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7 February 2024

Gerrit Prent
Senior Development Planner
Equis

By e-mail: Gerrit.Prent@equis.com

Dear Gerrit

Re: Calala BESS: SSD 52786213
Response to submission regarding Water Management

Reference the submissions received from Tamworth Regional Council (TRC) and DPE Water in response to the submitted EIS. The details of the submissions are provided as follows:

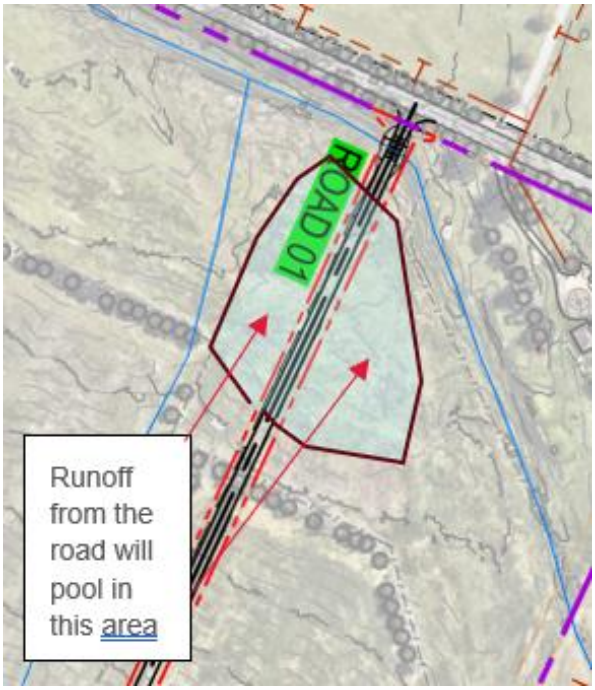
- TRC submission – letter to DPE dated 4 Jan 2024 and signed by Sam Lobsley from TRC. Relevant sections:
  - 2. Hydrology and Water Resources
  - 3. Stormwater Management
  - 4. Erosion & Sediment Controls
- DPE Water Submission – letter to DPE (ref: OUT23/20339) dated 13 Dec 2023 and signed by Tim Baker. Relevant sections:
  - 1.0 Water supply
  - 2.0 Controlled Activities on waterfront land
  - 3.0 Groundwater Interception and Licensing

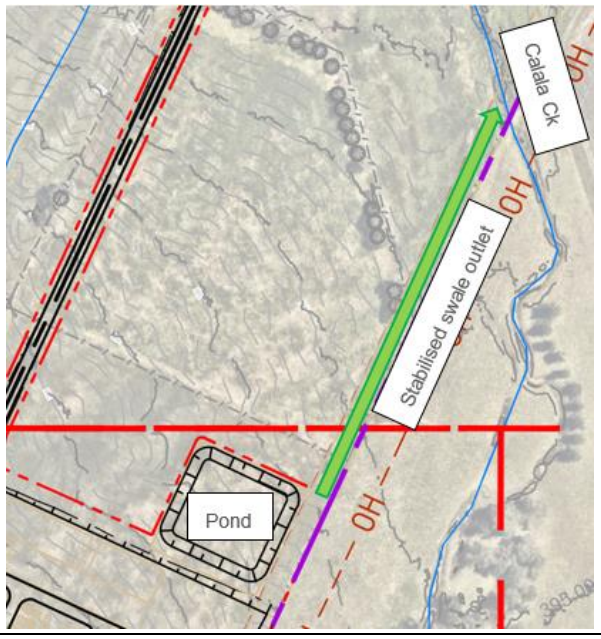
This response represents an Addendum to the previously submitted report by Northrop titled: *Water Management Plan: Calala Battery Energy Storage System* (Rev C, dated 24.07.23)

TRC submission comments and responses

Submission comment	Response
2. Hydrology and Water Resources Consideration should be given to the potential operational water demands of the Project in regard to dust suppression for any unsealed internal access roads and the ongoing maintenance of any supplementary landscaping.	Refer to Attachment 1 for calculations of water demand for the project during both construction AND operational stages. In summary for Operational Stage, the total estimated water demand in Year 1 (after which demand for water will be negligible) is 4.33 ML. This is considered to represent a likely worst-case scenario. Demand in Year 1 after construction would vary in very hot, dry or wet construction periods. One (hot, dry) day demand may be high, and the next (after overnight rain), there may be no demand at all. Summer days will have the highest demand. After year 1, the site will have stabilised and the landscaped vegetation will no longer require irrigation. With no workforce on site, the only

	water demands on an ongoing basis will be annual testing of the fire emergency control system. This testing is assumed to have a demand of 10 kL/annum that would require top-up of the tanks.

Submission comment		Response
3. Stormwater Management The site management consists of collection and conveyance systems directing runoff to a proposed wet basin. The stated objectives are to capture sediment from unsealed areas (during the establishment, operation and decommissioning phases), and to trap pollutants from battery cells in the event of a fire. The nominated water management plan should be updated to require:	The treatment of potentially turbid water generated by the unsealed access track, which is located downstream of the proposed wet basin. Sediment basins could be incorporated upstream of the interface with Calala Creek.	The road approach to Calala Creek is on very flat land where runoff will tend to pool and flow slowly, thereby allowing sediment to settle on the farm paddocks. Therefore, sediment basins are considered to be superfluous in this situation. However, if treatment is required, this may be resolved subject to approval conditions. 
	Definition of the overflow channel alignment from the proposed basin, including details of the discharge arrangement to Calala Creek.	The overflow channel will be a vegetated swale that discharges into Calala Creek, as shown indicatively over. The discharge arrangement will comprise a rip-rap outlet to blend in with the banks and bed of Calala Creek.

		
	Incorporation of a staged throttled outlet above the permanent water level on the wet basin (piped outlet in combination with higher level overflow weir) to provide a detention function as well as a retention (sediment settling) function.	Comment: A sensible inclusion and easy to incorporate into a detailed design Recommend this be conditioned by DPE.
	The incorporation of a mechanism for closing off the lower-level piped outlet (by way of a simple drop-in board or similar) would enhance the chances of successfully intercepting and removing contaminants from the basin in the event of fire damage to the battery cells.	Comment: A sensible inclusion and easy to incorporate into a detailed design. Recommend this be conditioned by DPE

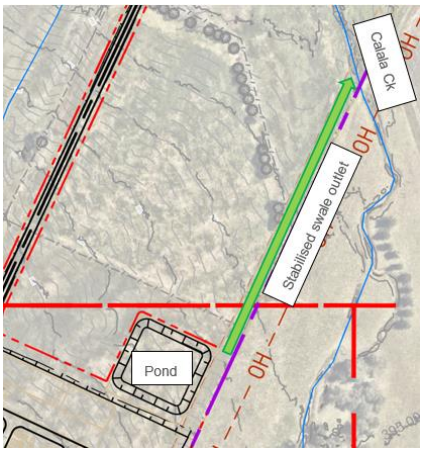
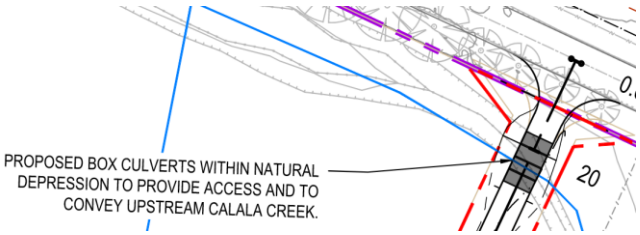
Submission comment	Response
4. Erosion and Sediment Controls The Applicant has indicated a commitment to prepare a Soil and Water Management Plan (SWMP) in accordance with the 'Blue Book' Volume 1 *Managing Urban Stormwater: Soils and Construction* (Landcom 2004). TRC	Erosion and Sediment Control Plans were provided in the Civil Engineering drawing package as part of the EIS submission (Sky Engineering). The plans show standard erosion and sediment controls that are consistent with the Blue Book, including: sediment basin (3,040m^3), sediment

stresses the importance of managing stormwater and soils to prevent offsite impacts and recommends the Applicant to look at synergies between managing the groundcover and stormwater runoff.	fencing, diversion drains stabilised with straw bale filters. They also show that run-on flows from upslope will be diverted away from the construction zone. Erosion and Sediment Controls were also discussed in the Water Management Report. It is the opinion of the author that this body of work satisfies the requirement of being in accordance with the Blue Book. However, Equis understands the importance of managing stormwater and soils to prevent offsite impacts and will continue to look at synergies between managing groundcover and stormwater runoff subject to appropriate approval conditions. The TRC comments in relation to groundcover and stormwater runoff synergies are note, with the following comments: • The site will need to be cleared for construction purposes. Clearing shall be minimised to prevent erosion, thereby groundcover would be maintained as much as possible, and it is in the interests of the Contactor to minimise disturbance. • The Contractor may elect to sow grass seed as a temporary cover crop to prevent erosion during the works (thereby providing groundcover) • A rehabilitation plan will be implemented to plant out bare areas. This will include batter slopes and other areas that may be disturbed, but not used for the operational stage. This will provide groundcover.

DPE Water submission comments and responses

Submission comment	Response
1.0 Water supply 1.1 Recommendation – prior to determination The proponent should provide clarification on the ability to obtain a secure water supply for the project. Explanation: Based on the information provided…, the water supply for the project is proposed to be sourced from Tamworth Regional Council and or bore and farm dams. However, none of these water supply options have been confirmed. The project needs to confirm a secure water supply prior to determination. This is to include relevant agreements where required and to demonstrate sufficient water entitlements can be acquired where necessary. Where the water is to be sourced from a currently unauthorised source and/or where additional water take infrastructure is required e.g., a bore, an impact assessment of this infrastructure development and water take will be required.	Council is correct in concluding that water supply options have not been confirmed. The intent of the Water Management Report was to indicate that there were several options present for both construction and operational stages of the project, and not to lock any particular option in. The main water demands will occur during construction and in Attachment 1, the water demand in the first year of construction is estimated at 14.9 ML and for the whole of the 18-month construction period will be 22.3 ML. There appear to be three sources of water that are options for the Contractor to access with agreements/approvals, including: 1. Council water supply – typically ample amount available, however, it needs to be trucked to site in tankers, and so is the highest cost and least-preferred (refer Attachment 2) 2. Maximum harvestable rights from existing farm dam and proposed sediment basin. The farm dams on site may yield adequate water to meet site demands during construction for 74% of the time, depending on weather conditions (refer Attachment 3) 3. Groundwater extraction from an existing or potential future Licensed Bore. Note that there are currently two Licensed Bores on the property (refer Attachment 4). The intended use is inconsistent with the Licensed use and approval to access this water for works would be required, in addition to an agreement with the bore/s licensees. This is an early stage of the project where a contractor has not yet been engaged for this phase of work. Reliance on one or a combination of the above water supply options can provide sufficient water entitlements where necessary and therefore the proponents ability to obtain a secure water supply for the project is clear. Confirmation of the approach can be subject to approval conditions.

Submission comment	Response
1.2 Recommendation – prior to determination If water captured by a dam will be utilised as a water supply option for the project's dust suppression, the proponent needs to review the dam to ensure that it is located on a minor stream and is either: □ consistent with the Maximum Harvestable Rights Dam Capacity of the property, □ satisfies an exclusion under Schedule 1 of the Water Management Regulation 2018, or □ is to be considered for water licensing. Explanation: A farm dam has been mentioned as a water supply option for the project. If so, its status within the water regulatory framework needs to be established.	The Farm dams on site fit within the water regulatory framework in relation to Maximum Harvestable Rights. Based on the WaterNSW Maximum Harvestable Rights Calculator (which is related to property area as opposed to dam volume) (https://www.waternsw.com.au/customer-services/water-licensing/maximum-harvestable-rights-calculator), for the site location and area of the lot (36.24 Ha), the maximum harvestable right for the lot is **2.54ML**. For further clarity, there are two existing small farm dams on the site which are both located on a **minor ephemeral stream** (see image below). The larger dam has an area of 2,344m^2 and is assumed to be an average of 0.9m deep. The large dam volume is estimated to be (area x ave depth) is 2.11 ML. The smaller dam has an area of 400m^2 and an assumed average depth of 0.6m. The small dam volume is estimated to be (area x ave depth) is 0.24ML. The total volume of the dams is 2.11 + 0.24 = 2.35 ML.  Based on discussions with Water NSW officers, it is understood that any water that enters the two dams can be used for non-potable uses, e.g. dust suppression and rehabilitation irrigation. (This means that the maximum harvestable right volume for the property of 2.54 ML is not a limit for water abstraction.) A water balance was calculated for 2.35 ML of dam storage and it shows that (depending on weather conditions), the dams may meet on-site water demands 74% of the time (refer Attachment 3). Therefore, this supply would likely need to be supplemented with another water source (Refer to response to Item 1 and Attachments 1, 2 and 3).

Submission comment	Response
2.0 Controlled activities on waterfront land 2.1 Recommendation – prior to determination The proponent should review works proposed within waterfront land (40m of a watercourse) to demonstrate consistency with the Guidelines for Controlled Activities on Waterfront Land. Explanation: The Water Management Report for the project states that once the project is approved, the stamped plans will need be submitted as part of a Controlled Activity Approval application to DPE-Water. This is not supported because the impact of works on waterfront land needs to be considered as part the project's SSD assessment. If approved, the project will be exempt from the need to acquire a Controlled Activity Approval from DPE-Water under Section 4.41(1)(g) of Environmental Planning and Assessment Act 1979. However, for the exemption to apply to the Project, the proponent needs to consider the Guidelines for Controlled Activities on Waterfront Land for all works that occur on waterfront land (including minor watercourses), prior to determination.	With thanks for advising of the exemption for Controlled Activity approval. There are two instances/locations where the works will intersect waterfront land, as follows: 1. The stabilised swale outlet from the proposed sediment pond/wet basin will flow through the riparian zone into Calala Creek (this was not shown on the Drawings provided in the EIS submission, but is shown indicatively below)  2. The permanent access road crosses the riparian zone and channel of Calala Creek (this was shown on the Civil Drawings by Sky Engineering).  At the two locations where the works intersect the creek riparian zone, there are two Guidelines that are relevant to the assessment, viz.: 1. Outlet structures – for the swale to discharge into Calala Creek, and 2. Watercourse crossings – for the access road crossing over Calala Creek The **assessment of the both the Outlet Structure and the Watercourse Crossing** in relation to the Guidelines is provided in **Attachment 4**.

Submission comment	Response
3.0 Groundwater interception and licensing 3.1 Recommendation – prior to determination The proponent should clarify whether groundwater will be intercepted due to the project's excavations. Explanation: The project will require excavations to provide suitable pad areas to accommodate the BESS infrastructure, however, there has been no assessment of whether groundwater will be intercepted by the project's excavations. If groundwater interception will occur due to the project's excavations, the maximum volume will need to be quantified and a Water Access Licence with sufficient entitlement to account for the groundwater take must be obtained, unless an exemption applies	As shown on the Civil Drawings by Sky Engineering, the maximum depth of cut on the site to create the earthworks pad for the battery units is 2.0m. The geotechnical report by Douglas Partners indicates that the minimum depth to groundwater is over 4m below the ground surface. Therefore, it is highly unlikely that groundwater will be intercepted as a result of earthworks cut on the site. In the circumstance where the Contractor does intercept groundwater during excavation, a groundwater (dewatering) management plan would be required. It is recommended to condition this requirement in any consent, contingent on groundwater being encountered.

Yours faithfully,

Mal Brown
Principal | Senior Engineer
M Envt Eng; B Envt Sci (Hons)

On behalf of Northrop Consulting Engineers Pty Ltd

Attachment 1

Construction stage water demands

The Contractor will be responsible for water supply during construction. This includes drinking and wash water plus managing areas of landscaping to ensure it survives during the Defects Liability Period – assumed to be one year. It is assumed that landscaping will be planted minimum 6 months after construction commences. Areas of landscaping will require irrigation to ensure the vegetation survives. This will be achieved by a water tanker fitted with a hose and spray nozzle. Similarly, water carts will be used for dust suppression on a relatively stable site.

Water demand estimates **in first year after construction** is calculated as follows:

1. Water for consumption (assumes 30 people x 20* L/person/day) = 172* kL
2. Dust suppression water demand – 250 days in year 1 @ 3 tankers per day (one tanker = 17 kL) = 12,750 kL
3. Rehabilitation irrigation (summer) water demand – 26 weeks @ 3 tankers/week (one tanker = 17 kL) = 1,326 kL
4. Rehabilitation irrigation (winter) – 26 weeks @ 1 tanker per week (one tanker = 17kL) = 442 kL
5. Fill the fire water tanks (one-off) – 2 water tanks @ 100kL = 200 kL

Total water demand in Year 1 = 14.89 kL (14.9ML).

Construction will occur over an 18-month period, and so **the estimated demand for construction stage is 22.3 ML**.

(Water tanker estimates assume that tankers are used to deliver water to the intended use. This water may be derived from any approved water source.)

*it is acknowledged that this estimate is high, and allows for contingencies that may occur on site.

Operational Water Demands

The site area will have very low operational water demands.

There will be no permanent workforce and no potable water or toilets requiring flushing. The workforce attending the site will be for routine or emergency maintenance/management. Workers will bring their own drinking water to site.

There will be fire suppression tanks located on site. These will remain full, other than for routine testing, or fire emergencies where it can be assumed all of the water stored will be used. It can be assumed that routine **testing of the fire suppression system will lead to losses (and subsequent top-up demands) of 10,000 litres annually**. This would be topped up with a tanker from an approved water source, e.g. Council supply (refer Attachment 2).

After the Contractor leaves the site, all areas will be stabilised with their design surface. These include:

- Battery earthworks pad – covered with gravels
- Access roads – road base
- Batters to earthworks pad – vegetated and/or mulched
- Landscaped areas – vegetation and mulch
- Stormwater basin – soils (with or without water) and vegetation (grasses)

Dust generation could occur in dry windy periods, but would be expected to settle after the site is fully established, i.e. after year 1.

The Contractor will be responsible for managing areas of landscaping to ensure it survives during the Defects Liability Period – assumed to be one year. Areas of landscaping will require irrigation to ensure the vegetation survives. This will likely be achieved by a water tanker fitted with a hose and spray nozzle. Similarly, water carts will be used for dust suppression.

Water demand estimates in first year after construction (i.e. during operations) is completed are as follows:

1. Dust suppression water demand – 50 days in year 1 @ 3 tankers per day (one tanker = 17 kL) = 2,550 kL
2. Landscape irrigation (summer) water demand – 26 weeks @ 3 tankers/week (one tanker = 17 kL) = 1,326 kL
3. Landscape irrigation (winter) – 26 weeks @ 1 tanker per week (one tanker = 17kL) = 442 kL
4. Test (fire) emergency water supply and refill tanks = 10 kL

Total estimated water demand in Year 1 after construction = 4,328 kL (4.33 ML).

After year 1, the site will not require dust suppression or irrigation. The only ongoing water demand will be for testing the fire emergency system. After testing, the tanks need to be re-filled. It is assumed this **ongoing water demand would not exceed 10 kL/annum**.

This water demand is an estimate only, and considered to represent a worst-case scenario. The actual amount could vary based on numerous factors, including: very hot, dry or wet construction periods, Contractor's Construction Methodology, etc.

In addition, the amount of water brought in by tanker would be reduced to the extent that another water source is identified and used, e.g. maximum harvestable rights from on-site farm dam/s, or bore water.

Attachment 2

Water supply from Council

Council is a water supply authority for the area. Their website contains a page dedicated to water supply, as follows:

https://www.tamworth.nsw.gov.au/live/water-and-wastewater/water-services

The water supply network extends into Calala, but not to the site. Council makes available to proponents two types of water , viz.:

1. **Bulk Filling Station** - Public access to bulk water filling stations is determined by the current level of water restrictions within any water supply. Public access is not permitted whenever a water supply is at level 3 water restrictions or above. At these water restrictions, supply is restricted to registered domestic water carters only.
2. **Metered standpipes** - Council hires out metered standpipes to approved customers under certain terms and conditions for the purpose of supplying potable water from its reticulation system for use on development sites, water cartage, road works, landscaping and wherever access to water is otherwise limited. A standpipe is a metered portable device used to obtain water directly from fire hydrants. Only approved customers can access the water network using a standpipe. Council's website has links to an Application Form, Terms & Conditions of use, Log Book for recording use, and Fees and Charges

A location that provides a metered stand-pipe and bulk filling is approx. 5.5-7km from the BESS site (depending on the route), and as shown below.

The website also lists Registered Domestic Water Carters who would collect, transfer and distribute the water on site. There are different types of water tanker, with the following two being the most common:

- Twin-steer 17,000 Litres
- Single drive 8,000 Litres.

To access this water, an application would need to be lodged with Council (using the website), and by liaising with Council officers, as relevant.

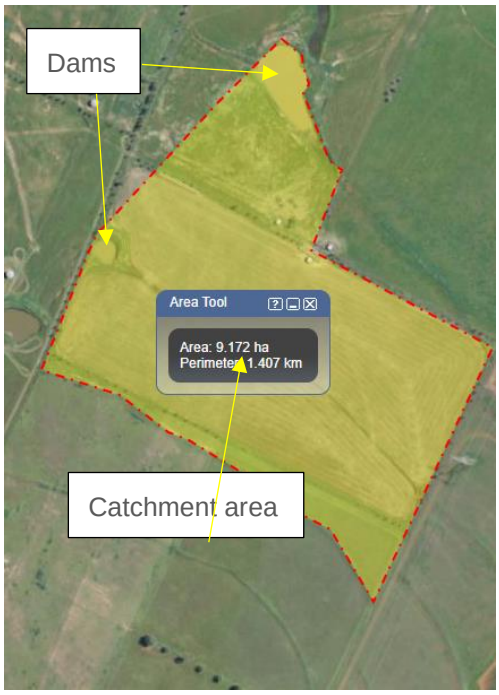
The trucking of water has other impacts, including fuel consumption and it is the least cost-effective of the options. Therefore, use of this water source should be minimised.

Attachment 3

Maximum Harvestable Right

Harvestable rights allow landholders (owners or occupiers of land) to capture and store a proportion of the rainfall runoff from their landholding in one or more harvestable rights dams without a water access licence, water supply work approval or water use approval.

There are two existing small farm dams on the site which are both located on a **minor ephemeral stream**. The larger dam has an area of 2,344m^2 and is assumed to be an average of 0.9m deep. The large dam volume is estimated to be (area x ave depth) is 2.11 ML. The smaller dam has an area of 400m2 and an assumed average depth of 0.6m. The small dam volume is estimated to be (area x ave depth) is 0.24ML.



In addition, an offline basin is proposed that would be constructed early (for erosion and sediment control before being converted to a permanent basin). It has a volume of 3,746m^3 (3.75 ML, as per Civil Drawings by Sky Engineering). The water in this basin may also be used for construction period demand (subject to separate approval from DPE Water).

Based on the WaterNSW Maximum Harvestable Rights Calculator (https://www.waternsw.com.au/customer-services/water-licensing/maximum-harvestable-rights-calculator), for the site location and area of the lot (36.24 Ha), the maximum harvestable right for the lot is **2.54ML**.

Advice obtained from Water NSW suggests that water from the dam can be used whenever the dams fill. A water balance calculation has been completed below to determine the estimated water yield in a median rainfall year.

Yield from farm dams

A high-level time-series water balance was undertaken to determine the yield from the volume of dam storage.

The time series relies on actual daily rainfall data. All weather data from Weather Station No. 055325 Tamworth Airport. Time Series used - January 2009 – December 2023 (inclusive) (limited by amount of evapotranspiration data available). The Mean Monthly Value was taken for any missing evapotranspiration data.

> BOM Daily Rainfall Data retrieved from http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=055325
>
> Daily Evapotranspiration Data retrieved from http://www.bom.gov.au/watl/eto/tables/nsw/tamworth_airport/tamworth_airport.shtml

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The following assumptions have been built into the water balance model:

- Demands are 60 kL/day (worst case in summer during construction)
- Contributing Catchment area 9.172 Ha
- Soils are Clay-loam (moderate permeability)
- Initial loss – 5mm
- Minimum volume threshold 120 kL

The Spreadsheet assumes the Dams start at 50% full on the 1st January 2009. Each day it calculates how much volume it will capture depending on rainfall (if the rainfall is less than 5mm for the day, there is no volume captured as the model assumes it is lost to pervious storage). It adds the daily rainfall volume to the previous day's volume. Every day it subtracts the same volume required for site demands (e.g. dust suppression / irrigation) and then subtracts the daily evaporation volume. (The daily evaporation assumes the surface area when the dam is full i.e. 2,500 m^2)

In summary, the time series spreadsheet calculates: Tank Volume at the end of the day = volume the previous day + rainfall – dust suppression / irrigation demand – evapotranspiration. It then calculates (over the whole time series) how often the Dam had at least 120kL of water available (i.e. 2 days of supply).

Following the calculations, the dam volume was found to have a **reliability of 74%.** In other words, 74% of the time the dam volume meets the demands of the site during construction phase.

Therefore, this supply may need to be supplemented with another water source, e.g. Council water supply or groundwater (Refer to response to Item 1 and Attachments 2 and 4).

Attachment 4

Water supply from groundwater bores

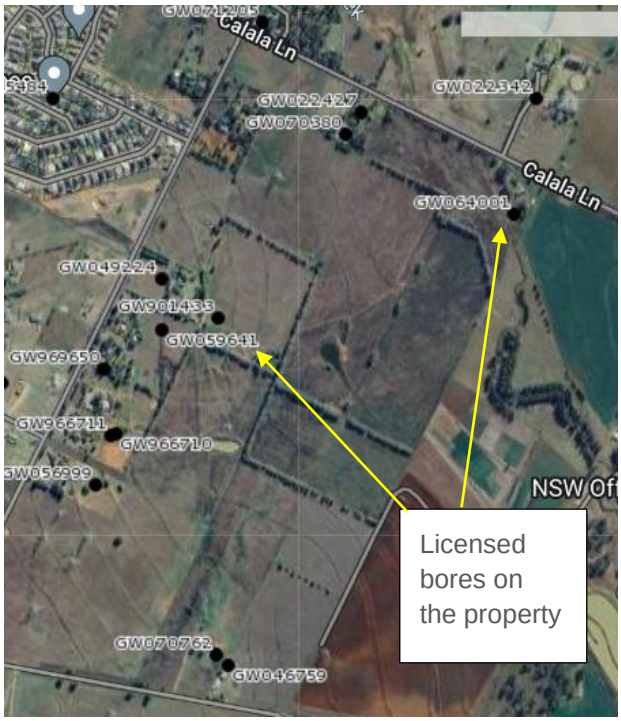
The following information was found on the WaterNSW website (https://realtimedata.waternsw.com.au/water.stm?ppbm=207_HASTINGS&rs&2&rsvm_org)

There appears to be two licensed bores on the 57 Burgess Lane property, viz.:

1. GW064001 - Licence 90WA816882: Licensed to Leonard Mannion for Domestic purposes. Yield = 2.52 L/s
2. GW901433 – Licence 90WA816203: Licensed to M+L Mannion for Stock & Domestic purposes. Yield = 2.52 L/s

Water NSW may allow water from one or both of these bores to be licensed to provide water for the construction phase demands of the BESS. Given the purpose of the licences is inconsistent with the intended use, discussions with Water NSW would be required, probably with an application.

A first step would be to confirm with the Licensee whether they would permit the bore to be accessed for this purpose, and under what arrangement this would occur.

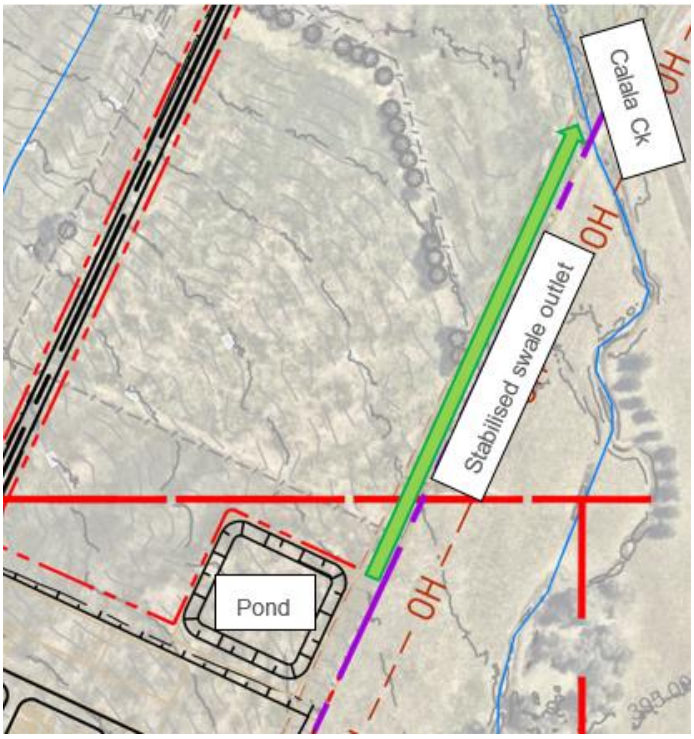


Attachment 5

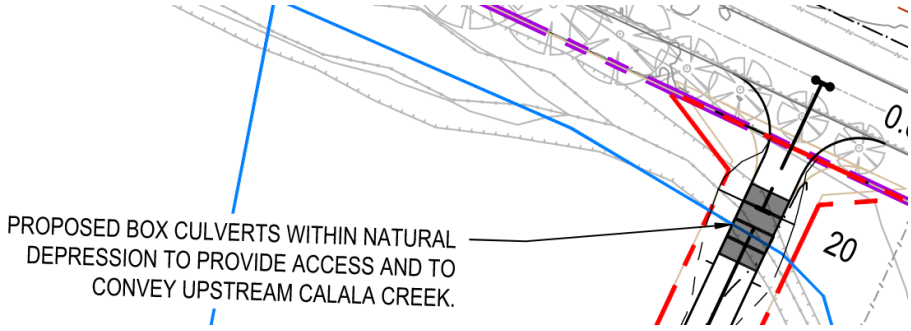
Assessment in relation to Guidelines for controlled activities on waterfront land (NRAR, 2018)

There are two instances/locations where the works will intersect waterfront land, as follows:

1. The stabilised swale outlet from the proposed sediment pond/wet basin will flow through the riparian zone into Calala Creek (this was not shown on the Drawings provided in the EIS submission, but is shown indicatively below)



2. The permanent access road crosses the riparian zone and channel of Calala Creek (this was shown on the Civil Drawings by Sky Engineering).



In these locations, Calala Creek has been heavily modified by past agricultural activity, including cultivation, which as altered the bed and bank features compared to nearby reaches of the creek where this has not occurred. The creek is ephemeral, flowing only after significant rainfall in the catchment. When not flowing, the creek channel is a wide grass-vegetated swale with no other features distinguishing it as a creek, as shown over:

At the two locations where the works intersect the creek riparian zone, there are two riparian Guidelines that are relevant to the assessment, viz.:

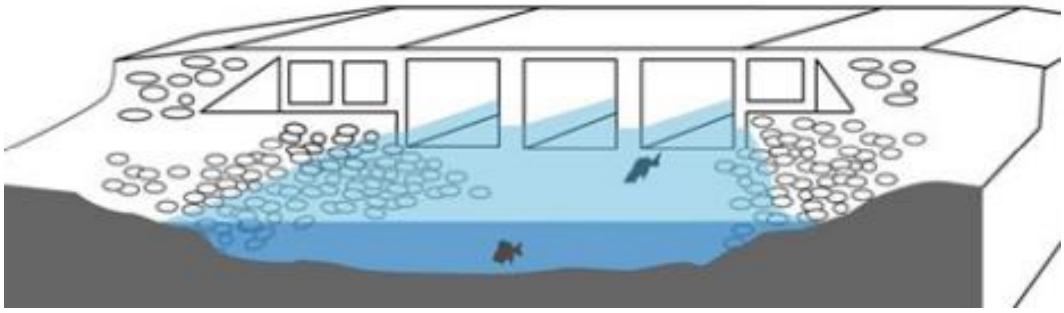
1. Outlet structures – for the swale to discharge into Calala Creek, and
2. Watercourse crossings – for the access road crossing over Calala Creek

The **assessment of the proposed outlet structure** in relation to the Guidelines follows:

- Point of discharge is stable (although modified)
- Construction footprint is minimal
- The discharge structure is rip-rap blending in with the banks and bed of the creek
- No noticeable changes to hydrology or hydraulics will occur. No bed or bank erosion is expected to occur
- The discharge structure shall be oriented to discharge at an angle to the flow (not perpendicular)
- Detailed Design to consider tractive forces for rock sizing. It is anticipated that 100-250mm rip-rap rock diameter will be suitable
- Disturbed areas adjoining the works will be stabilised with soil, mulch and plantings of grass and sedges
- Weed management shall occur until the works are stabilised
- Erosion and sediment controls will be placed downstream of the works during and immediately after construction, i.e. a sediment fence and straw bales
- Works shall occur in a dry period – noting weather forecasting for 1-2 weeks. If rain >1mm is forecast, works should be delayed.
- A Detailed Design will incorporate all these requirements
- Note: no pipes or concrete is proposed, only rock, earth, geofabric liners and vegetation.

The **assessment of the proposed watercourse crossing** in relation to the Guidelines follows:

- The selection of a box culvert crossing over the creek is consistent with the Guideline
- The culverts will be installed to be flush with the bed level of the creek – thereby allowing fish passage
- Culverts shall be aligned with direction of flow
- Detailed design may incorporate elevated dry culvert cells in combination with wet cells, as indicated below



- Detailed design to include: survey, cross sections, long section, bed and bank profiles
- Hydraulic assessment and calculations to size the culverts
- Associated bed and bank stabilisation works for scour protection to be shown
- Vegetation plantings shall be grasses and sedges – to be designed
- Erosion and sediment control plan to be included. Erosion and sediment controls will be placed downstream of the works during and immediately after construction, i.e. a sediment fence and straw bales
- Works shall occur in a dry period – noting weather forecasting for 3-4 weeks. If rain >1mm is forecast, works should be delayed.
- A maintenance period of 3 years shall apply