volunteers and developers in our community, whom we have heavily relied on to understand the detail and process, and yet it is true that we are still just community members, volunteers, attempting to negotiate within a developers' framework.
4. **Consultation workshop:** Council staff seemed to think that the community consultation workshop was a matter of dispute between community and developer and not much to do with Council. It seems to us that Council is not only the third party in the DA process but also, precisely because of their role as decision makers, that staff's input and advice would have been valuable for both parties present at the workshop. Perhaps not surprisingly the developer's own planner commented at the meeting that it was a shame council staff weren't present.

## **APPENDICES**

### **Appendix 1. FCCSG's Onsite sewerage management system (OSMS) report**

- 1. The proposed system is non-compliant with NSW regulations & BSC guidelines.** [BSC1-3 & NSW1-2] Both authorities require subsurface irrigation (evapotranspiration) in a land application area that is vegetated, and reserve areas to be set aside. The same applies for the relevant Australian Standard AS/NZS 1547:2012 [AS1].

[NSW1]: 'Designing-and-Installing-On-Site-Wastewater-Systems-WaterNSW-CRP-2019.pdf'

Page 197 (Publication v.2 November 2019) - with contributions by Joe Whitehead of Whitehead & Associates Environmental Consultants Pty Ltd (the developer's peer reviewer!) states "*The following factors should be considered when designing a subsurface irrigation system*":

*"Adequately vegetate the effluent irrigation areas with species suited to effluent irrigation before the irrigation system is commissioned"* [NSW1]. Appendix 7 of the 'Silver Book' (Department of Local Government, 1998) includes a list of vegetation suitable for land application areas.

[NSW2] known as the Silver Book, states that '*Total Nitrogen (TN) is supposed to be completely eliminated though plant uptake in the biologically active upper soil layers.*' and only mentions evapotranspiration but not the proposed sealed and covered land application.

[BSC1] 'Design Guidelines for On-site Sewage Management for Single Households'

*"7.3. SUB-SURFACE DRIP IRRIGATION (SDI): 'available for rapid root uptake'.*

*Thus, BSC guidelines for sub-surface irrigation all rely on vegetation and evapotranspiration.*

[BSC1] *"In essence, Byron Shire Council's philosophy for land applications areas is to make them big enough to ensure that the treated effluent will have sufficient opportunity for plants within the area to take up all of the water and all of the nutrients applied"*

AS/NZS 1547:2012 [AS1] - On-site domestic wastewater management in Section 1.2.2 states "*This standard does not cover systems for the treatment of wastewater from commercial and industrial sources, or stormwater*".

The proposed system therefore is not even covered by AS as it is commercial and using cells designed for stormwater as repositories for treated wastewater. AS considers only hydraulic loading and not TN and TP with the upper soil layer dealing with TN and TP.



- 2. The Peer review of the OSMS proposal [Peer1-2] is not independent** (disclosure by Dylan Brooks GAA [DB2]) as the reviewer was involved in the proposal itself. The revised Peer review [Peer2] is **even more non-committal** putting responsibility back to the Council and stating requirements but not outcomes.

All referenced documents used in the Peer review [Peer2] (Australian Standards, NSW guidelines and BSC guidelines) state and require vegetated land application areas for evapotranspiration.

The Peer reviews [Peer1 &2] considers the methods but not the conclusions and outcomes. It does not provide any assurance that the systems work. It even puts this responsibility back to BSC: It requests '*Careful selection of a treatment system which achieves high level of nutrient removal will minimise nutrient loads on the proposed land application area. Council should identify appropriate conditions for the treatment system*'. [Peer2 Page 2 Point 1.]

The peer review [Peer2] highlights that emergency response to deal with predictable risk factors is not defined. Shut down site for months if the application falls and use the pump-out option while they tear up the concrete and replace the AWTs.

[Peer2] Highlights that it is "*not clear if the MBR fits in the allocated space*" – this demonstrates that the OSMS is a concept only rather than a proven system or properly designed.

Furthermore, the peer review is limited in credibility as it:

- Did not pick up error with reference to toilets nearby [Peer 2 Page ] -actually a single public toilet 100 metres away in the Park.
- Did not pick up error missing #1a Coachwood Court [Peer 2 Page 3 Point 5.].
- States wrongly that '*nutrients are not typically considered limiting in adsorption systems*' [Peer2 Page 6] as this contradicts Byron Shire Councils [BSC1] guidelines for LAAs.
- The soils have NOT been "appropriately assessed". The Ksat values are unreliable resulting in uncertain size requirements for the LAA.
- Warns of odours due to pumping while ignoring this for a dissolved air flotation system that, in contrast is open-air, has bubbles bursting and releasing odours.
- Does not notice that Appendix G & H have a changed title while the content is missing.
- Peer reviewer did not pick up the error with Ksat value (see below).

Considering the non-compliant, 'innovative and novel' and unproven system that has been put forward, which is also clear from council's letter [BSC4 from 30 Aug 21] what assurance or independent assessment did Council have to ensure that

this system would be risk free for this site, particularly given it is an un-serviced site in this residential village location?

We understand an independent review by HMC Environmental Consulting Pty Ltd is underway, which we look forward to receiving.

### **3. Proposed OEM's don't support the application:**

- A. Taylex, the proposed OEM for the AWTs have "never encountered this type of application" referring to the application of their WW sub-surface under a sealed carpark and "don't know if it is feasible". The accreditation of the Taylex AWTs is also only for single domestic premises and thus, not certified for the applicable here and would not comply.

This is an extract of an email exchange that community member Goetz Bickert [GB], had with Taylex's Technical Manager Wastewater & Stormwater, Henry Hape [Taylex]. A full transcript can be provided:

Inquiry [GB]: Taylex ABS AWTs system with following land application (draining the produced water from your ABS AWTs) underground (not sure if you call it irrigation as nothing is irrigated) through drainage cells (Ausgrid or similar) and having the complete land application area sealed (sides and top) to prevent stormwater ingress and having a concrete slab on top (to be used for car park).

Answer [Taylex]: The Taylex ABS systems typically utilises land-based applications incl. Subsurface Irrigation, covered in the Designing and Installing On Site Wastewater Systems NSW.

Now whether that suits your proposal is not up for us to decide. You will need to consider all parameters in your design, Factor in an installation and maintenance contract to ensure the system is operating accordingly, than submit to Council for approval.

Clarification [GB]: We were thinking about seal and cover the land application area (subsurface irrigation sealed to the surface and covered by concrete slab) as I understand this is done in QLD. Thus, no evapo-transpiration and no vegetation of the effluent irrigation areas. Is this feasible? Or is your AWTs only suitable for subsurface irrigation when the land application area is covered by plants?

Answer [TAYLEX]: To be completely honest, we don't know if this is feasible as we have never encountered this type of application. We can only recommend per approved subsurface irrigation systems by council.

- B. Ausdrain, the supplier of the drainage cells, have not heard of their 50mm cells being installed in four layers or contained on top and sides by concrete.

The developer has proposed using an Ausdrain 50mm drainage cell in layers under the concrete slab. These cells would be a receptacle for the wastewater until it leaches into the soil.

After contacting Ausdrain and reviewing their proposed product specification, it is apparent that Ausdrain are not aware of, nor would they recommend using their product for a waste-water solution as proposed by the developer. The product is simply not design for this use.

C. Watercore, the suggested supplier of the MBR highlights the need for on-site personnel for maintenance as small MBRs need as much operator attention as large plants.

The revised plan provides 'membrane filtration' as most likely black water treatment system and provides a Watercore MBR proposal in the Appendix as example for black water treatment. The MBR is not provided any longer by Watercore as they are closing down and does not build the example MBR. They provided a budget quote for \$ 77k to supply and install.

MBR is a membrane filtration technology combined with a biological sludge treatment process. While suited for blackwater in particular for full scale communal water treatment plants, the supplier Watercore highlighted the need to have skilled personnel on site for "a bit more than daily visual inspection and checking operational parameters" and that "the membrane will need cleaning" with unknown frequency" , which similar attention requirements compared to full scale plants.

**4. OSMS treatment system is conceptual only and will be chosen and details submitted with the Section 68 application. It is only a feasibility and thus, no assertion that it will work**

[GAA3] The Updated Waste Management Report\_PAN-70196 is unspecific and non committal regarding water treatment type. It states it is "*conceptual*" and a "*feasibility assessment*" only and does not define the water treatment systems (grey and black water). Examples are given in the first missing appendixes – Taylex for greywater and now unavailable Watercore MBR for blackwater.

It states 'most likely that a membrane filtration OSMS will be utilised'. Does 'membrane filtration' mean MBRs (membrane bioreactors)?

A MBR is a large and expensive separation and treatment plant and an industrial unit. MBR produces according to [MBR1] "*faecal sludge*", that needs to be removed regularly and much more often than advanced AWTs and treated water. Its nature does not make it suitable for a small block with close neighbours due to odour (the mixed sludge tank is shown open to the atmosphere), noise (pumps running 24h), size (even unclear to the peer reviewer if it fits) and height but in particular maintenance requirements.

MBRs also have uncertain Nitrogen (N) and Phosphorus (P) removal qualities, as highlighted by Larsson & Persson (2004) [LP1]: *“5.3 Summary of conclusions From a water quality standpoint the MBR is a viable pre-treatment process to OWST, since it removes COD, ammonia and fecal coliforms good and also nitrate to some extent. When enough carbon for a high denitrification efficiency was available in the incoming wastewater the effluent quality was suitable for direct discharge to surface water. Total-P was not removed by the MBR.”*

The alternatively mentioned reverse osmosis (RO) is also a ‘membrane filtration’ method, technical clarity is missing. RO is suitable for either tap water treatment or seawater desalination and requires extensive pre-treatment and is considered totally unsuitable for blackwater (unless treated to almost tap water standards).

The alternatively mentioned DAF (dissolved air flotation) is applicable for dairy and abattoir waste water (and other waste water with grease, oil and solids) and not suitable for grey water. This demonstrates that GAA has not really thought through the duty and thus, the conclusion of the feasibility is questionable.

Costs of the concept are also extremely underrepresented in the cost estimate with < \$50k allowed for water, sewerage, drains and other services: The Taylex AWTS system is quoted at \$ 25k and the MBR at \$ 77k excl. piping and electrical, latter requiring continuous monitoring and maintenance.

loading area, pools)	τ
External services (e.g. gas, telecommunications, water, sewerage, drains, electricity to mains)	\$49,500

##### 5. Soil testing and in-situ soil permeability testing provided is unreliable and not based on state of the art practise.

Saturated Hydraulic Conductivity (Ksat) values gained through the Talsma-Hallam method as done by [GAA2] are not accurate (for permeabilities greater than  $1 \times 10^{-7}$  m/s) as stated by [GAA2] in the below ‘Table 2’ below:

Table 2: Summary of Insitu Permeability Tests

Sample Location	Depth of Hole below Surface Level (m)	Section of Tested Zone (m)	Soil Description	Permeability $K_{sat}$ (m/sec)
BH 1	1 m	0.75 – 1.15	Silty CLAY	* $6.5 \times 10^{-7}$
BH 1	2 m	1.7 – 2.1	Silty CLAY	* $5.9 \times 10^{-7}$
BH 1	3 m	2.51 – 2.86	Silty CLAY	$2.8 \times 10^{-6}$
BH 3	1 m	0.7 – 1.05	Silty CLAY	* $6.5 \times 10^{-7}$
BH 3	2 m	1.7 – 2.05	Silty CLAY	(1)

Notes: \* The type of test method adopted, 'The Talsma-Hallam permeameter, with modifications' is not usually used or accurate for permeabilities greater than  $1 \times 10^{-7}$  m/s which is typically outside the land application of wastewater treatment systems.

(1) The test results did not represent the soil profile and other test results and for this purpose this result has not been recorded in Table 2.

Ksat at FedSheds (GAA) is  $2.8 \times 10^{-6}$  to  $6.5 \times 10^{-7}$  m/s and thus, ALL values ( $2.8 \times 10^{-6}$  is also greater than  $1 \times 10^{-7}$  m/s !!!) are not accurate! See below extract from GAA.

McKenzie et al (2002) in chapter *Field Measurement of Saturated Hydraulic Conductivity Using the Well Permeameter* states that the Talsma-Hallam permeameter measurements are often one or two orders of magnitude less than determinations made with more accurate methods!

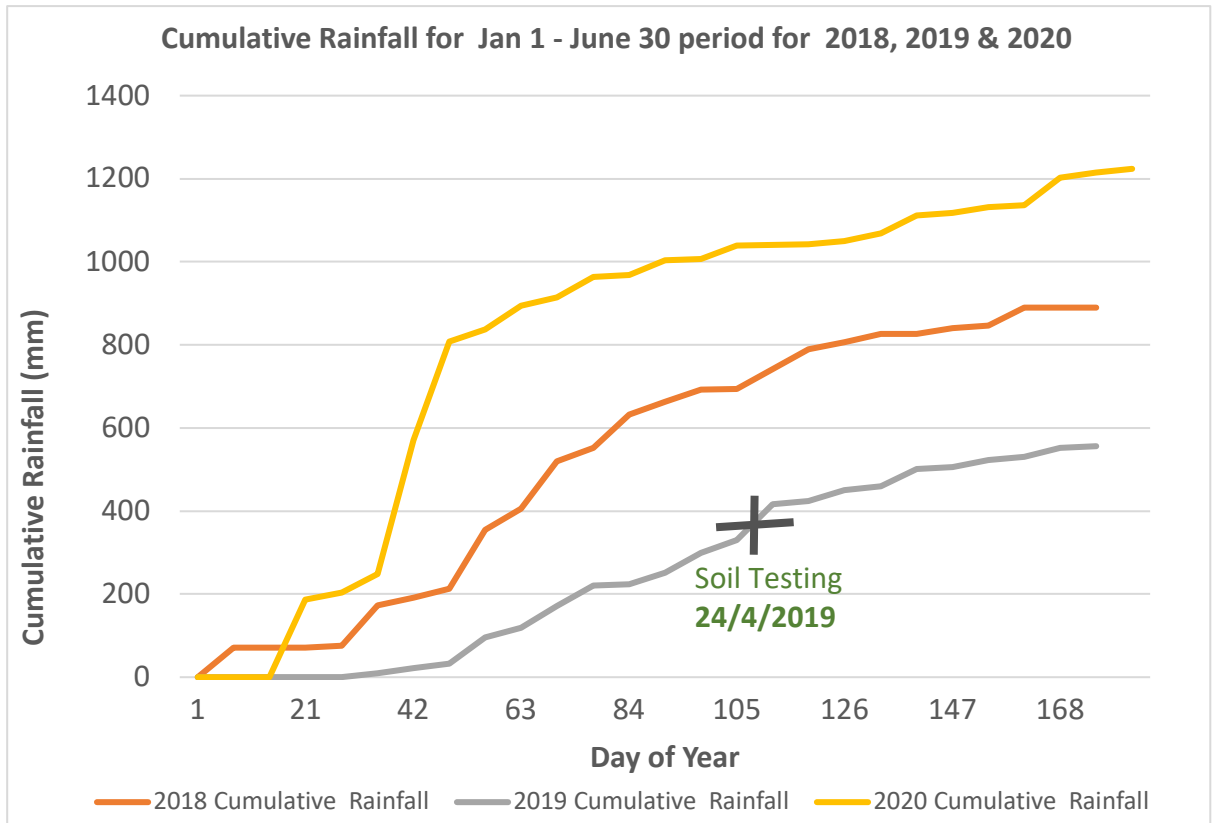
Thus, the land application area of 544 m<sup>2</sup> is not conservative, as based on above and thus, could well be a large factor too small.

While [GAA3] refers to “*demonstrate through scientific methodology ... in-situ soil permeability testing*” above recent research shows that the science used here in regards to Ksat is outdated / overhauled.

*We request BSC or the developer undertakes proper soil sampling and tests Soil Water Retention Curve - Estimation by modelling using surrogate methods SS-SING-013 (Southern Cross University Environmental Analysis Laboratory) to gain Ksat via USDA RETention Curve (RETC) software as otherwise the system would be based on inaccurate data. Accurate soil permeability testing has not been undertaken so far.*

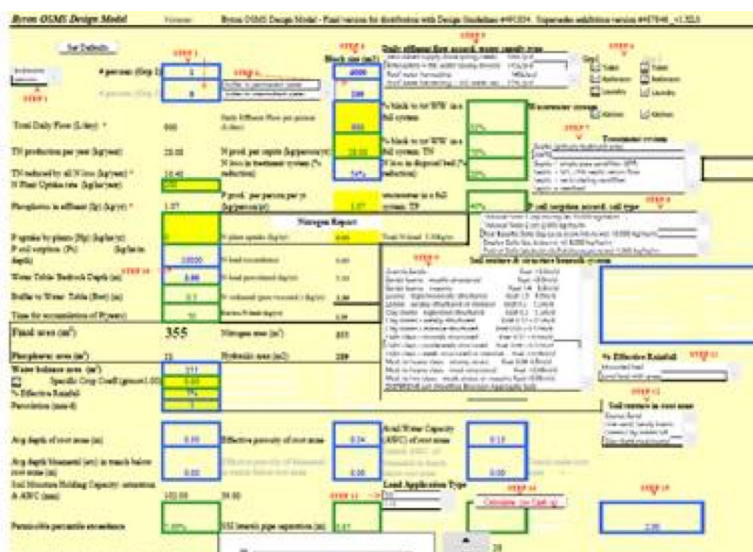
Renan Solatan (Development Engineer at BSC) advised verbally during the stormwater audit on 29/8/22 [RS1] that he believes the Talsma -Hallam method for Ksat determination is too narrowly applicable and results in inaccuracies and that a different method should be applied.

The 3m groundwater level assumed from the single-day drilling in a drought is very unreliable as rain usually is much higher as shown below (< 400mm 2019 compared to > 1000mm in 2020 and 500mm in 2019).



6. **Byron OSMS Design Model used by [GAA1&2] is not applicable**, as [BSC3] explicitly says that this model is ‘for household design, not commercial designs’. The model printout in the DA shows 1-bedroom single household. It also uses Ksat value that is thought too high while uncertain making the application area too small.

“OSMS design model for households – not for commercial use(XLSM, 1MB)”



GAA has used 0.06 – 0.12 m/d (light clays moderately structured) in the model. Talsma-Hallam method as per GAA gives (see above) 2.8E-6 to 6.5E-7 m/s range which is 0.24 – 0.05 m/d for bore-cores

3 values were  $< 0.06$  m/day so using  $< 0.06$  m/d (light clays weak structured or massive) would have been appropriate. But  $> 0.06$  m/day was used. With this, the application area would be considerably larger.

GAA changed cells that could conceivably be changed given the choices offered by selecting soil type for example (eg Light Clay moderately structured with Ksat blah blah that gives a DLR of 4mm/day), or changing the default values for claimed nitrogen loss via AWTs (eg from 20% TN removal default to 54%). Normal council oversight of models submitted would not allow some of these changes, for example having a system with 1 person creating a wastewater flow of 900L /day! (as GAA has done). This gives LAA result of N area = 355m<sup>2</sup> and H area = 240m<sup>2</sup>.

GAA also changed DLR from 4 to 5mm/day, in place of the 4mm/day that the model offers when you select soil type of "Light Clay moderately structured". This is illegitimate from the model's point of view.

GAA made changes to the N model which are entirely contrary to its environmental intentions which include significant uptake of N via plants and some N reduction in the soil through biologically mediated processes (eg denitrification). They set plant uptake to zero (because the GAA model includes no plant uptake). However, they left a 20% reduction in soil N in cell F9.

Dealing with the first change (zero N uptake) GAA overwrote cell D12 with a zero to make it look like there was no N plant uptake considered. Still, GAA left the N plant uptake value of 200 kg/ha/yr in cell B10.

GAA also changed 20% N reduction in cell F9. In a system which operates in the biologically active zone of the soil, ie near the surface, a 20% N reduction is allowed. When the system is buried under a carpark the reduction might be much less. Thus GAA's area of 355m<sup>2</sup> is misleading, yet the 355m<sup>2</sup> is the major part of the LAA area they have designed for.

## **7. Uncertainty of conceptual 'innovative' systems – [GAA2] and lack of references**

If this type of wastewater system, with a capped application area, already exists and has been installed numerous times, tested, with proven long-term reliability and longevity, in a similar soil and in a light industrial environment with a similar risk profile (ill-defined activities with potentially difficult to ensure compliance to conditions), we suggest that this system proposed could be better assessed. This is not the case though.

The developer lacks providing references of similar systems combining the drainage cells with a sealed and covered land application area for wastewater. FCC asked the developer and GAA on 11<sup>th</sup> August and 29<sup>th</sup> August without any result. If the developer could provide references, either consisting of published

performance data or name, email and location to assure those references are not only installed but also perform that would be of assistance?

**8. Detailed review and proper definition of the system is required with leading experts highlighting the risk of the proposed system**

A detailed review of the OSMS is required due to above points but also because other experienced professionals raise concerns:

**Ian Law**, for 13 years Adjunct Professor at the University of Queensland and a leading water practitioner with 7 years SE Asia Technology Director, CH2M HILL – a leading wastewater consultancy at the time and published author, recommended by Prof. Greg Leslie from UNSW provided a review which is attached (**Appendix 2A**) with following conclusion:

*“Finally, it is considered that the Concept Report underestimates the risk to long term human and environmental health by constructing the proposed system in the area identified and in the manner suggested.”*

**John Craven**, Environmental and Planning Consultant, previous Member of PIA, with decades of OSMS experiences stated:

*“Council would be negligent in their duty of care to approve this proposal before it had satisfied itself that the OSMS suggested has proven longevity and performance.”*

**Dr Antony McCardell SCU**, Co-author of Byron OSMS Design Model Associate Lecturer (2004 - 2012) and Lecturer (2013 - 2014) - Ecotechnology for Water Management at Southern Cross University reviewed the OSMS in detail and stated:

*“The OSMS model developed largely by myself for Lismore Council and adapted by Byron Shire Council is designed to include land application area for total nitrogen (TN) removal via plant uptake within the biologically active upper layers of the soil where the state of the system can be easily observed and where biological processes assist wastewater treatment, in contrast to the results provided by Greg Anderson & Associates which provide no opportunity for plant uptake and do not reflect many of the assumptions and aims of the model.”*

*“Greg Alderson Ass. applies the Byron OSMS model in ways beyond the scope and intention of the model, and which fail to properly address concerns about environmental impacts from nitrogen and phosphorus.”*

*“The application zone of AWTS-treated wastewater would not be able to be properly accessed or repaired due to the sealed and concrete carpark on top,*



*while AWTs usually fail sometime during their life - which would only be catastrophic as consequences would be largely invisible at ground level due to lack of real monitoring."*

*"The method of irrigation into cells under concrete as desired by FedSheds is not sanctioned in AS/NZS 1547:2012. 'subsurface irrigation' does not include anything described in the FedSheds report."*

*"All the above at a light industrial development on an environmentally sensitive site with no visible reserve area is highly risky and prone to failure."*

**Taïsa Baars** | Environmental Health Scientist from **BYRON ENVIRONMENTAL CONSULTING**, providing advice to NSW Health and Byron Shire Council states in her Environmental Health Review for the OSMS (FedSheds) which is attached ([Appendix 2B](#)) that:

*"It is our opinion that the proposal is not suitable and residential concerns regarding the environmental health risk are justified and technically plausible and sound."*

*"The feasibility assessment and proposed 'Onsite Sewage Management system' (OSMS) are not sound in respect to environmental and public health requirements and carry risk for the local amenity, the protection of surface and ground water for the catchment area and future degradations of soil over time."*

*"the risk for seepage, which can be a public health risk and risk of odour issues to nearby residents. In the light of recent and predicted worst case scenarios of flooding and very high rainfall, it is highly likely that soil saturation will occur"*

Emeritus **Prof. Jurg Keller** FTSE, IWA Distinguished Fellow, Academic-at-large  
Australian Centre for Water and Environmental Biotechnology (formerly AWMC)  
The University of Queensland reviewed the OSMS and advised:

*"It seems to me unclear how the proposed system can be operated effectively and sustainably in the long run given the continuous hydraulic and nutrient loading on a limited area with very limited and probably uncertain treatment capacity given the basic design that's proposed, and the fact that it will essentially be fully covered. I would seriously question how this system will be able to achieve an effective and sustained treatment capacity given the significant hydraulic and nutrient loads, and the apparent limited capacity of the 'underground/covered up' infiltration system so a detailed review seems necessary."*

**References:**

[AS1] Standards Australia, (2012), AS/NZS1547:2012, On-site Domestic Wastewater Management.

[BSC1] Byron Shire Council (2004): 'Design Guidelines for On-site Sewage Management for Single Households'

[BSC2] Byron Shire Council, (2001) 'On-site Sewage Management Strategy.

[BSC3] Byron Shire Council, (2004) 'OSMS Design model(xls)' downloaded from Byron Shire Council website 29 August 2022

[BSC4] Letter from Byron Shire Council, Request for Further Information DA No. 10.2021.114.1, dated 30 August 2021 – this is only partly available through the reply in the Peer review [Peer2]

[DB1] Discussion with Daryl Brooks during council site visit to FedSheds on 11th Aug 2022.

[DB2] Dylan Brooks: Word by word transcript (recorded) from the mediated meeting with the developer on 29 August 2022

*"So in my discussions regarding that I talked to Joe Whitehead. He helped (unclear) the report. He had examples of where that had happened. So I got involved with this and spoke with Gavin and said the only way we can do this development is if we do something different. This is not going to tick all the boxes. So I rang Joe Whitehead and said 'I might be getting involved with this, what do you think?'. The nature of the conversation was 'This has been done elsewhere Dylan, have a go at it and we'll review it'. So I basically relied on his expertise and his support as well to keep pushing ahead with it because for me there's a lot on the line in the sense that if it doesn't work, that's bad for me as well. So I'm relying then on Joe Whitehead's 'no, we've done this before'. And the side note is that it is actually used very commonly for storm water. Storm water infiltration under car parks is very, in the Byron Shire, is used. So the concept was then okay. We're going to treat the water so well that we're going to use something that is commonly used for storm water for houses whatever. So we're going to mimic what is done commonly and me relying on Joe saying this has actually been done with waste water. So I myself don't have personal experience in doing this. I've been guided by Joe to say. He's done it on X Y Z property and it works. That's all I can say"*

[CGB1] Cromer W C, Gardner E A and Beavers P D (2001), *An Improved Viral Die-off Method for Estimating Setback Distances*, Proceedings of On-site '01 Conference, Armidale Australia: An Improved Viral Die-off Method for Estimating Setback Distances

[GAA1] Greg Alderson & Ass. (2021), 'On-site Sewage Management Feasibility Assessment', Revision D. 1<sup>st</sup> February 2021

[GAA2] Greg Alderson & Ass.(2021), 'On-site Sewage Management Feasibility Assessment', Revision E. 9<sup>th</sup> December 2021

[GAA3] Greg Alderson & Ass. (2021) 'Letter GAA to Environmental Health Officer',  
9<sup>th</sup> December 2021 6 Pages

[NSW1] Water NSW (2019), 'Designing-and-Installing-On-Site-Wastewater-Systems'

[NSW2] NSW DLG, (1998), 'Environment & Health Protection Guidelines On-site Sewage Management for Single Households.'

[IL1] Ian Law. Review of concept design developed for on-site sewage management at Lot 10, Federal Drive, Federal NSW, 6 September 2022 Rev1 IBL Solutions

[MK1] McKenzie et al (2002) in chapter Field Measurement of Saturated Hydraulic Conductivity Using the Well Permeameter

[MBR1] Membrane Bioreactor in <https://sswm.info/pt-pt/water-nutrient-cycle/wastewater-treatment/hardwares/semi-centralised-wastewater-treatments/membrane-bioreactor> [accessed 18/9/22]

[LP1] Larsson, E. Persson, J. (2004): Viability of Membrane Bioreactor Technology as an Advanced Pre-Treatment for Onsite Wastewater Treatment. Lulea: University of Technology [URL](#) [Accessed: 03.06.2019]

[Peer1] Whitehead & Ass. (2019), Peer Review of On-site Sewage Management Report, 12 September 2019

[Peer2] Whitehead & Ass. (2022), Peer Review of On-site Sewage Management Report, Revision E 10 January 2022

[RS1] Renan Solatan (Development Engineer at BSC) advised verbally during the stormwater audit on 29 08 2022 to Goetz Bickert, member of the community.

## **Appendix 2A: Independent peer review of the OSMS**

See attached PDF: Ian Law. Review of concept design developed for on-site sewage management at Lot 10, Federal Drive, Federal NSW, 6 September 2022 Rev1 IBL Solutions

## **Appendix 2B: Independent peer review of the OSMS**

See attached PDF: Taïsa Baars | Environmental Health Scientist, Environmental Health Review for an Onsite Sewage Management Feasibility Assessment for 'Fed Sheds' Proposed light industrial development at Lot 10 DP 790360, Federal Drive, Federal. 16th September 2022, "FedShedFederalReviewOSMS",

### **Appendix 3. FCCSG Report on Fed Sheds Storm Water Plan**

#### **Federal Community Centre 'Fed Sheds' Stormwater Concerns**

##### **Introduction**

Federal Community Centre (FCC) members participated in a development site meeting on the 29/08/2022 with Council Stormwater and Engineering Staff (Scott Moffett and Renan Solatan) on the development site and went for a tour of Coachwood Court to discuss stormwater issues, concerns and potential follow up ameliorative actions.

The FCC has sought the input of a qualified Stormwater Engineer to constructively review the Stormwater Management Plan (McKenzie 2020) commissioned for the Fed Sheds development. This engineer has had limited time to review the material but is familiar with the site having grown up in Coachwood Court Federal.

To assist the above FCC has also reviewed availability of accurate rainfall data for Federal Village noting that this was missing from the McKenzie 2020 report. This was made available as part of the rapid SMP review.

##### **Rainfall Data**

The Bureau of Meteorology (BOM) Rainfall data for Federal Post Office (Station Number 58072) was accessed (Monthly Rainfall - 058072 - Bureau of Meteorology (bom.gov.au)). This data spans a period from 1904 through to 1998. This data was supplemented by rainfall records from Federal Village for the period 1994 - 2022 (refer Figure 1 for Rainfall data collection points in relation to the Fed Sheds development site. Precedence was given to BOM data records (over Residential) except when they were incomplete for an Annual Record.

Appendix 1 summarises this data while Appendix 2 charts the Federal Villages rainfall temporal distribution and trendline. Complete Annual Rainfall Records are available for 69 separate years over this period with the largest gap occurring between 1917 – 1961 (no recorded data). Occasional gaps occur in the 80s and 90s. Data in Table 1 was compiled from Bureau of Meteorology data for the data from 1905 up until 1996 and then from two local village residents for data for 1997 up until 2021. There is a high year to year variability and a trend of increasing rainfall. The long-term annual average of 1847 mm is less than the BOM statistic for the period 1961 – 1990 of 2022mm. These figures are locally derived and therefore more relevant than data used from the Alstonville area in McKenzie 2022 which showed this 10-year rainfall average 1996 – 2006 was 1563mm.

It is our contention that the most accurate and relevant data for the Subject site should be used to model stormwater and identify a resilient design.



Figure 1 Federal Village Rainfall Data Collection Points



Figure 2 Coachwood Court Flooding downslope of Fed Sheds



## Reviewing Engineer<sup>1</sup> Notes on Stormwater Management Plan

“The objective of this SMP is to ensure that there is no worsening of stormwater quantity and quality nor any reduction in the environmental values of the downstream receiving waters as a result of activities on the subject site in compliance with the Byron Shire Council Development Control Plan (DCP) 2014” McKenzie 2020

- The Hydraulic Impact Assessment which has been undertaken on behalf of the developer is high level and fails to consider the range of design flood events which is required to assess the adverse impact caused to downstream adjacent/nearby properties as a direct result of the development.
- The assessment is constrained to a comparison in peak flows from the property for a single defined duration, which is assumed to be a short duration high intensity event (likely 15 to 30 minutes). The DA hydraulic impact assessment must consider the quantity of stormwater, which relates to both peak flow rate and volume, which has not been considered.
- The consideration of ‘**volume of rainfall/runoff**’ is especially important given the history of flooding in the Federal area, not to mention the wider Northern Rivers catchment.
- The majority of flooding which has occurred over the last decade has resulted from longer duration events, ranging from 6 to 12 hours to 7-day events.
- The volume of water in these large events is the source of the major issues, with the existing drainage infrastructure, including the road kerbs/shoulders, and natural storage in the catchment unable to handle the volume of water, as is demonstrated in the images below (Figures 2a – c inclusive comprising screenshots from the videos of flooding which have been presented to council).
- The outlet of the new proposed 375 mm RCP discharges at the top left of Figure 2 c above. All additional runoff which enters the pipe will discharge to the areas shown in Figures 2a – 2c, making flooding worse for downstream residents.
- **Assessment of longer duration events**

An assessment of the full suite of events is required to assess the hydraulic impact of the proposed development, in line with the AR&R 2019 guidelines (Ball *et. al.* 2019).

- This should include hydraulic modelling to determine flowpaths from the site and better identify the areas/properties which suffer adverse impacts as a result of the flooding
- The proposal is written in a way where all discharge from the site is managed by the RainGarden/Detention Basin, and discharges through the

RCP downstream. Whilst this will still cause significant impacts, it is extreme unlikely that this will occur during large events.

- The proposed rain garden has significant vegetation, which whilst visually appealing will also act as a source of debris which can easily block the outlet pipe and/or orifice pipe. Given that the 2 m wide emergency weir is at a lower level to the Pit Crest, blockage of the outlet structure will result in all excess runoff discharging as overland flow from the southern corner off the site through downstream properties, adversely impacting the flooding through these blocks.
  - **This needs to be assessed during the impact assessment of the proposal**
- For comparison purposes, a 1% AEP 15 minute event is comprised of 46.7 mm of rainfall, whilst the 30 minute event has 67.2 mm of rainfall (one of these likely was used for the peak flow analysis for the site).
  - The rainfall depths for longer events are included in the table below:

• Storm Duration	• Rainfall depth (mm)
• 12 hour	• 350
• 24 hour	• 469
• 36 hour	• 541
• 48 hour	• 590
• 72 hour	• 655
• 96 hour	• 697
• 168 hour	• 771

- In an area where the volume of rainfall is likely to be the key source of flooding, these events need to be considered.
  - This area was previously predominantly grassed/pervious, and post development will now be predominantly impervious. Based on these rainfall depths below, this is expected to result in significant excess volumes of runoff which will impact downstream residents.
  - As a rough calc. using the 1% AEP 72 hr event as a guide, using ARR2019 loss rates the initial loss for a pervious catchment is 34 mm, whilst the continuing loss rate is 0.84 to 2.1 mm/h pending catchment characteristics.
    - Using the conservative value of 0.84 mm/h, and if 80% of the site which was previously pervious is now impervious, this results in an extra 377m<sup>3</sup> of runoff which will impact downstream residents.

- This increases to 740 m<sup>3</sup> of additional rainfall runoff if the less conservative 2.1 mm/h continuing loss rate is used.
- Either scenario will result in significant adverse flooding for downstream residents.
- Based on these volumes, the proposed detention volume of 39 m<sup>3</sup> seems minor, and might need to be reassessed using the longer storm events.
- The average rainfall depth of 1,563 mm which was quoted in the report was incorrect, and was based on a rain gauge/s in Alstonville, which is ~20 km away and receives significantly less rainfall than Federal.
  - Since 2009, Federal has received an annual average of 1,960 mm per year (> 25% more) (Refer Appendix 1).
  - In 2022 Federal received more than this in less than 7 months, reaching 2,732 by the end of July.
  - 2022 included 700mm in a 7day period, followed three weeks later by 500mm in a 4 day period.
  - Any assessment that relied upon the Alstonville Average Annual rainfall e.g. Music Stormwater Quality Assessment should be redone using this increased average annual rainfall volume.
  -
- Quick Calculations , the 375mm pipe capacity is probably pretty similar to what the 1% AEP flow is listed as (~0.177 m<sup>3</sup>/s). Based on this, events up until the 20minute event contribute flow at a rate faster than the outflow (again, some rough assumptions involved here).  
 Peak excess volume across these events is 43.3 m<sup>3</sup>, which is probably where they got their 39m<sup>3</sup> detention storage requirement (noting my rough hand calcs are probably slightly wrong).  
 None the less, interesting to see this eventuated from a 5 minute event (10 minute event was similar), events which have a total rainfall depth of 24.7 mm and 37.4 mm respectively.

**If blockage of this pipe was to be assessed/incorporated then this detention volume would be much higher.**

Storm Duration	Storm Event Rainfall Depth	Volume In (rainfall)	Out (through pipe)	Delta (In minus Out)
1 min	6.68	26.3192	10.8	15.5192
2 min	12.7	50.038	21.6	28.438
3 min	17.4	68.556	32.4	36.156
4 min	21.3	83.922	43.2	40.722
5 min	24.7	97.318	54	43.318
10 min	37.4	147.356	108	39.356
15 min	46.7	183.998	162	21.998
20 min	54.4	214.336	216	-1.664



## FCC Recommendations Re Stormwater

The FCC notes and appreciates Council staff's willingness to meet onsite and discuss FCC's concerns about stormwater issues and threats for Coachwood Court Properties (refer Appendix 3). We note the endorsement Council staff made during that assessment of the McKenzie 2019/2020 SMP report. We note that our community review and that of our Engineering advisors find the SMP light on detail and unsubstantiated in terms of supporting information in terms of calculations, depictions of flood extent or consideration of risks (to downslope properties and downstream biodiversity assets such as the platypus breeding pond and Grey headed flying fox colony camp). Further to this, reliance on rainfall data which does not directly relate to the site and is inaccurate to what we know to be most relevant to the site, undermine confidence that this report adequately addresses all the items outlined in Sections 1.03, 1.04, 1.05 & 1.06 of NRLG (2018).

1. We request that evidence that the SMP satisfies the requirements outlined in the above sections be provided and / or uploaded to the DA Tracker. The information in the SMP is summary and high level and does not refer to supportive documentation. We are unable to determine whether other supportive information has been provided to Council that demonstrates the adequacy of the design.
2. Coachwood Court residents have been investing significant financial resources to deal with flooding and stormwater erosion / scour that has been impacting property access, foundations etc. Council staff have recently acknowledged the challenges they face maintaining drainage systems. The Coachwood Court drainage has not been inspected for blockages in its almost 30 years of existence
3. More work needs to be done by the developer to demonstrate that the development is not causing adverse impacts. Showing evidence (with no background to what calcs/events have been considered) that the peak flow rate has been reduced to pre-development conditions does not do this. Flood modelling needs to be undertaken for the full suite of rainfall durations (and temporal patterns) to assess the impact of the development.
4. An assessment of the full suite of events is required to assess the hydraulic impact of the proposed development, in line with the AR&R 2019 guidelines (Ball *et. al.* 2019). This should include hydraulic modelling to determine flowpaths from the site and better identify the areas/properties which suffer adverse impacts as a result of the flooding. Consideration of Storm Durations of 12, 24, 36, 48, 72, 96 and 168 hours is required as a minimum.
5. The MUSIC Stormwater Quality assessment (or any assessment that relied on the Alstonville rainfall data) should be redone using the increased average annual rainfall volume available for Federal.
6. Adequacy of the proposed detention basin needs to be established for the longer storm events. This should also include a precautionary risk assessment of the influence of pipe blockage and associated detention volume

requirements. A detailed stormwater infrastructure maintenance schedule needs to be drafted as part of the SMP to mitigate risks of operational failure.

7. Council review its DA Tracker processes to ensure greater transparency and accountability regarding provision of information to community stakeholders regarding important (or all) developments.
8. Council consider routine community consultation processes to engage the local community and better and more objectively utilise local knowledge and expertise for significant local developments as evidence from the Fed Sheds experience identifies that community consultation cannot be left to the proponent to manage independently.

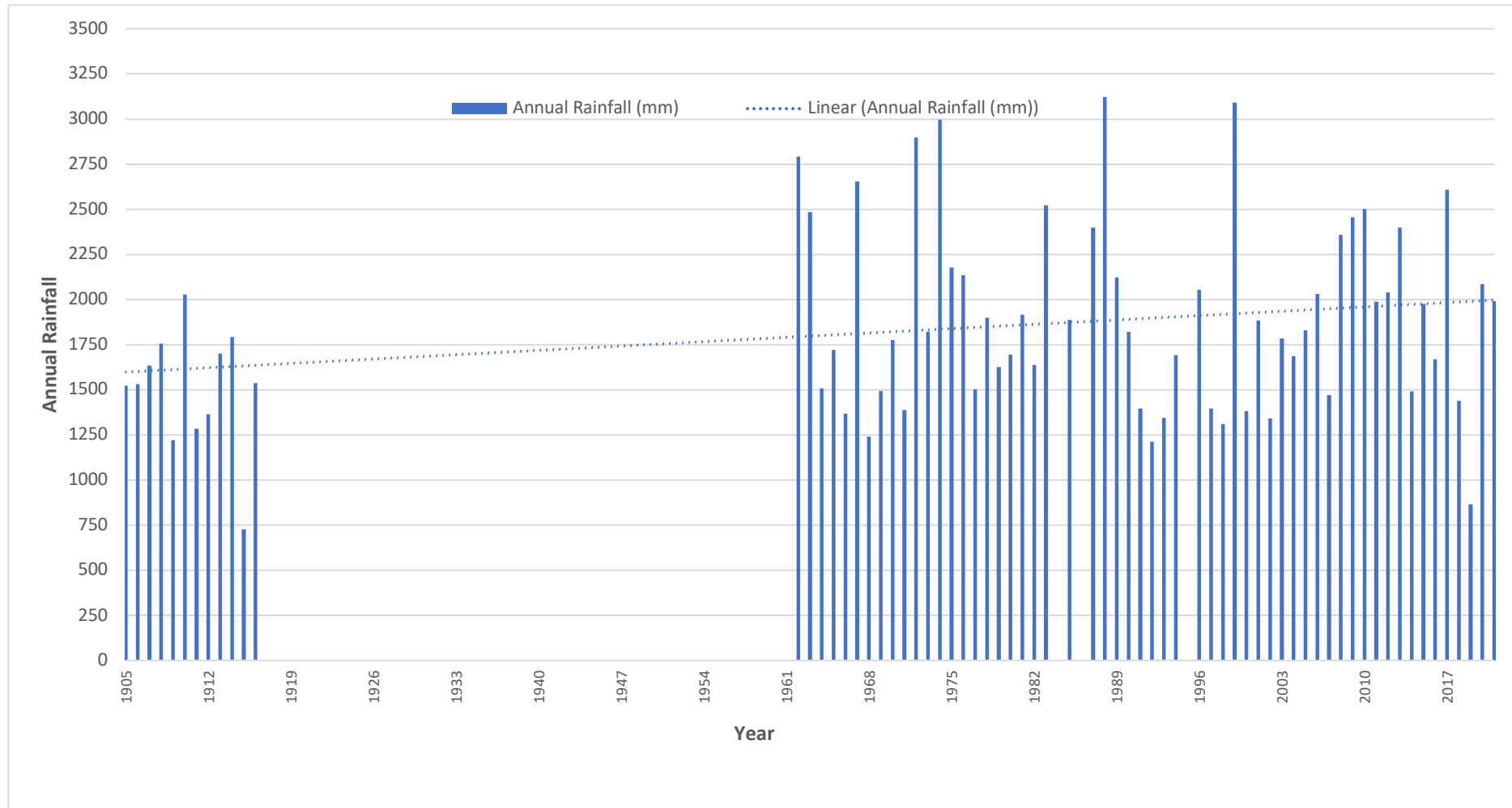
**FCCSG Submission to Byron Shire Council**

Appendix 1 Rainfall Records for Federal Village using BOM data (blue) and validated local data ( yellow). Note the part 2022 record are up until late August and has not been used to generate the summary statistics at the bottom of the table.

<b>Year</b>	<b>Annual Rainfall (mm)</b>
1905	1523
1906	1532
1907	1636
1908	1754
1909	1220
1910	2027
1911	1285
1912	1366
1913	1700
1914	1792
1915	726
1916	1536
1962	2791
1963	2484
1964	1509
1965	1720
1966	1367
1967	2654
1968	1240
1969	1493
1970	1776
1971	1388
1972	2899
1973	1821
1974	2995
1975	2178
1976	2134
1977	1503
1978	1900
1979	1626
1980	1694
1981	1917
1982	1636
1983	2521
1985	1887
1987	2398
1988	3121
1989	2123
1990	1821
1991	1397
1992	1214
1993	1345

<b>Year</b>	<b>Annual Rainfall (mm)</b>
1994	1692
1996	2054
1997	1396
1998	1309
1999	3090
2000	1383
2001	1883
2002	1341
2003	1783
2004	1687
2005	1831
2006	2032
2007	1470
2008	2358
2009	2457
2010	2503
2011	1988
2012	2040
2013	2399
2014	1492
2015	1975
2016	1670
2017	2608
2018	1440
2019	866
2020	2084
2021	1991
part 2022	2760
<b># Years Complete Record</b>	<b>69</b>
<b>Average Rainfall (mm)</b>	<b>1847</b>
<b>Max Rainfall (mm) in 1988</b>	<b>3121</b>
<b>Min Rainfall(mm) in 1915</b>	<b>726</b>
<b>Median Rainfall (mm) in 1970</b>	<b>1776</b>

Appendix 2 Federal Village – Annual Rainfall (mm) for years with complete records 1905 – 2021 period and Trend Line



**Draft actions resulting from inspections between FCC representatives and BSC staff (FCC notes)**

- Reshaping the spoon drain (deepening of the roadside verge) entering the major pit drain opposite No 24 from the North side of Coachwood ( in between No 11 and No 9 driveways and also going back towards Grated pit opposite No 24 in front of No 5). This should improve drainage and minimise spill over the road to lower lying properties.
- Council will investigate 375mm pipe future location through easement from development site to LPD (Legal Point of Discharge – just upslope of driveway to No 5 (due to existing vegetation issues)
- Investigating pipe dimensions from the LPD location downslope. Mention was made of adding another similar 375 pipe under Driveway to No 5
- Camera Investigation (CCTV) of the under easement pipes system downslope to (near Stoney Creek) discharge point to assess for pipe fatigue, blockage and potential failure points and associated maintenance.
- Council will note obvious evidence of Coachwood resident's attempts to divert stormwater entering driveways or property boundaries and may undertake ameliorative maintenance (particularly for lower lying properties). Note this may apply only if the driveway is 'registered' with Council. Future liaison with Council will clarify what 'registration' exactly entails.
- FCC also undertook replicate soil samples (witnessed by Council staff) for subsequent lab analysis by SCU to inform the Community's input into the currently ongoing discussions with the developer and Council.

**References**

Ball J, Babister M, Nathan R, Weeks W, Australian Rainfall and Runoff: A Guide to Flood Estimation, © Commonwealth of Australia  
Weinmann E, Retallick M, Testoni I, (Editors) Estimation, © Commonwealth of Australia  
2019 (Geoscience Australia), 2019.  
Byron Shire Council (2014) Comprehensive Guidelines for Stormwater Management  
McKenzie, D. (2019/2020) Stormwater Management Plan for 10 Federal Drive, Federal, NSW Report produced by Floodworks for DavGav  
Northern Rivers Local Government (2018) Handbook of Stormwater Design (Aus-Spec-1)\ NSW

Engineering review undertaken by Luke O'Connor who received a Bachelor in Civil and Environmental Engineering from University of Queensland in 2016. He was the recipient of the C.K Chin Memorial prize for Thin walled Structural Engineering. Luke has worked in Civil and Environmental engineering in The Netherlands (Chicago Bridges and Iron), India (volunteering with Pollinate Energy on environmental and sustainable engineering) and across Eastern Australia with the Surface Water team at GHD based in Brisbane (4.5 years experience in the surface water engineering field). He left GHD in 2021 and now works as a Consulting Engineer for BHP-Mitsubishi Alliance Engineering – Modification and Operations Projects.

## **Appendix 4. The Masterplan's Traffic Impact Assessment and its relationship to the DA**

Findings of the Masterplan in relation to traffic:

- The data on traffic volumes used in the Traffic Impact Assessment (1 February 2021) submitted as part of the DA is out of date and underestimates the current traffic volumes. The traffic survey data was collected immediately in front of the proposed development, but traffic activity in Federal is greater in the section near the commercial premises – the shop, Doma café etc. The vehicles travelling to and from the proposed development will likely also pass through this very congested area and thus it would be more appropriate to consider traffic volumes in the middle of Albert St.
- Council data on traffic volumes collected as part of the Masterplan process in February 2021, indicated considerably higher volumes than provided in the Developer's report (collected February 2020) – they have between 1268 and 1402 movements on weekdays, while we counted between 1948 and 2028 on weekdays in the village centre, with 1382 to 1537 at the counter on Federal Dr at the 50km sign, both of which are considerably higher than their counts. (N.B. their counter was located at the site of the proposed development, which is between our two counters). For the weekend, they have 1262 for Saturday and 1002 for Sunday, while our data is 1781 in the Centre and 1343 at the village entrance on Saturday, and 1505 in the village centre and 1007 at the village entrance on Sunday. All these counts are higher than for the corresponding day in their assessment, with some at least 50% higher.
- The village is already extremely congested and dangerous at times – the Council has recognised this by commissioning a design for the main street aimed at improving safety and amenity.

The Traffic Impact Assessment indicates that they anticipate that the proposed development will result in a net increase in trips at peak times by 15 vehicles per hour. The assessment is only done for peak hours and doesn't estimate an increase at other times. However, even if this were the only impact, the addition of 15 extra vehicles at this extremely busy time of day, is still likely to impact the safety and traffic movement in the centre of the village. Our movement study data showed that on average, 167 people cross the road in the village centre between 7 and 9 am on school days, with an average of 214 crossing between 3 and 5pm. This situation is already extremely dangerous and will only be compounded by the addition of 15 vehicles each peak hour.

- Their own data indicated over 220 traffic movements on weekdays between 7 and 9am, or approximately 110 per hour. An additional 15 vehicles in one hour (peak hour) represents an increase of nearly 14%.
- Depending on usage, the increased vehicle movements, may be cars, small or medium trucks, or possibly even large trucks. It is likely that there will be a large number of delivery vehicles. No analysis of the type of vehicle has been presented. Obviously, the impact on the community and our local community facilities, as well as the impact on the requirements for road development and maintenance, will be affected by the type of vehicle movements, at all hours, not just peak hours.

In order to undertake a valid and appropriate assessment of the impact of additional traffic, both on the roads themselves, and the local community, the final usage of the proposed units needs to be specified. The developer's assessment of impact fails to account for the already dangerous conditions. Until the final usage for the proposed development is determined, it is not possible to undertake a valid assessment of the impact on traffic.

**Appendix 5. The context of the Masterplan in this DA recommendation. Community led planning and its relationship with the DCP and LEP – the fear of litigation.**

1. Masterplanning is becoming a vital and recognised part of the development of both strategic and statutory planning instruments in NSW and is promoted by State agencies. The Federal Village Masterplan process is the first example of Byron Shire Council stepping into this space. It has been moving along for two years and comes out of the learnings of the previous Byron Town Masterplanning process and advocacy from the Federal community. There are no surprises for staff or Council as the draft Federal Masterplan, on exhibition now, has been completely transparent throughout its development phase and has been reviewed countless times within Council. The Federal Masterplan is an acceptable, encouraged and endorsed process. As an early example of this type of Place Planning in this Shire staff and community have gone to great lengths to get the consultations right and to not produce anything wildly radical in the draft Masterplan.
2. One clear aim of the Federal Masterplan is to update and change statutory planning instruments to make them more in line with the community's needs and visions (Action 5). This process may take longer than most would like and those time frames led to an understanding between Council and the community which aimed to protect the village from development which may subvert the community's intention, expressed in the Masterplan (horse bolting issues). This intention was strong and important enough for it to be included as one of the Masterplan's priority actions, *Action 5b: Promote the Federal*

## FCCSG Submission to Byron Shire Council

*Village Masterplan to ensure it is considered by Council, community, and developers – especially during the period prior to Local Environmental Plan and Development Control Plan updates.*

3. Some would respond that all the above is fine, however until the Masterplan makes those changes to statutory regulations then Council has no choice but to deal with development applications before them under the statutory rules in front of them today. This is because the applicant ultimately can, or can imply/threaten to, go to the Land & Environment Court to have the law strictly applied. The Federal Masterplan Steering Committee and Council staff have jointly investigated this point with the State Government and this is not the only reading of the specific situation in Federal Village.
  - The top statutory regulation in these matters is the LEP and the Fed Sheds site is given more options within the zoning applicable to it under the LEP.
  - The local Council initiated statutory regulation over this site is the DCP, which does not zone this site to enable the Fed Sheds proposal.
  - There is a conflict between the two statutory rule books.
  - The Masterplan aims to interrogate these differences and come up with a solution which will see the two rule books more in line and reflect the community's vision for their village.
  - Our investigations and discussions with State agencies did indicate that the L&E Court could well look at these conflicting rule books and while considering the Masterplan and community submissions decide that the development not be supported. The State agency said, and they also said that the L&E Court is aware that previous LEPs were created when any development in rural villages was seen as a positive, while today's situation is vastly different, with the community and Council needing to update their relevant DCPs and LEPs in many instances.

This is a real possibility, not unrealistic community dreaming, especially, when in this specific case (a) there is this significant conflict between the two statutory regulations (b) there is a Masterplan process in tow, entered into in good faith by Council and the community and with full knowledge of the developer (c) there are clear errors made in the assessment of parts of the proposal by Council (d) Council has not made sufficient attempts to bring the developer together with the community, the evolving Masterplan and their commitment to support the Masterplan process against the fear of allowing the "horse to bolt".



## **Appendix 6. Concerns regarding Fed Sheds Cost of Works**

References: BSC SUSTAINABLE DEVELOPMENT FACTSHEET

And A GUIDE TO ESTIMATING THE COST OF WORKS - Byron Shire Council

'If the estimated cost of works is more than \$3 million a registered Quantity Surveyor's detailed cost report must be submitted on lodgement of the DA'.

'Misrepresenting the value of the development will result in delays in the assessment of the development application and will necessitate reassessment/redetermination of the matter.'

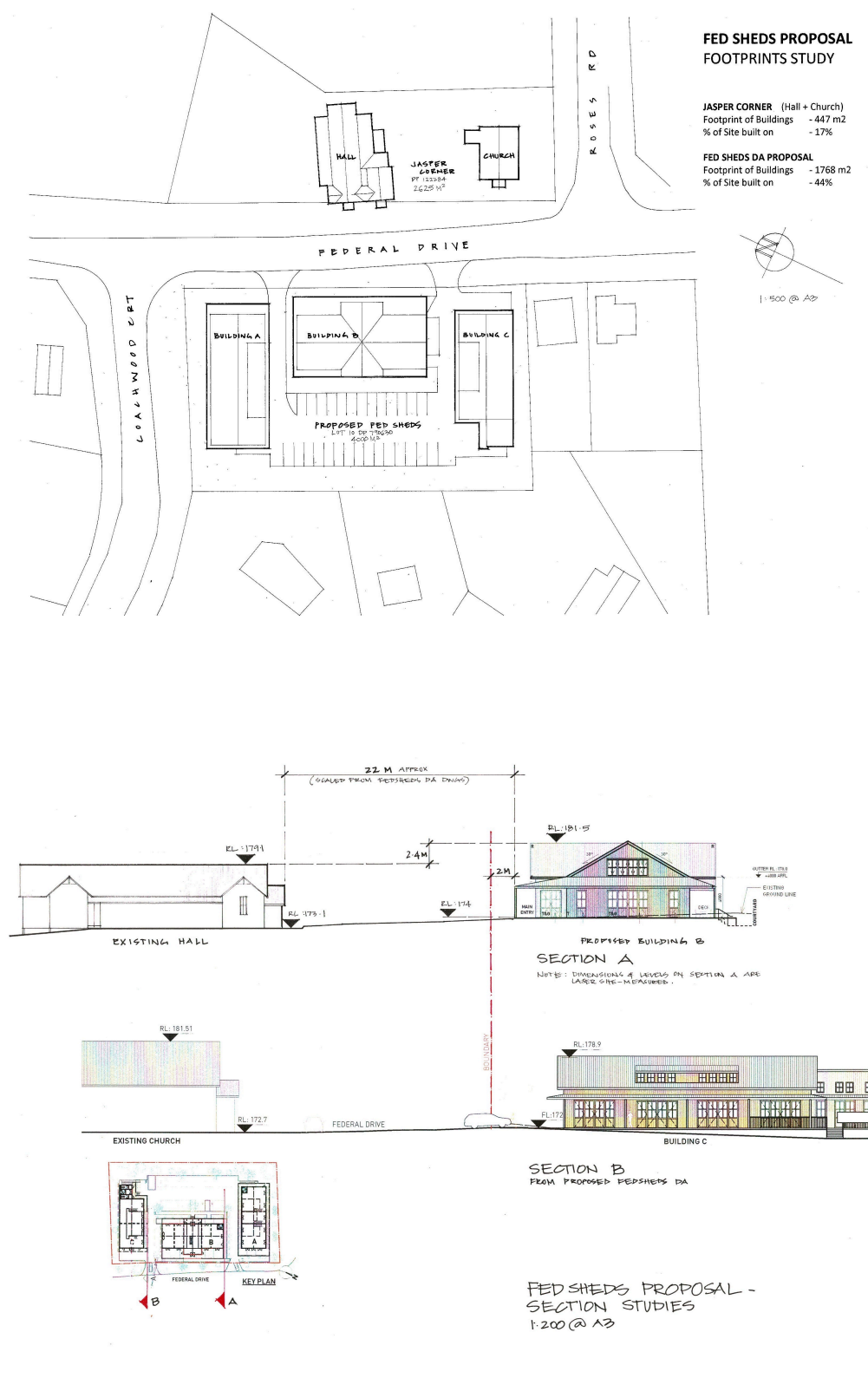
The (confidential) 9.2.2021 Denary 'Trade Summary' lodged with the DA does not follow the requirements listed in the Guide in the following ways:

- No allowance for 'excavation including shoring, tanking, filling and waterproofing' to support the proposal to put formed on site concrete water tanks under each building
- The mezzanine floors, total 340sq.m, are not included in the calculation of the Gross Floor Area which becomes 1585 sq. m.
- The areas of the covered walkways, or roofed area of the buildings outside of the functional areas, total approximately 357 sq.m, and are not included in the calculation of the building footprint. The true footprints are:
  - A. Building A approximately 638 sq.m.
  - B. Building B approximately 640 sq.m.
  - C. Building C approximately 480 sq.m
  - D. A total footprint of approximately 1768 sq.m on this 4,000 sq.m site.
- The allowance for external services does not include for the realistic cost of disposal of wastewater on this unserviced site. Including power supply for eight industrial units and water storage for three buildings would give a more realistic estimate.
- The per square metre allowance in the Trade Summary is for 'residential building works' at \$1,065 per.sq.m. This is not a residential building, nor has it been possible to build to the quality that is claimed here for less than \$3,000 per sq.m for at least a decade.
- The allowance for professional fees shown is a very low percentage of the total building cost.

Note drawing DA5 provides the 1245sq.m floor area used for calculating in the Cost of Works. This is not a true representation of the area of the buildings. The actual gross floor area including the roofed walkways and mezzanines is approximately 1585 sq.m.

The development would have passed the \$3M amount that the Guide requires for a Registered Quantity Surveyor's detailed cost report to be submitted on lodgement of the development proposal. By its own rules, Council must request this document before proceeding with any recommendation for approval.

## Appendix 7. Fed Sheds Footprint Study and Fed Sheds Section Study



Attn: Gavin Elterman  
Re: Fed Sheds DA

Dear Gavin,

The FCC Steering Group is comprised of representatives from the following Federal organisations and groups:

- Federal Community Centre
- Federal Masterplan Steering Committee
- Federal School of Arts Association Inc (FSAAI), Jasper Corner facility
- Coachwood Court and nearby residents' group

These groups will all be represented at the consultation workshop.

As we hope you will appreciate, we are all volunteers, who have our community at heart. We share a long history of involvement in the Federal community and constructive engagement with Council processes to create positive outcomes for the village. We have secured numerous government grants and been involved in creating many of the facilities that make Federal the place it is today. This includes establishing the Federal Community Children's Centre, creating the Federal Park, raising funds to purchase the Anglican Church, running the annual Federal Park Party and the current Masterplan project. We also have expertise and professional experience working in architecture, water management, property development and strategic community engagement. We therefore feel a responsibility to our community to ensure that the concerns regarding Fed Sheds, which is the largest DA the Federal village has seen, are addressed adequately and appropriately.

As a group we support and welcome appropriate development in Federal and believe that some form of Fed Sheds has the potential to be positive for the local community. However, we have deep concerns about the Development Application in its current form.

There also remains significant opposition within the Federal community to Fed Sheds as evidenced by the 153 submissions against it during the DA process and the significant number of people who turned out during the councillors' recent visit to the site.

You will also be aware that the Masterplan has already undertaken extensive consultation with the community. These outcomes can clearly inform us as to what the community needs to ensure Federal is a liveable and sustainable place into the future. We are concerned that this development application in its current form, on this specific site, does not fit within the vision for the future of Federal that the community has carefully set out.

Our concerns include:

1. The size, bulk, height and relative scale of the proposal.
2. Parking provision and traffic flow into and out of the site.
3. The proposed onsite sewage management system.
4. Stormwater runoff and its impact on Coachwood Court.

#### THE SIZE, BULK, HEIGHT AND RELATIVE SCALE OF THE PROPOSAL.

- Building Size and Bulk - every proposed building on Lot 10 has a larger footprint than either the Church or the Hall and the total building footprint is more than three times the combined footprints of the Hall and the Church. The total building footprint on Jasper Corner is 447 sq.m compared with 1560 sq.m on Lot 10. Both sites are 4000 sq.m.
- Percentage of the site covered by buildings – Jasper Corner – 11%
- Percentage of the site covered by buildings - Lot 10 – 39%. We note that a mandated floor space ratio is not required in the RU5 zone.
- Additional hard surfaces proposed on Lot 10 prevent an approvable Land Application Area for effluent disposal. A drawing showing the total hard surfaces is attached.
- The relative Height and Scale of the proposed buildings was not truthfully demonstrated on the drawings submitted for approval. This appears to have misled the Heritage consultant. A drawing showing the height of Building B in relation to the Hall is attached.

#### PARKING PROVISION AND TRAFFIC FLOW INTO AND OUT OF THE SITE.

- There is no congruency between the parking provisions of the Main Street design funded in the Master Plan process and the sketch forwarded to us from Council.
- The suggestion that the spaces in the proposal could be subdivided into smaller units of as little as 36 sq.m. could not be approvable since additional parking spaces would have to be provided.
- The on-site parking would be of more benefit to the development and the community if it were to be immediately visible and accessed from the street, not at the back of the site.
- With up to 30 people working onsite, and only 20-something carparks, it's clear that parking from this development is going to spill into the neighbouring streets. Any extra visitor cars to the 'artisans' working onsite would only add to that number.

#### THE PROPOSED ON-SITE SEWAGE MANAGEMENT SYSTEM.

- The servicing issues for this DA would not be problematic in a fully serviced area where stormwater and effluent are not required to be treated, and/or detained on the site.
- In an unserviced village, where buffers to neighbours, structures, driveways and the location of water storage tanks, effluent system design usually becomes the most limiting factor. The smallest new lot sizes allowed in the RU5 zone for a dwelling are 2000 square metres for good reason.
- The conceptual wastewater proposal and the peer review put forward do not provide enough certainty for an unproven/innovative system to be a success. We have concerns that these are reviewing methods only, rather than being conclusive or providing an assurance of success.
- Council's published standard for on site effluent systems only includes evapotranspiration as an approvable method. This site has no space for an approvable system.
- The Council's recommendation that this DA be approved with delayed commencement gives no certainty to the developer or the community that the development can proceed.

#### STORMWATER RUN-OFF AND ITS IMPACT ON COACHWOOD COURT

- The community notes that Council has been asked by councillors to undertake a further study of the stormwater services impacting Coachwood Court.
- Given the rain events of February and March this year, we contend that the size of the building footprints and hard surfaces of the carpark and driveways on lot 10 would exacerbate existing stormwater runoff issues, with potential flooding of the neighbouring homes in Coachwood Court a very likely prospect.

#### RECOMMENDATIONS

1. Remove Building B from the proposal to reduce the building footprint by approximately 1/3. This would provide natural ground for an approvable onsite sewage management system.
2. In addition, by providing a central common courtyard area, Fed Sheds could integrate positively with Jasper Corner producing a 'town square' effect.
3. Review the cost of the development in relation to more current costs of building. The existing estimate of costs could cover two sheds and contain the proposed eight spaces, with smaller provisions for start-up enterprises.
4. That council seek an urgent independent review of the feasibility of this onsite sewage treatment system on this site, or the developer is willing to reduce a shed and revert to a more conventional system proven to work in the area.

We appreciate your willingness to meet with us and engage in a mediated workshop. Approval of a proposal of this scale could radically change the face and heart of Federal. We therefore hope you give our concerns the weight they deserve, and we look forward to discussing them in more detail with you and your team at the meeting.

Regards,

The Federal Community Centre Steering Group

## REVIEW OF CONCEPT DESIGN DEVELOPED FOR ON-SITE SEWAGE MANAGEMENT AT LOT 10, FEDERAL DRIVE, FEDERAL NSW

### 1. Introduction

Ian Law of IBL Solutions was approached by GBL Process on 17 August 2022 to review and comment on a proposed On-site Sewage Management System (OSMS) for a development in Federal, NSW.

The documents submitted for review by GBL Process and upon which the comments in this report are based are:

- a. On-site Sewage Management Feasibility Assessment: Proposed Light Industrial Development at Lot 10 DP 790360, Federal Drive, Federal – Rev D, 1 February 2021, Greg Alderson Associates, and
- b. Peer Review of On-site Sewage Management Report - Proposed Light Industrial Development at Lot 10 DP 790360, Federal Drive, Federal NSW – 12 September 2019, Whitehead & Associates.

It was noted that the Peer Review was conducted some 5 months *before* Revision D of the Concept Report was released. It was subsequently learnt (GBL Process, 24 August 2022) that the Peer Review report was based on Revisions A & B and GBL Process stated that 'it is assumed that there are no relevant differences between Rev D and Rev B'.

This review is therefore based on the contents of Rev D of the Concept Report.

### 2. Scheme Overview

The proposed scheme is essentially an OSMS with the treated effluent being managed by a subsurface irrigation disposal area that is sealed with a concrete-based car park above.

This review will consider the risks of adopting and then developing this concept.

### 3. Commentary on the Proposed Scheme

#### 3.1 General Comment

The Drawing, Exhibit No 2, in the Appendices to the Concept Report, shows that once developed, the site will be congested with the land disposal area (544m<sup>2</sup>) for the effluent produced from the development being surrounded on three sides by, and in close proximity to, buildings housing light industry activities and on the remaining side, by a proposed stormwater bioretention area.

The comment in Section 2.6 on page 11 of the Report that 'there is an absence of suitable area for a conventional OSMS disposal system' is noted. The reference to Table 3 and 5 in

the report is also noted and, in particular, the comment on ‘Land available for application area’ in Table 5, namely:

*Due to the proposed development footprint covering the site, the wastewater land application area is proposed to be located under a sealed car park within the property.*

A clear and succinct comparison of the land areas required for both forms of effluent disposal would be a useful adjunct to this discussion.

### **3.2 The Taylex On-Site Treatment System**

It has been confirmed that the Taylex ABS AWTs has never been used in conjunction with a subsurface irrigation system of the type being proposed for this development (Henry Hape, Technical Manager at Taylex, 24 August 2022 – email provided by GBL Process). Further, Hape comments that they can only recommend subsurface irrigation systems approved by Council ...and it is suggested that complies with relevant NSW guidelines (e.g. Section 13 of WaterNSW publication).

It is noted that the Taylex brochure appended to the Report states that the treatment system will require ‘servicing and maintenance every 3 months’ – a factor to be noted and planned for in this project.

No mention is made of the fact that there will be an occasional requirement to remove sludge from the septic tank as well as from the biological reactor in the Taylex system and this will require access for an appropriately sized truck. It is not clear from the drawing in Exhibit 2 if this has been allowed for.

### **3.3 Risk Assessment**

Section 7 of the Concept Report covers a risk assessment of the proposed OSMS with the first paragraph stating:

*‘There are elements of this proposed OSMS design that are innovative. In addition to the non-standard design features, the OSMS is bordered by sensitive receptors such as dwellings, a bore, stormwater infrastructure and neighbouring properties. Table 6 presents a risk assessment of the identified design, operational, management & administrative risks particularly associated with this proposed OSMS’.*

Thirteen possible Risks are identified in Table 6, along with ‘Factors that increase likelihood’ and ‘Risk reduction measures’. Various of the risk items identified require further consideration, as summarised below:

#### **3.3.1 Risk 1: Poor installation quality**

Council inspections – and these relate to all relevant identified risks – must be carried out by suitable qualified personnel to an agreed works programme.



### **3.3.2 Risk 4: Clogging of land application area from solids passing through treatment system.**

Risk reduction measures: Cleaning of filters is likely to be more frequent than 'every 3 months' and will be dependent upon not only the type and removed solids size rating of the filters but also the solids content of the effluent exiting the septic tank and that exiting the effluent balance tank.

### **3.3.3 Risk 5: Ingress of stormwater into land application area**

Exhibit No 4 shows high level water sensors will be installed in the land application area drainage cells and be 'linked to the property manager & plumber'. No description of what action is to be taken if or when the high level alarms are activated ?

### **3.3.4 Risk 6: Proximity to groundwater bore.**

It is not clear from the Report what the bore water is used for – this should be addressed. A passing reference to the WHO is made on page 13 of the report but no reference details are provided and neither is the nature of the virus used in the calculations.

### **3.3.5 New Risk Item 13 – Flush water**

Exhibit No 4 confirms that the dripper lines will have provision for flushing but there is no mention of how this flush water will be handled so as not to accumulate in the disposal area. Where is it discharged to ?

### **3.3.6 New Risk Item 14 – Reduced soil permeability**

Section 2.6.1 of the Report quite correctly states that soil permeability will be reduced with time. This will occur immaterial of the effluent being of 'advanced secondary standard' as specified in the Report - and could lead to high water level or reduced throughput concerns.

The report states that application of lime to the land application area will reduce the rate of permeability degradation but how is this lime to be applied when the disposal area is sealed off with a concrete carpark ?

## **4. Section 68 Requirements**

Section 8 on page 23 of the Concept Report raises three topics that it recommends the Section 68 application should address, as follows:

- An integrated wastewater land application area/car park designed by a suitably qualified engineer,
- An up-to-date hydraulic design is to be resubmitted with engineer's design,
- A plan of management suitable for issue to the property manager to outline maintenance requirements and system failure procedures.

In addition, the items raised in Section 3 above should be clarified either before DA approval or at the same time as the Section 68 application.

## 5. Closure

The peer review by Whitehead & Associates states that *'The design presents a conservative and innovative approach to onsite wastewater management which responds to the constraints of the site'*.

However, there are aspects of the design that do *not* fit the 'conservative' mould and it is considered that further work is required to address questions and concerns raised in this report *before* approval of any Development Application can be contemplated.

Finally, it is considered that the Concept Report underestimates the risk to long term human and environmental health by constructing the proposed system in the area identified and in the manner suggested.

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**Taïsa Baars | Environmental Health Scientist**



**0428 480 511**



**taisa@byronenvironmental.com.au**



**www.byronenvironmental.com.au**

## Environmental Health Review

for an

## Onsite Sewage Management Feasibility Assessment

Name document: On-Site Sewage Management Feasibility Assessment

'Fed Sheds' Proposed light industrial development at

Lot 10 DP 790360, Federal Drive, Federal.

*Prepared by Greg Alderson Associates. Date: 9 December 2021.*

Date

16<sup>th</sup> September 2022

Report No:

FedShedFederalReviewOSMS



Byron Environmental Consulting has been engaged by residents of Federal to provide comment regarding the 'Onsite Sewage Management Feasibility Assessment', for the light industrial development at Lot 10 DP 790360, Federal Drive, Federal. A complex of eight light industrial units is proposed within three separate buildings in a RU5-Village with a current residential and proposed commercial use on a 4000m<sup>2</sup> site.

I have reviewed the wastewater feasibility report by Greg Alderson and Associates with this DA proposal and have the following comments to make:

- The feasibility assessment and proposed 'Onsite Sewage Management system' (OSMS) are not sound in respect to environmental and public health requirements and carry risk for the local amenity, the protection of surface and ground water for the catchment area and future degradations of soil over time. There is risk and uncertainty, including the risks already identified in the report under review, in Table 6 of the report.
- The OSMS feasibility assessment report is comprehensive, and the proposal is the best feasible outcome engineered for the maximization of building space for the benefit of the developer. It is our professional opinion that the land size is not suitable for the footprint of the buildings being proposed leaving no area for wastewater disposal as outlined in Byron Councils guidelines that is mentioned in correspondence from Byron Council that states that they prefer the tried and tested land application by evapotranspiration. The proposal which leaves the wastewater to no exposure to the sun and wind which allows for evapotranspiration opportunity as well as no nutrient or water uptake by vegetation allowing wastewater to 'stagnate' therefore significantly raising the environmental health risk. The development, with its unusual land application area (LAA) being proposed, being under a sealed carpark, carries environmental health risks and uncertainties.
- The subsurface irrigation field being under sealed carpark does not allow water uptake by grass or vegetation nor the drying by the sun and wind which allows adsorption of wastewater by the soil. The Wollongbar identified Soil landscape



with low available water holding capacity and slow permeability increase the risk for seepage, which can be a public health risk and risk of odour issues to nearby residents. In the light of recent and predicted worst case scenarios of flooding and very high rainfall, it is highly likely that soil saturation will occur. It was evident how saturated the soil was after the recent rain event and how long it took for it to dry.

- The modelling of wastewater for commercial development carries additional uncertainty and allows more room for error than domestic wastewater modelling. At this stage the tenants are not known, and the hydraulic and nutrient load is calculated conservatively, however they may not be that conservative in the real case scenario. It is known that industrial development has multiple creative and 'domestic' uses in the Byron area.
- The increased traffic and mentioned redirection of clients that visit the proposal will use the council's public toilets nearby which is relying on its own OSMS and needs to be remodeled and checked for suitability for the associated flow on effects of the development on this wastewater system.
- Trade waste and management carries further uncertainty.
- The rain fall data has not allowed for new worst-case climate change predicted future scenarios such as the recent flood in February and March 2022.
- All major environmental and health issues are needed to be considered in on-site sewage management and limitations and risk of the proposed system must be adequately mitigated. It is our opinion that the proposal is not suitable and residential concerns regarding the environmental health risk are justified and technically plausible and sound.



Taisa Baars, has been awarded Distinctions during her 10 years of University studies in Science and Environmental Health, culminating in being contracted by Byron Shire Council for environmental advice on sustainable development assessments, trade waste, development approvals, on-site sewerage management systems and contaminated land assessments. Byron Environmental Consulting has also been contracted by NSW Health for environmental health advice on privately owned potable drinking water supplies.

Please let me know if you have any questions or require any further information, do not hesitate to contact me.

Yours sincerely,

Taisa Baars

19<sup>th</sup> of September 2022



**Taisa Baars | Environmental Health Scientist**  
**BYRON ENVIRONMENTAL CONSULTING**

M: +61 428 480 511

E: [taisa@byronenvironmental.com.au](mailto:taisa@byronenvironmental.com.au)

W: [www.byronenvironmental.com.au](http://www.byronenvironmental.com.au)

Dr Antony McCardell, on-site wastewater management consultant,

Technical Officer (soil water-retention analysis), Environmental Analysis Laboratory, SCU



Mob. 0474 549 038

I was the primary author of the Byron Shire Council (BSC) OSMS Design Model spreadsheet for calculating Land Application Areas (LAA) for domestic on-site treated wastewater (referred to as “the Byron model”). I offer the following summary critique of Greg Alderson and Associates’ (GAA) use of the model in designing the LAA for the Fed Sheds proposal to dispose of treated wastewater as described by GAA in their *On-site Sewage Management Feasibility Assessment – ‘Fed Sheds’ Proposed light industrial development at Lot 10 DP 790360, Federal Drive, Federal* and associated documents.

As stated by GAA “the constraint of greatest concern is the absence of suitable area for a conventional OSMS disposal system”. GAA’s response was to use the Byron model and the Australian/New Zealand Standard *On-site domestic wastewater management* AS/NZS 1547:2012 in highly *unconventional* and questionable ways to justify their design. Section 1.2.2 of the Standard states “This standard does not cover systems for the treatment of wastewater from commercial and industrial sources, or stormwater”. The Byron model is also intended only for disposal of treated domestic wastewater. In addition, neither the Standard nor the Byron model describe any kind of subsurface application methods (eg trenches, beds, drip irrigation etc) that resemble the proposed application into drainage cells situated under a carpark. The Standard allows for use of local water balance calculations for very wet regions such as our own. Hence the Byron model employs a water balance using 21 years of continuous local daily rainfall and evaporation records. It is designed to **protect the environment** through designs where treated wastewater is applied only to the upper, biologically active, levels of the soil profile where plant uptake of water and nutrients (particularly nitrogen) can occur. It is not designed to deal with treated wastewater applied directly to the deeper soil levels or under paving where plant root access is absent.

The use of the Byron model in many questionable ways by GAA includes

- treating the water load as emanating from one person alone producing 900L wastewater daily where in fact the design is for 30 persons each contributing 30L/day from the Fed Sheds complex. GAA thereby avoids the model’s constraints on LAAs in relation to water and nutrient loading from small numbers of equivalent persons within households.
- GAA’s elimination of nitrogen plant uptake in the nutrient balance by relying solely on the model’s default 20% total nitrogen (N) reduction in soil as well as the 54% N reduction stated by the manufacturer of the Aerated Wastewater Treatment System (AWTS) raises several questions. First, the default 20% N reduction in soil is predicated on the availability of carbonaceous matter allowing denitrification processes in the biologically active upper soil layers. N reduction in deeper soil layers under a carpark would no doubt be less due to lack of carbonaceous matter. Second, the claimed 54% N reduction from AWTS may decline over time with wear and tear and would also depend on regular and effective quarterly monitoring of the device by personnel responsible for compliance. Such monitoring risks being substandard in our region, as past experience has shown. In addition, AWTS may periodically fail due to power interruptions, overloading (leading to aerobic bacterial population decline in favour of anaerobic bacteria in the device), or underloading (due to decline of aerobic bacterial population lacking sufficient carbonaceous material from persons contributing to the wastewater flow when the facility may be unmanned for longer periods). No doubt, partly for these reasons, AWTS-treated wastewater is typically directed towards plants (grassed areas/garden beds) able to buffer irregularities in treated wastewater quality. Schedule B: Conditions of Accreditation (NSW government) of the Taylex AWTS specifies permitted uses of effluent “for re-use for garden purposes by way of any of the forms of irrigation as described in AS/NZS 1547:2012” As mentioned, disposal into drainage cells situated under a carpark does not fit any description in the Standard.

The unconventional and in some cases the seemingly ad hoc manipulation of parameters in the Byron model to support what appears to be a pre-judged area for the disposal zone under a carpark arouses concern.

Of concern are also the reduced ability to observe the state of the disposal zone in spite of the provision of observation ports located at ground level, and the inability to dismantle the system (built under a carpark) if it fails, unless the carpark itself is temporarily or permanently dismantled.

Antony McCardell, 28/09/2022