30 November 2023

The Chief Executive Officer
Toowoomba Regional Council
PO Box 3021
Toowoomba QLD 4350

RECEIVED
30/11/2023
TOOWOOMBA
REGIONAL COUNCIL

Dear Sir/Madam,

Information Request Response (Pursuant to Section 13.2 of the *Development Assessment Rules*)
Your Ref: MCUI/2023/991
345 Punchs Creek Road, Punchs Creek QLD 4357
Lot 39 N25188, Lot 1 RP22800, EMT P SP162209, Lot 2 RP22800, Lot 2 RP60015, Lot 11 ML72, Lot 144 ML72, EMT Q SP162210, Lot 145 ML72, Lot 149 ML412 and EMT R SP162210

On behalf of Punchs Creek Renewable Energy Pty Ltd we refer to Toowoomba Regional Council's information request, dated 21 April 2023, and the further advice required items raised via email received on 23 November 2023, for the development application over the above site.

Pursuant to section 13.2(a) of the *Development Assessment Rules* (DA Rules) we provide our response to this information request below.

In support of the response, please find attached:

- **Attachment A**: updated Traffic Impact Assessment (prepared by Amber Organisation), including Turner Road Assessment (prepared by Friends Civil Engineering)
- **Attachment B**: updated Concept Surface Water Impact Assessment, including hydrologic and hydraulic analysis (prepared by Civil IQ)
- **Attachment C**: Operational Noise Assessment (prepared by Resonate Consultants)
- **Attachment D**: updated Landscape Character and Visual Assessment & Landscape Concept Plan, including lighting impact assessment (prepared by Accent Environmental)
- **Attachment E**: Ecological Impact Assessment – Turner Road (prepared by Terra Solutions)
- **Attachment F**: amended Planning Scheme Code Response
- **Attachment G**: amended Site Concept Design Layout plan
- **Attachment H**: Access Route Infrastructure (Pipe) Assessment (prepared by Friends Civil Engineering)
- **Attachment I**: Summary of IR and Further Advice Required Responses

We confirm this letter and attachments constitute our response to Council's information request.

We will now seek to proceed with public notification of the development application in accordance with Section 16.3 of the DA Rules. Noting Section 53(12) of the *Planning Act 2016*, which sets out that a 'business day' as it relates to public notification does not include a day between (and inclusive of) 20 December of one year and 5 January of the next year, we will seek to proceed with public notification of the development application on or after 6 January 2024.

INFORMATION REQUEST

1. Traffic Impact Assessment

Information Required:

The applicant is requested to provide an amended Traffic Impact Assessment (TIA) and include an assessment consistent with the methodology outlined in the TMR Guide to Traffic Impact Assessment to address the items raised above, and must include but not be limited to the following:

1) Inclusion of both Stage 1, Stage 2 and decommissioning assessment details.
2) Further information about the use of shuttle buses including staff utilization assumptions and pick-up locations. Table 3 must be corrected for 'vehicles per day' and 'vehicles per hour'. The traffic volumes in Section 4.2 must be consistent with Table 3.
3) Road Safety Assessment including a typical section or detail showing how roadside vegetation could be retained when Turners Road is sealed. The inadequate safe intersection sight distance at Turners Road south along Gillespies Dam Road must be addressed.
4) Pavement Impact Assessment. Default state-controlled road values for the marginal cost will need to be used as Council does not collect this information.
5) Transport Infrastructure Assessment; and
6) Impact Mitigation.

Note: The TIA must be prepared by a RPEQ or under the direct supervision of a RPEQ. The RPEQ must be identified and sign the report.

Response

The TIA, prepared by Amber Organisation and Friends Civil Engineering, has been amended to provide updated information on construction traffic generation and movements, construction duration and peak, and other amendments as follows:

1 Inclusion of both Stage 1, Stage 2 and decommissioning details.

2 Further detail on shuttle bus usage and movements has been included in Section 3.1.1, 3.2 and 9.3. Following discussions with Council the number of shuttle buses proposed has been reduced to provide a conservative assessment.

The traffic volumes in the Table 3 are correctly labelled as vehicles per hour which is how Level of Service is determined. No change has been made to Table 3. Section 4.2 has been amended.

3 Road Safety Assessment is provided in Section 8. TIA Appendix E (Existing Road Formation Assessment: Turners Road, Punchs Creek) provides drawings: Typical Road Cross Sections and Details (Sheet 1 of 2 and Sheet 2 of 2) showing how roadside vegetation could be retained on Turners Road.

The inadequate sight distance noted relates to right turning vehicles from Turner Road onto Gillespies Dam Road. The development is not expected to generate this right turn movement and as such, there is no conflict with vehicles approaching from the south and this has been removed. This has been updated in Table 14 and reflected in Section 6.3.

4 A Pavement Impact Assessment has been completed and is now included as Section 5 of the TIA.

5 The structures along the local access route from Millmerran to Turner Road (access to site) have been assessed by Friends Civil Engineering. A separate report has now been included as **Attachment H** (Access Route Infrastructure (Pipe) Assessment). Tuner Road specific commentary on this can be found in TIA Appendix E (Existing Road Formation Assessment: Turners Road, Punchs Creek). As noted in the TIA (Section 4.1), the access route utilises National and Main roads that are designated for B-Double vehicles, and accordingly the access route is expected to be able to accommodate the loads and types of vehicle movement to be generated during construction of the project.

6 Impact Mitigation has been summarised in Section 8 and a basic Traffic Management Plan is included in Section 9.

The TIA has been signed by an RPEQ.

Refer to **Attachment A** for the amended TIA prepared by Amber Organisation and Friends Civil Engineering. Refer to **Attachment H** for the Access Route Infrastructure (Pipe) Assessment prepared by Friends Civil Engineering. Minor amendments to the Planning Scheme Code Response document (refer to **Attachment F** for further details) have been completed to reflect the amended TIA.

1.1. Further Advice Required

Issue:

The Traffic Impact Assessment (TIA) Rev C states the peak workforce is 200 people and this is a significant reduction from the Planning Report and original TIA (January 2023) which assumed a workforce of 450 people. This reduces the number of trips to the site and there is no explanation of why there is a significant change.

Further Advice Required:

Please explain why there is a significant reduction in the peak workforce from that stated in the original TIA and Planning Report.

Response

It is noted, in the amended TIA the estimated maximum peak workforce has been refined from 450 to 200 workers. This was the result of better representing the staging of the development (with Stage 1 including a 400MW SF). Splitting the development into Stage 1 and Stage 2 would mean the peak workforce numbers would reduce with the maximum stage size under construction at any one time rather than the original estimate based on the full development. The Applicant has also taken some time to interrogate contemporary construction workforce numbers on renewable energy projects.

For example, the 400MW solar farm in the Western Downs Green Power Hub, is reported to have provided a total of 337 on site (full-time equivalent) jobs over the construction phase (ref: https://westerndownsgreenpowerhub.com.au/solar-farm/ and https://westerndownsgreenpowerhub.com.au/wp-content/uploads/2022/08/Aurecon-Infographic-Western-Downs.pdfand) and through discussions with key project staff it is understood the peak workforce on the project was estimated at 220 workers for 12 months however, this timeframe was affected by the project being delayed three times, twice by rain events and once due to module delivery delays.

Another project of relevance is the 400MW New England SF in Northern NSW (https://www.acenrenewables.com/project/new-england-solar/). After detailed discussions with the EPC (Engineering, Procurement, Construction – main contractor), it was clear that higher workforce numbers on site caused financial, social and efficiency risks and these were realised. There is now detailed evidence that weather events such as floods and heavy rain have major impacts on workforces that cannot be mitigated, whereby efficiencies are depleted by larger numbers of work fronts open at one time (clashes). In addition, an emerging risk that differs from previous years is supply chain and logistics. In many recent projects, shipping delays, high demand for materials common across the globe like transformers, modules, cables and substation primary plant have forced EPCs to minimise work fronts and focus on diversified zones.

We have approached three Tier 1 EPCs and they all have the same view now, that construction needs to be de-risked and focus on smaller teams with higher impact. The industry is now experiencing increased productivity with smaller teams focusing on dedicated areas, higher skills in smaller teams, less issues with accommodation further away leading to decreased transit time, resulting in improvements in efficiency. Should delays from weather or supply chain occur, smaller crews can be moved and still be productive where larger teams are often displaced or stood down.

1.2. Further Advice Required

Pavement Impact Assessment

Issue:

The pavement impact assessment includes only a summary of pavement contribution costs and Council is not able to reconcile how the construction traffic in Table 2 converts to the pavement Impact assessment contribution in Table 12.

Further Advice Required:

Council requests a detailed breakdown of the peak construction traffic volume assumptions provided by Echo Consultants as summarised on page 8 and 9 of the TIA. We also require further detail about the type of heavy vehicle by vehicle class and SAR4 values so that the derivation of the PIA Contributions for Council Roads can be understood.

Response

The traffic volumes used for the PIA calculations are the average daily vehicle movements shown in Table 2 of the TIA, which represents the average across the construction stages (i.e. both the construction peak and phases where volumes would be expected be reduced). The volumes, heavy vehicle types, AustRoads classification and associated SAR4 values are shown in the table below. The SAR4 values used are consistent with those provided by TMR.

Table: Traffic Volumes, Vehicle Class and SAR4s

Heavy Vehicle Type	Daily (vpd)	*Austroads Class*	SAR4 Values – as provided by TMR		Calculated Daily SAR4 Values based on traffic volume		Total
			Unloaded SAR4	Loaded SAR4	Unloaded SAR4	Loaded SAR4	
MRV/HRV	8	*4*	0.5	3.57	4	28.56	**32.56**
Truck and Dog	4	*9*	0.51	4.93	2.04	19.72	**21.76**
19m AV	12	*7*	0.56	5.02	6.72	60.24	**66.96**
26m B-Double	8	*10*	0.53	6.3	4.24	50.4	**54.64**
	80	**-**	-	-	**17**	**158.92**	**175.92**

The total daily SAR4 value of 175.92 was used for the assessment of the Council roads (being that these roads carry all the truck volumes in both unloaded and loaded directions) along with the assumptions provided. The results are summarised in Table 12 of the TIA.

1.3. Further Advice Required

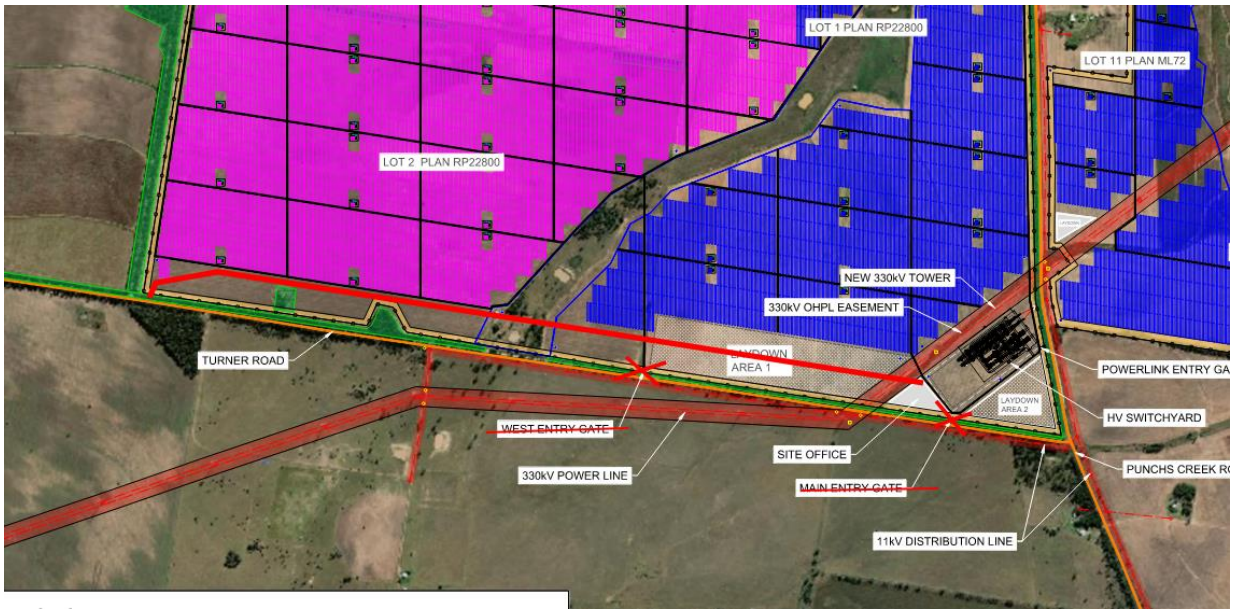
Site Access

Issue:

The proposed site access to Turner Road occurs in two locations at the west entry gate and main entry gate. The TIA assumes all vehicles will access the site from the west and this means construction traffic uses some 2.9km of Turner Road (gravel) and this road will be impacted by construction vehicles. If site access to Turner Road was confined to a single access driveway at the western end of the development site, then only some 500m of Turner Road (gravel) will be impacted by construction traffic. An internal access road could be provided within the development site.

Further Advice Required:

Please consider the provision of a single development access to Turner Road at the western extremity of the development site (Please refer to proposed access in red line on the below image). All of Stage 1 and Stage 2 traffic would use this access, reduce the damage to the gravel section of Turner Road and reduce the extent of seal extension works required.



Response

The Applicant has considered the suggestion of a single development access to Turner Road at the western extremity of the development site and is not in favour of this for the following reasons:

- As shown in the image above, the proposed access in red line would require the following impacts to:

    a) MSES Regulated vegetation (category B), Regulated Vegetation Management Category B containing endangered regional ecosystem, possible Threatened Ecological Community (TEC) associated with RE 11.4.3, and TRPS Areas of Environmental Significance and Areas of Environmental Significance Buffer.

The proposed development has deliberately avoided any impacts to these mapped areas (magenta overlay on the image), including in the south-western corner of the development land, specifically to remove any potential impacts to the flora, fauna and habitat values over which the mapping intends to prevent.

In the image to the left, it can be seen there is currently no existing farm access track through these mapped sensitivities, thus no opportunity to access the proposed development land with minimal/no impacts.

Additional approvals (e.g. Native vegetation clearing) would be triggered if impacts over these mapped sensitivities is required. The Applicant has intentionally avoided disturbance to this area of the proposed Development primarily to eliminate/minimise flora, fauna and habitat impacts, but also to reduce approvals/permit requirements.

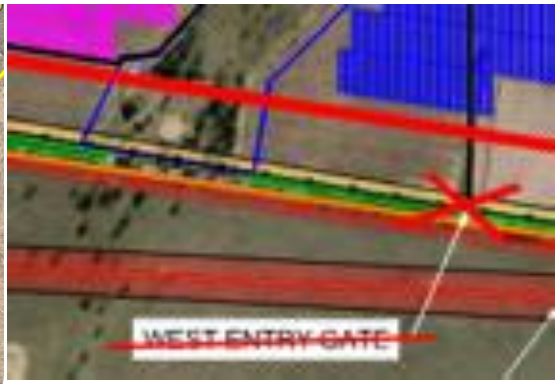
As shown in the image to the left, the proposed development identified an existing farm access point with no mapped sensitivities and has proposed this as the 'West Entry Gate' for primary access for all construction traffic and deliveries. Again, this has been proposed to deliberately avoid any impacts to mapped areas, specifically to remove any potential impacts to the flora, fauna and habitat values over which the mapping intends to prevent.

Whilst it is assumed the suggested single access at the south-western corner of the project land intends to minimise or avoid potential road widening/upgrade requirements to this gravel section of Turner Road, on balance the Applicant believes the West Entry Gate offers the least possible environmental and ecological impacts. And the *Existing Road Formation Assessment: Turners Road, Punchs Creek* by Friends Civil Engineering (Appendix E in amended TIA which is **Attachment A** in IR Response) report provides recommendations to upgrade the gravel section of Turner Road which would avoid/minimise any impacts to the roadside vegetation and all the flora, fauna and habitat values they represent.

b) A ~185m crossing over the unnamed tributary of Punch Creek, which is mapped as a Drainage feature (defined by *Water Act 2000*) and a Vegetation Management watercourse/drainage feature (under the *Vegetation Management Act 1999*) – see lefthand image below. The proposed development has intentionally avoided impacts to existing drainage, with only one potential crossing utilising an existing farm track.

   A new crossing for all construction traffic over this drainage line would likely require all-weather drainage infrastructure to be built to carry the heavy loads of the delivery vehicles, while Turner Road has been constructed and can be further upgraded to more adequately carry such heavy vehicle loads and the construction traffic.

   Notably, this crossing location would involve a land parcel (Lot 70 D36980) that is not part of this Development Application and is not owned by the Project Land landowner. The red line (on the further advice required image, extracted in righthand image below) is currently shown directly over the top of existing shed infrastructure owned by the neighbouring landowner, with whom no land use agreement exists. In short, it is not possible to cross over this uninvolved land parcel.



- Additionally, the proposed access in red line (on the further advice required image further above) would require crossing over/through the Powerlink easement and under the 330kV powerlines. This would involve a negotiated access agreement with Powerlink which is likely to include vehicle restrictions and other possible conditions of use.

In summary, whilst it is assumed the suggested single access at the south-western corner of the project land intends to minimise or avoid potential road widening/upgrade requirements to this gravel section of Turner Road, on balance the Applicant believes the proposed West Entry Gate offers the most practical and least impact access point for the Development. It presents the least possible environmental and ecological impacts, circumvents negotiating an access agreement with Powerlink which may involve conditions that can't be met, and crucially avoids seeking to cross through land that is not involved in the Development Application and over which the Applicant has no rights to access.

2. Stormwater

Information Required:

To demonstrate compliance with the above mentioned PO8 of the Integrated Water Cycle Management Code, the applicant is requested to provide a hydrologic and hydraulic analysis and conceptual design to demonstrate flooding and drainage characteristics upstream or downstream of the site are not worsened by the development. This analysis must include but not limited to the following:

1) Lidar or survey data sufficient to define the upstream and site catchments.
2) Determination of the 1% AEP pre and post development flood extents (including depth and velocity) within the Subject Site using advanced computer simulation modelling.
3) A site plan is required showing the location of solar modules and buildings within the Subject Site. Any solar modules within the 1% AEP flood extents will need to be included in the post-development flood model.
4) Infrastructure required to convey stormwater around the buildings in the south-eastern corner of the site will need to be included in the post-development flood model including details of how flood waters will be conveyed across Punchs Creek Road.
5) Plots showing as a minimum the flood extents, peak depths, peak velocity and afflux; and
6) A design report incorporating all the above information with concept design of mitigation works.

Response

To address the information required, the Concept Surface Water Impact Assessment prepared by Civil IQ has been amended to provide the following:

1 LiDAR and photogrammetry survey has been completed over the proposed development land and immediate surrounding areas. Site catchments were developed from numerous sources included Qld Govt, LiDAR, cadastre, watercourse data, etc., suitable for catchment delineation and can be found in Section 1.5 of the amended Concept Surface Water Impact Assessment report.

2 Flood modelling results include 1% AEP flood depths, levels and velocities for pre and post development, as well as afflux mapping. This has been detailed predominantly in Section 3 and Section 4 (and associated Figures 4-6, 4-7, 4-8, 4-9) of the amended Concept Surface Water Impact Assessment report. TUFLOW has been utilised for hydraulic modelling.

The model results illustrate that in a 1% AEP flood event for the developed scenario (i.e. post-development flood model) simulated:

- Flood flows can be diverted around key site infrastructure without impacting flood levels outside of the development site
- Increases in water levels of up to 400 mm would be expected within the existing drainage channels surrounding the switchyard
- Water depths within the powerline easement channel would increase to 0.75 m
- Flow velocity increases would be expected within the powerline drainage channel but peak flow velocity values broadly remain below 1.5 m/s.

3 A Site Layout Concept Design can be found in Appendix B of the amended Concept Surface Water Impact Assessment report and **Attachment G** of the IR Response. Detail regarding 1% AEP flood extents is included predominantly in Section 3 and Section 4 (and associated Figures 4-6, 4-7, 4-8, 4-9) of the amended Concept Surface Water Impact Assessment report. A Concept Stormwater Management Plan can be found in Figure 5-1 and is detailed in Section 5.2 and Section 5.3.

The flood model results illustrate that in a 1% AEP flood event for the developed scenario (i.e. post-development flood model) simulated:

- The solar arrays have been assessed to not have a significant impact on run off volumes, peaks, or times to peak, when associated with the provision of good vegetative ground cover throughout to replicate the existing scenario
- The impact associated with the infrastructure works are localised in the vicinity of the infrastructure footprint
- Flood flows can be diverted around key site infrastructure without impacting flood levels outside of the development site.

4 Flood modelling include 1% AEP flood depths, levels and velocities for pre and post development, as well as afflux mapping and are addressed predominantly in Section 4.4, Section 5.2, Section 5.3 and Figures 4-6, 4-7, 4-8, 4-9 and 5-1. The afflux mapping results (Figure 4-9) and reporting discusses the requirements for flooding/ stormwater management around proposed infrastructure footprints.

The flood modelling results show the impact associated with the infrastructure works are localised in the vicinity of the infrastructure footprint. Key outcomes of the modelling and assessment include:

- The solar arrays have been assessed to not have a significant impact on run off volumes, peaks, or times to peak, when associated with the provision of good vegetative ground cover throughout to replicate the existing scenario
- Flood flows can be diverted around key site infrastructure without impacting flood levels outside of the development site
- A minimum freeboard of 300 mm for the peak 1% AEP storm event level is to be determined for habitable buildings and critical infrastructure during future project development
- A treatment train approach is required to be adopted, with tertiary implementation measures, such as bioretention basins or wetlands, within the critical site infrastructure area development footprint to treat to the leading practice pollutant reduction targets prior to discharge to the receiving environment
- Erosion and Sediment Control measures are to be developed during the project development in accordance with the requirements of the Best Practice Erosion and Sediment Control Guidelines, IECA (2008), and in context of anticipated construction methods for the extent of works.

The stormwater quantity management (flooding/ stormwater management) measures for the site infrastructure area footprint are shown in Figure 5-1.

The site infrastructure area is located directly adjacent to the southern boundary of the site, within the vicinity of Punch Creek and tributaries to the east. From iterations of the flood modelling documented in Sections 3 and 4, the development areas have been setback a minimum of 10 m from the southern boundary to allow flows to be contained within the site without causing afflux beyond the site boundary in the 1% AEP event. The site infrastructure ground elevations have been raised which acts as a diversion channel in the flood model to divert the flows around the footprint as shown in Figure 5-1 to ensure no afflux to external properties and ensure conveyance of flows downstream. The existing channel through laydown area one is required to be maintained

and increased to 15 m width. The existing channel to the west of the HV switchyard has existing bunding on each side. The eastern bund of this channel has been removed along the length of the proposed site infrastructure footprint to Punch Creek Road, which increases the width of this channel by 10 to 15 m providing additional capacity for flows in the 1% AEP event.

With these proposed works, the afflux is contained and managed within the site and does not require the upgrade of any stormwater infrastructure at Punchs Creek Road and elsewhere within the developed site as shown in the flood modelling results.

A minimum freeboard of 300 mm for the peak 1% AEP storm event level is to be determined for habitable buildings and site infrastructure during future project development. Further development of the layout of the site infrastructure area, and actual impervious extents within the 30.2 Ha footprint needs to be developed during future project development and stages.

Drainage from the site infrastructure area is to be determined upon further development of the layout and footprint of works. Stormwater drainage from the site is to discharge to the existing channels in the vicinity of the infrastructure works.

5 Flood modelling results include 1% AEP flood depths, levels and velocities for pre and post development, as well as afflux mapping and have been detailed in Section 4.4 and Figures 4-6, 4-7, 4-8, 4-9 of the amended Concept Surface Water Impact Assessment report.

6 The amended Concept Surface Water Impact Assessment (Rev B) prepared by Civil IQ incorporates all the above information with concept design of mitigation works, as detailed in Section 5.3.1 and Figure 5-1.

Refer to **Attachment B** for the amended Concept Surface Water Impact Assessment prepared by Civil IQ. Minor amendments to the Planning Scheme Code Response document (refer to **Attachment F** for further details) have been completed to reflect the amended Concept Surface Water Impact Assessment.

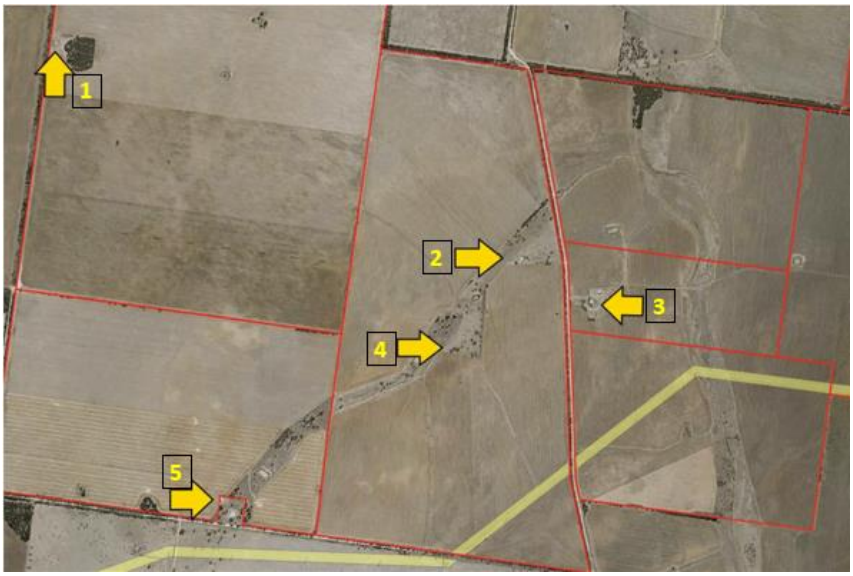
3. Potential Sensitive Receptors

Information Required:

The applicant is requested to provide the following:

1) Further information on the current and future uses of the dwellings / buildings as indicated by the arrows noted above. Each site may be a receptor of noise and dust emissions (aside from one caretaker only) and would trigger further assessment against the Environmental Standards Code and Rural Uses Code.

Response



With reference to aerial image above, the following additional information on the current and future uses of the dwellings/buildings located on/near the proposed development land has been provided to Council:

1 consists of sheds, which will be removed or demolished as this area is within the Development footprint.

2 is a residential dwelling (farmhouse) and outbuildings. At this stage, these buildings are to be removed or demolished as they are expected to be within the Development footprint. Final determination of these buildings can be discussed further and may not be known until detailed design stage.

3 is a residential dwelling (farmhouse) and outbuildings. This is to be retained and has been designed around in the footprint. This dwelling can be used as accommodation during construction and then may be used as accommodation for O&M staff. Further detail on this is not known at this stage.

4 is an old unused building and will be demolished as this area is within the Development footprint.

5 is a non-residential building (consisting of 2x shipping containers under a roof, with attached water tank, and small sheds as outbuildings). These buildings are located in a parcel that is not involved in the project land and is not owned by the involved landowner. However, it is understood the site is seldom used and mostly used for storage of machinery, etc.. Brief discussions have been held with this property owner and no issues or concerns have been raised regarding the proposed development.

PO8 of the Rural Zone Code response has been amended to clarify that the residential dwelling (shown as site 3 above) on Lot 11 ML72 is proposed to be a possible caretaker accommodation during construction and potentially also during operation of the proposed development.

Refer to **Attachment F** for the amended Planning Scheme Code Response document.

4. Noise Emissions

Information Required:

To demonstrate compliance with the abovementioned Performance Outcome PO8 of the Environmental Standards Code and PO8 of the Rural Zone Code, the applicant is requested to submit an Acoustic Impact Assessment, completed by a suitably qualified person, that must include but not limited to the following:

1) Description of all site activities, plant and equipment and related noise sources that includes:
   (a) operational and maintenance activities and their relevant noise sources,
   (b) numbers of each type of plant and equipment and their location over the site;
   (c) vehicle movements;
   (d) regulated noise devices integral to site operations.
2) Location of sensitive receptors relative to the proposed development, including on and off site.
3) Assessment criteria for compliance including day, evening and night time limits for clearly defined normal operating hours for each component of the development.
4) Monitoring of Background noise levels (L_{90}).
5) Modelling of cumulative impacts from the proposed use on all existing sensitive receptors.
6) Model results should be presented in both noise contour plots and tabulated summaries for identified receptors.
7) Descriptions of specific mitigation treatments, management methods and procedures that will be implemented to control noise during site activity and operations; and
8) A complaints management procedure that must include the following:
   (a) a contact person with whom complaints can be lodged;
   (b) a clearly defined procedure for responding to and investigating complaints; and
   (c) a notification protocol to all complainants of the outcome of complaint investigations.

Response

To address the information required, an Operational Noise Assessment has been completed for the proposed development by an experienced acoustic consultant from Resonate Consultants. The

assessment determined the following regarding the potential operational noise impacts associated with the Project:

- the predicted variable and continuous operational noise levels of the Project during neutral weather condition are expected to comply with the variable and continuous noise criteria at all surrounding residential receivers.
- during noise enhancing meteorological conditions, the variable and continuous operational noise levels have been predicted to comply with the variable and continuous noise criteria at all surrounding residential receivers.
- to ensure that the operation of the Project achieves all Project specific criteria during all meteorological conditions, it is recommended that all PCUs are to be installed at locations that are at least 1 km away from any residential building facade.

Appendix D in the Operational Noise Assessment contains a complaints management procedure, which could be amended to include project-specific details (e.g. contact name/s and number/s) in preparation for commencement of operation.

Refer to **Attachment C** for a copy of the Operational Noise Assessment report.

Minor amendments to the Planning Scheme Code Response document (refer to **Attachment F** for further details) have been completed to reflect the findings of the Operational Noise Assessment report, which determined the proposed development will be compliant with the noise levels listed in the Planning Scheme.

4.1. Further Advice Required

Issue:

1. Default background levels

Section 3.2 includes a note regarding low background noise levels and Prescribed Noise Criteria (PNC):

> "The DEHP's PNC acknowledges that maintaining background levels in very rural areas below 25 dB(A) may not be possible. It recommends that in such cases, a threshold background level of 25 dB(A) is to be used."

This is followed by a footnote to Table 4 that states:

> "In accordance with the Noise EPP, the background noise level has been set to 25 dB(A) as the measured L90 level is below the 25 dB(A) threshold."

It is unclear where this threshold of a default 25dB background level comes from. The Noise Measurement Manual, V 4.01 (DES, 10/03/2020) and the EPP (Noise) 2019 do not include any such default criteria. Council could not find any default background criteria in any DEHP noise manual. Toowoomba's Planning Scheme also does not include default background noise criteria.

2. Duty Cycles

Section 5.1 includes the following discussion of noise source duty cycles:

> "The maximum utilisation for a battery storage is typically 80% of peak system capacity during day and evening periods, and usually less than 50% during the night-time period. Based on this understanding, this assessment has considered the following typical operational utilisation capacity:
> • Day & evening – 100% duty factor
> • Night-time – 50% duty factor"

Further information is requested to confirm the 50% duty factor during night time activity. Many battery storage developments run 100% duty cycle at night time as peak loading and higher capital return can occur during night time periods (higher family use, TV, internet, heating and air conditioning of residential dwellings, etc).

Further Advice Required:

Please provide further information on where the default 25dB criteria comes from. Council will consider the source and its relevance to Qld development assessment. Revision of the noise criteria to the lower monitored levels is considered likely.

It is anticipated that night time peak use of the PCU's will be 100%, Noise assessment should include representative modelling of reasonable peak operational capacity. Night time duty cycle should therefore be modelled at 100%.

Please revise modelling and the report to address the issues noted above.

Response

1. In response to the source of the default 25dB background level, DEHP's Noise Control Guideline has been added to **Attachment C.** The guideline states on page 3 of 19, under Table 2 that, "It may not be possible to maintain background levels in very rural areas below 25dBA as developments occur. In such cases a threshold background level of 25dBA is to be used."

2. In response to the battery 50% duty factor during night-time, the Applicant provides the following information:

   - The proposed plant has a connection of 400MWac to the grid. This represents the maximum possible export capacity of the plant (comprising solar and battery technology).
   - The battery size is 200MW/400MWh (2hrs duration at 50% of max export). This means the battery represents a maximum of half the capacity of the plant, thus can only discharge up to 50% of the peak system capacity at any time.
   - The battery will almost always charge during the middle of the day at negative pricing events, during which export will be 0%, unless there is a network event that requires FCAS or similar grid support. Effectively the duty cycle during day would be 75-100% depending on network needs.
   - The battery has a maximum discharge capacity of 200MW, which is half the export limit and that will almost always be discharging at peak periods in the evening for 2hrs. During the evening the solar plant will not be operating (as there is no longer sunlight), thus the plant could only reach a maximum 50% duty factor if the maximum battery export is occurring.
   - It is expected there would be less than 5% chance the battery will cycle after 8pm, because the import charging cost would exceed the export value and the system would lose money. The exception to this operational approach is in the rare event that the grid owner requests network system support.

   In summary, the duty factor could be further refined to the following typical operational utilisation capacity:

Day (7am – 6pm)	75-100% duty factor
Evening (6pm – 10pm)	50% duty factor
Night (10pm – 7am)	0% duty factor

   It is possible, from the wording of the further advice required, the reviewer may be considering the proposed battery system operates similarly to a house battery that charges and discharges daily and, more specifically at evening/night it cycles for full duration and the full capacity of the house system. This is not the case with a utility battery system which functions as per the typical operational utilisation capacity as described, and for the reasons outlined, above. As such, no revision or amendment to the modelling and reporting is required.

5. Air Quality (Dust)

Information Required:

In response to the abovementioned Performance Outcomes of the Environmental Standards Code, the Rural Uses Code and the Landscape Code, the applicant to requested to provide further information including but not limited to the following:

1) Dust deposition modelling in mg/m2/day for the development site on all sensitive receptors. Emissions rates should be quantified by both wheel and wind bourne dust from all exposed surfaces. Estimated vehicle generated dust emissions should be based on the numbers of vehicles per day for light, medium and heavy vehicles

2) Revise mitigation and management measures to ensure compliance is achieved; and
3) Include additional areas of landscaped vegetation within development land to improve impact mitigation and help maintain the character and ambience of the local area.

Response

As per correspondence with Council following issue of the Information Request, the applicant has not undertaken dust deposition modelling for the development site but rather has provided more information to support the basis that ground cover and appropriate site management during operation as well as sufficient separation from nearest residential uses, supports the responses provided in the Environmental Standards Code (PO20, PO21 and PO22) which have also been amended with more detail. It was noted by Council, this information request item is not related to construction and Council will set limits in conditions if the development is approved, thus this response focusses on operations. In support of the code responses the applicant provides the following:

In our experience, most solar farm sites have vigorous ground cover regrowth, so much so they require ongoing mowing or have introduced sheep grazing to manage.

Ground cover regrowth is successful within solar farming infrastructure because tracking systems allow panels to move with the sun's movement through the day. This means the ground is receiving sunlight and shade, which improves growth and quality because the ground is not constantly shaded or baked under the sun. This also allows for greater moisture retention, again fostering vegetation growth and retention. In other words, the shading effect of solar panels creates a micro-climate under the panels with differences in air temperature, humidity, wind speed and soil moisture. This leads to higher water efficiency and soil moisture retention. This would assist with pasture production for sheep grazing.

Given the local sheep grazing land use in proximity to the development land, it is likely a sheep grazing activity will be utilised (via agistment or other arrangement) within the development to continue the agricultural use of the project lands and manage the ground cover. Other complimentary uses that may be considered during operation include bee keeping, which would also provide benefit to local cropping activities with pollination and biodiversity improvements. Some useful articles and links related to the first three points in this response section are provided here:

https://lightsourcebp.com/news/six-reasons-why-solar-farms-make-great-grazing/

https://reneweconomy.com.au/uk-pm-says-solar-farms-are-a-blight-on-the-landscape-heres-how-they-benefit-wildlife/

https://assets.cleanenergycouncil.org.au/documents/resources/reports/agrisolar-guide/Australian-guide-to-agrisolar-for-large-scale-solar.pdf

https://www.abc.net.au/news/rural/2022-05-30/solar-farm-grazing-sheep-agriculture-renewable-energy-review/101097364

https://www.linkedin.com/posts/gavinmooney_renewables-solar-rooftopsolar-activity-7117625749846560768-2yOx?utm_source=share&utm_medium=member_ios

https://edifyenergy.com/project/gannawarra-solarfarm/

As noted in the response to AO20 Environmental Standards Code in the Planning Scheme Code Response document, *all frequently used areas for vehicle manoeuvring are to be hardstand areas in line with the appropriate staging of the development*. This will ensure that areas where vehicles are most likely to be moving will have a gravel or other hardstand finish, which will result in minimising dust fall.

In operation, most vehicle movements within the facility will involve light vehicles and would typically remain on the developed internal access tracks/roads which will have a road base surface. It is expected up to 10 LVs may be required during operations of the full development, however movement of those vehicles on any given day is expected to be minimal and dependent on what maintenance activities are active. For instance, it is highly unlikely all 10 LVs would be moving around the site at the

same time. Typically, only one or two LVs may be moving on site at any one time. Vehicle movements on site are also speed limited (during construction and operation) to minimise dust generation.

The Powerlink Substation will have blue-metal rock cover over most of the surface and internal roads will be spray sealed. This will result in minimal, if any, dust generation.

It is expected Council will require Operations Management Plan/s, that would include aspects such as Air Quality (Dust) and Ground Vegetation Control/Cover, which would be approved prior to commencement of operations. Such plan/s will document appropriate mitigation and management measures to ensure compliant operation of the renewable energy facility. For instance, it would be standard practice to notify local residents of scheduled maintenance activities that have the potential to generate higher than normal operations dust levels. Mitigation measures such as dust suppression (water spray and/or geo-binder/dust retardant products) could also be employed in the event of such dust generating activities. Ground vegetation coverage could be monitored to ensure a minimum percentage of ground cover is achieved across the site, with agreed mitigation measures to address any deficiencies detected. The plan/s would include a complaints management procedure including project-specific details (e.g. contact name/s and number/s) in preparation for commencement of operation.

Additional vegetation screening areas are now detailed in Section 5.2, Figure 5.1 and Section 6 (Landscape Plan) of the amended LCVIA & LCP prepared by Accent Environmental, to improve impact mitigation and help maintain the character and ambience of the local area (refer to **Attachment D** for further details).

The Planning Scheme Code Response document has been amended to include some of the above information to better respond to PO20, PO21 and PO22 of the Environmental Standards Code and other relevant code responses have also been updated (refer to **Attachment F** for further details). The main amendments to the code responses include:

The proposed development is not adjacent to any residential use, with the nearest residence located approximately 274m from the site and the majority of nearest receivers being located more than 900m from the site.

> It is noted Table 9.4.2:2 does not nominate a minimum separation distance from a Renewable Energy Facility use. However, the proposed development exceeds the minimum separation distance (from nearest receiver) nominated for Forestry use, and Cattle dips and yards. Regardless, the proposed use is sufficiently separated from receivers and the proposed activities are consistent with the communities' expectations for a use in this locality given this land is currently used for cropping activities.
>
> In operation, most vehicle movements will be LVs within the facility and would typically remain on the developed internal access tracks/roads, which will have a road base surface. All frequently used areas for vehicle manoeuvring (e.g. carpark and storage areas) will be hardstand areas to minimise dust. The Powerlink Substation will have blue-metal rock cover over most of the surface and internal roads will be spray sealed, resulting in minimal (if any) dust generation.
>
> The areas under the solar pv panels will remain pervious and ground cover will regrow, with the ground receiving sunlight and shade as the panels track the sun's movement throughout the day. An operations management plan/s to monitor and address ground vegetation coverage and address any community complaints, can be conditioned for approval by Council and implemented during operation.
>
> The proposed use involves retention of almost all the existing roadside and fence line vegetation and will plant additional vegetation screening areas. This vegetation within the development land and on roadsides will improve impact mitigation and help maintain the character and ambience of the local area.

These factors will serve to minimise dust generation and thus dust nuisance for the nearest receiver/s.

6. Environmental Management Plan

Advice only, no response required.

7. Lighting Impacts

Information Required:

To demonstrate compliance can be achieved with Performance Outcome PO1 of the Environmental Standards Code, the applicant is requested to submit a Lighting Impact Assessment using the model outputs against the above stated criteria. This assessment should include, but not be limited to:

1) Site plans showing where all lighting is proposed.
2) Luminance levels for each lighting device.
3) Model impacts on all adjacent receptors; and
4) Discuss what mitigation measures within the site are required to reduce the risk of lighting impacts.

In addition, to demonstrate compliance with PO3 of the Landscaping Code, the applicant is requested to include additional areas of landscaped vegetation within the development land to improve impact mitigation and assist to maintain the character and ambience of the local area.

Response

To address the information required, the LCVIA & LCP prepared by Accent Environmental has been amended to provide the following:

1 Appendix D provides a Lighting Impact Assessment, including plan showing where lighting is proposed (Figure 4.5).

2 Section 4.3.3 and Table 7 provide detail on minimum substation lighting illumination levels (in accordance with Powerlink requirements).

3 Section 4.3 discusses night lighting involved in the proposed development, predominantly during operation, and provides a lighting impact assessment including model of lighting from substation on adjacent receptors (Figure 4.5). Lighting impact mitigation is also discussed in further detail in Section 4.3.6 and Section 5.

4 Additional areas of screening vegetation are now provided in Section 5.2, Table 5.1, Figure 5.1 and Section 6 (Landscape Plan).

Refer to **Attachment D** for further details.

Minor amendments to the Planning Scheme Code Response document (refer to **Attachment F** for further details) have been completed to reflect the lighting impact assessment (including model of lighting from substation on adjacent receptors (Figure 4.5)) incorporated in the amended LCVIA & LCP, which determined the proposed development will be compliant with *AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting*. Most of the relevant Code responses already state, *Lighting for the proposed development will comply with the Australian Standards* or otherwise refer to lighting in accordance with AS4282.

8. Ecological Significance – Road Widening

Information Required:

To meet the 'avoid and minimise impact' requirements of Performance Outcome PO1 of the Environmental Significance Overlay Code, all potential road widening works should retain all existing vegetation within the road reserve.

If road upgrades are unavoidable and it is not possible retain all existing vegetation within the road reserve, the applicant is requested to provide an Ecological Impact Assessment for Council consideration, that includes but is not limited to:

1) Desktop assessment from relevant flora and fauna databases.
2) Site investigations for areas of remnant vegetation, essential habitat for fauna and protected plant found either on site or believed to occur on site.
3) Confirm footprint of all operational areas and roads required to be cleared, areas to be retained and areas to be rehabilitated
4) Discussion of road upgrade options including possible alternate routes, quantitative analysis for the route providing the least amount of vegetation loss.
5) Ecological and habitat assessment of all road corridors, including species, densities and species diversity for each side of the road.
6) Consideration of clearing only one side of the road to maximise the retention of vegetation.
7) Discussion of the implications and requirements under State and federal legislation, including the Vegetation Management Act 1999, Nature Conservation Act 1992, Water Act 2000, and EPBC Act 1999.
8) Discussion of matters of local environmental significance including how the development will:
   (a) Avoid impacts on the biodiversity values of ecosystems, areas of ecological significance and biodiversity corridors;
   (b) Maintain ecological processes and the ecosystem services provided by areas of ecological significance;
   (c) Retain connection of habitat areas and biodiversity corridors;
   (d) Restore and rehabilitate any degraded ecosystems, habitats and corridors;
   (e) Protect ecological values and processes of waterways and wetlands;
   (f) Protect water quality and riparian habitat of waterways on site or those receiving runoff from site.
9) Provision of managed buffers between operational areas, sensitive receptors, ecologically significant areas and waterways; and
10) Provision of a Rehabilitation plan for end of life or staged operations.

Response

An Ecological Impact Assessment of the extent of roadworks required on Turner Road to achieve the quoted road standard and in consideration of all items included in the information required (per above) has been completed. The ecological assessment followed the completion of the *Existing Road Formation Assessment: Turners Road, Punchs Creek* by Friends Civil Engineering (Appendix E in amended TIA), which investigated the impact on formal road profiling of the existing gravel road and potential for widening of the existing sealed and gravel road sections to achieve the total 14m corridor width and how this would impact existing vegetation along the Turner Road corridor.

In sections where the 14m total road formation width is not currently achieved and where vegetation impacts may occur, Friends Civil Engineering (2023) has proposed three alternative options that would achieve a formation width of 8.0m whilst avoiding impacts to roadside vegetation. This would be achieved through steeper batter grades than the TRC standard of 1 in 6.

The Ecological Impact Assessment provides an assessment of the environmental values – including implications and requirements under the relevant State and federal legislation – of the roadside vegetation along Turner Road (referred to as Assessment Area) and identifies key impacts if widening follows the TRC Typical Cross Sections for regional roads.

This assessment confirmed that matters of Local, State and National environmental significance are present within the roadside vegetation of Turner Road. The identified values identified within the assessment area include:

- One Threatened Ecological Community (TEC) listed under the EPBC Act, Brigalow (*Acacia harpophylla* dominant and co-dominant).
- Hollow-bearing trees with potential to support listed threatened species and/or breeding places for native fauna on both sides of Turner Road. It is noted that substantially more hollows are present on the northern side of Turner Road.
- Hollow-bearing trees occur in areas that are mapped as non-remnant and are located outside of the mapped areas of ecological significance under TRC's Planning Scheme.

- No conservation significant flora or fauna, or signs of their presence, were detected during the field investigation, nonetheless 13 conservation significant fauna species and one flora species have potential to occur in the Assessment Area.
- The Assessment Area is traversed by a high risk (red) and low risk (green) Waterway for Waterway Barrier Works (WWBW).

The presence and potential presence of matters of environmental significance within the 14 m wide corridor indicates that impacts, some of which may be potentially significant, are likely to occur if road widening follows the TRC Typical Cross Sections for regional roads.

The Ecological Impact Assessment concludes the proposal options presented by Friends Civil Engineering in *Existing Road Formation Assessment: Turners Road, Punchs Creek* (2023) would ultimately avoid impacts to matters of environmental significance by avoiding the removal of potential critical habitat features and vegetation clearing within EPBC Act listed threatened ecological communities.

Furthermore, the Friends Civil Engineering report identifies additional benefits in avoiding impacts to matters of environmental significance and retaining the existing vegetation would include, maintaining the landscape values of Turner Road for road users and the local community; and maintaining the noise, dust and visual buffer or relief offered by the vegetation for the local residents along Turner Road.

Therefore, it is believed implementing the proposed options presented by Friends Civil Engineering and supported in the Ecological Impact Assessment, will achieve an outcome which balances a range of factors to achieve an acceptable compromise.

Refer to **Attachment A** and **Attachment E** for further details.

9. Landscaping

Information Required:

The applicant is requested to provide information demonstrating the need of providing Asset Protection Zone (APZ) Buffer.

To demonstrate compliance with the above mentioned PO8 of the Rural Zone Code, the applicant is requested to submit an amended landscape plan addressing the following:

1) Demonstrate how the visual amenity issues are to be mitigated.
2) Indicate suitable landscaping provision to screen the proposed infrastructure and buildings; and
3) Include further detail relating to the proposed plant species mix, locations and quantity within the prepared mass planting areas.

Response

The Asset Protection Zone (APZ) Buffer illustrated on the concept layout plan and noted in the LCVIA & LCP, is not related to any risk associated with the Bushfire Hazard Overlay. An internal clearance and APZ buffer has been included as a measure primarily to protect the proposed asset infrastructure from tree falls. It is standard practice on solar farms to allow a separation buffer, of at least the height of the tallest tree, to the built infrastructure. This is also to minimise or avoid shading on the solar pv panels which reduces the generating output of the asset.

The LCVIA & LCP prepared by Accent Environmental has been amended to address the information required and provides the following:

1 Additional areas of screening vegetation are now provided in Section 5.2, Figure 5.1 and Section 6 (Landscape Plan).

2 Visual impact mitigation is discussed in further detail in Section 4.3.6 (for lighting) and Section 5.

3 Further detail relating to the proposed plant species mix, locations and quantity is discussed in Section 6.1, Figure 6.3, Figure 6.4, Drawing numbers 1 of 4, 2 of 4, 3 of 4 and 4 of 4 at the end of Section 6 and Appendix C.

The Planning Scheme Code Response document has been amended with responses to the Environmental Standards Code and other relevant codes now referring to the landscaping as detailed in the Landscape Concept Plan.

Refer to **Attachment D** and **Attachment F** for further details.

10. Social Impact Assessment

Advice clarification provided by Council, no response required.

We look forward to working with you on this development. Should you have any queries or require any further information, please contact me per the details below.

Yours faithfully,

Claire Driessen
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Encl. As above (Attachments A to I)