Level 8,
55 Market Street,
Sydney NSW 2000

PO Box Q577
Queen Victoria Building NSW 1230

T 02 9438 5098

Our Reference: NA231578
Your Reference: DOC25/401585

27 Aug 2025

NSW Dept. of Climate Change, Energy, the Environment and Water
4 Parramatta Square
PARRAMATTA NSW 215

Attention: Liz Peterson

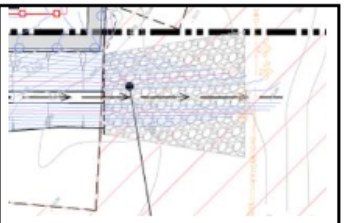
Dear Liz,

Re: SSD-73761707 Glendenning Road Data Centre – 2 Glendenning Road, Glendenning NSW
Response to Engineering Matters Raised by Conservation Programs, Heritage & Regulation Group (CPHR)

Further to the CPHR Advice (ref: DOC25/401585) relating to the Environmental Impact Statement (EIS) submitted for the above State Significant Development Application (SSDA), this technical memorandum has been prepared by ACOR Consultants Pty Ltd (ACOR) to respond to engineering matters within the CPHR advice.

The Engineering matters that have been raised within the CPHR Advice are the following:

| | | |
|---|---|---|
| 1 | *Flood Impact Assessment is not adequate* | CPHR refers to Blacktown City Council's flood maps FloodBlacktown which shows the site is impacted by overland flooding in the 'Medium Risk Precinct' in the 1% Annual Exceedance Probability (AEP) event.<br>  <br>In addition, the site is impacted by Eastern Creek mainstream flooding in rarer flood events larger than the 0.2% AEP event. The depth of Eastern Creek flooding in the probable maximum flood (PMF) within the site ranges between 0.1 m to 0.4 m.<br>The Flood Impact Assessment Report (FIA) is inadequate. The FIA includes discussion on existing flooding behaviour. However, no assessment for the post development scenario has been undertaken. No assessment for the impact of the development on flooding has been undertaken. No maps for existing, post development scenarios, or flood impact have been provided.<br>***Recommended action:***<br>The FIA is updated to assess the following:<br>• consider the relevant provisions of the *NSW Flood Risk Management Manual* (2023) and associated guides, and Blacktown relevant Flood Studies for overland flooding and Eastern Creek<br>• address the full range of flood behaviour, flood constraints and risk for existing scenario for both overland flooding and mainstream flooding. To achieve this, flood behaviour would be examined for a range of events. Typical events examined may include the 10%, 5%, 1%, 0.5% or 0.2% AEP events and the PMF. The hydrological and hydraulic models developed by the consultant must be compatible with the council's flood studies results for the full range of flooding<br>• address the full range of flood behaviour, flood constraints and risk for the post development scenarios for both overland flooding and mainstream flooding. To achieve this, the consultant must incorporate the development components onto the verified models and identify post-development flood characteristics for a range of events. Typical events examined may include the 10%, 5%, 1%, 0.5% or 0.2% AEP events and PMF<br>• identify the constraints that flood places on the land particularly hydraulic constraints that is flow paths, flood storage and flood hazard, determined for several events, typically 5%, 1%, 0.2% or 0.5% AEP and PMF<br>• assess the appropriateness of the development or development types for the location based on the flood constraints on the land<br>• identify the impacts of the development on flooding and on adjacent areas for the full range of flood events<br>• identify and assess the adequacy of management measures and development controls to:<br>➢ effectively address these constraints to ensure the flood risks to the proposed development and its users are acceptable,<br>➢ manage flood and associated emergency management (EM) impacts to the existing community due to the development and<br>➢ outline how the development has considered climate change impacts on flooding behaviour. |

| | | |
|---|---|---|
| 8. | *Stormwater outlets – impacts on adjoining Nurragingy Reserve* | Two stormwater outlets are proposed along the eastern boundary. These outlets do not appear to connect into existing stormwater infrastructure or waterway. Instead, they drain via a concentrated flow into the neighbouring land that is mapped on the Biodiversity Values Map and forms part of Nurragingy Reserve.<br>CPHR is concerned with the potential for erosion and pollution impacts over time past the proposed rock-armoured outlets, entering neighbouring land.<br>For the northeast outlet, there appears to be a nearby drainage channel that could be connected into. For the southeast outlet, no stormwater infrastructure appears to be nearby that could be used for a connection.<br>  <br>*Northeast outlet*<br>  <br>*Southeast outlet*<br>***Recommended actions:***<br>• Confirm if an easement is required to extend the northeast outlet into the existing drainage channel located on the neighbouring property to the north.<br>• The construction of the rock-armoured outlet follows Blacktown Council's engineering guidelines and standard drawing available at https://www.blacktown.nsw.gov.au/Plan-build/Stage-2-plans-and-guidelines/Engineering-Design-Guide-library/Engineering-guidelines-for-development.<br>• Provide a solution for the south-east outlet, that minimises erosion.<br>• Consideration may be given to a combination of an absorption trench, level spreader and / or rainwater garden. The feasibility and suitability must be assessed by a suitably qualified stormwater engineer.<br>• Any on-site stormwater infrastructure should be located at least 5 m from the property boundary.<br>• A stormwater engineer provides justification on:<br>➢ how the update stormwater solution meets the definition of a legal point of discharge<br>➢ how the adjoining land will effectively be protected from erosion<br>➢ how the stormwater solution meets Blacktown Council's engineering guidelines and standard drawings. |

Our responses to each item are detailed below.

## CPHR ENGINEERING MATTERS

**CPHR Item 1 – Flood Impact Assessment is not Adequate**

ACOR Response:

Review of flood data in the Local Overland Flow Path Study within Existing Urban Areas of Blacktown City Final Report indicates that overland flow in Glendenning Road adjacent to the site does not exceed 0.2 m deep, and assessed not to overtop the road and enter the site in the 5% AEP, 2% AEP or 1% AEP overland flow events. This is supported by flood mapping (Eastern Creek Catchment Development Scenario Hydraulic Assessment (Blacktown City Council, 2016)) that shows 1% AEP and 0.2% AEP flood events do not directly impact the site. This assessment is also supported by Figure E1.5 in Local Overland Flow Path Study within Existing Urban Areas of Blacktown City Final Report. In these events, flood water is contained within the drainage channel to the north of the lot and in Eastern Creek (external to the lot) to the east. The proposed fill will therefore not cause an increase in flood levels on site or neighbouring properties or public areas for the medium risk overland flow event (1% AEP).

A meeting with Blacktown City Council to assess flood impact comments from Council's Engineering department was held on 18 August 2025. It is noted that Council's concerns related to the portion of the site inundated by the 1% AEP flood event adjacent to the Endeavour Energy transmission tower, described as the "medium flood risk precinct". The area of concern is shown in Figure 1 below.


**Figure 1. Blacktown Council Flood Maps – 1% AEP Extent of Inundation to Subject Site (Medium Flood Risk Precinct) – Existing (Pre-Development) Scenario**

The area of 1% AEP inundation is caused by localised sag points in the topography of the existing grass overing, causing isolated ponding in the TUFLOW model map outputs in the Blacktown Overland Flow Path Study. Figure 2 below illustrates the sag point causing isolated ponding of flood water based on the topographic survey data.

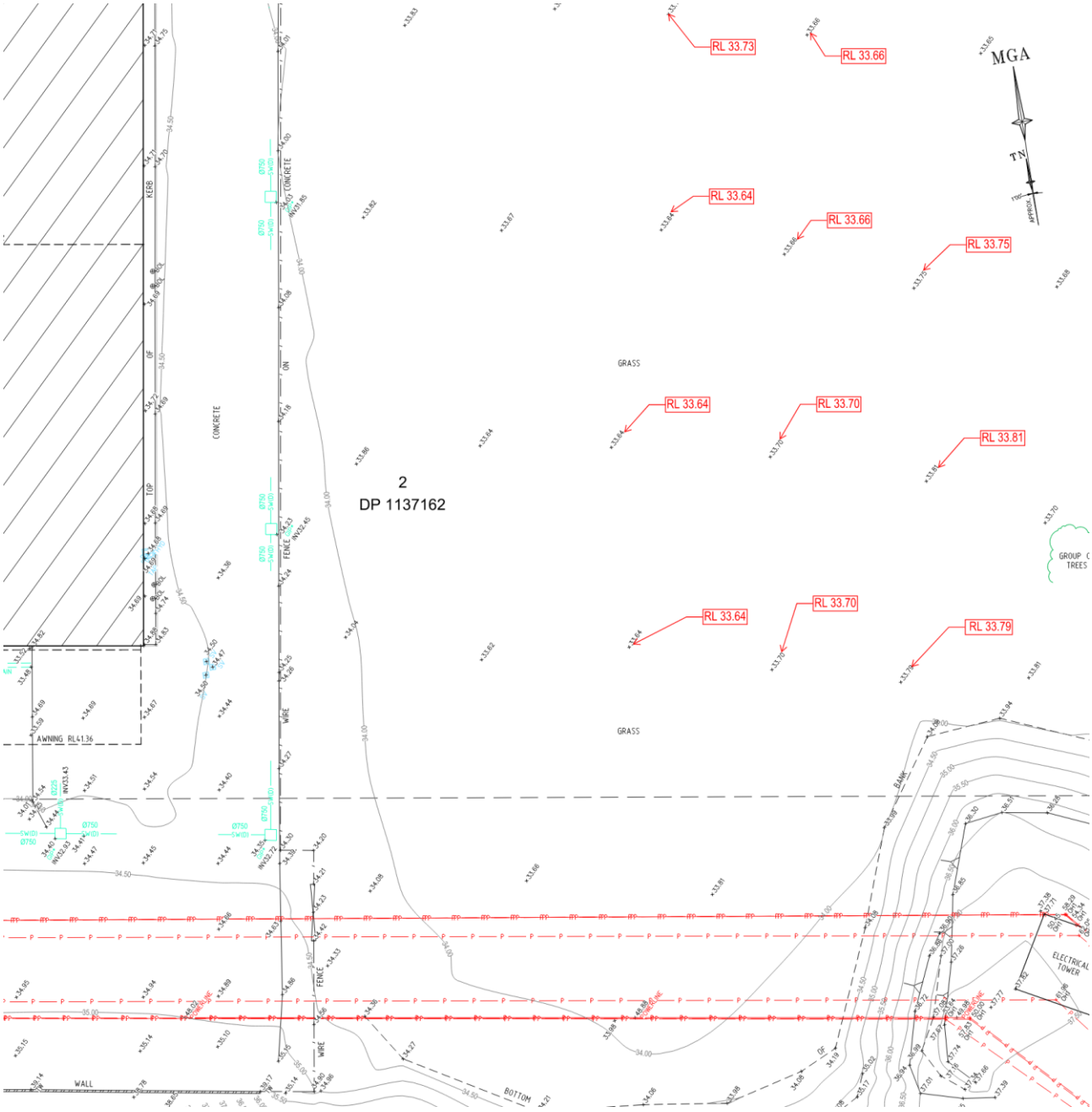



**Figure 2. Summary of Existing Topographic Survey Levels at Localised Sag Point**

In the post-development scenario when the data centre campus is constructed, a surface swale drain will be constructed to intercept overland flows travelling into the site from the southern catchment at Woodstock Avenue. This swale drain has been graded with a minimum 0.5% longitudinal grade to prevent localised ponding of stormwater / floodwater runoff.

Furthermore, we note that the site will be re-graded to remove the above isolated sag points in the topography, effectively also removing the 1% AEP extent of inundation to the site. Figure 3 below shows the post-development re-grading, swale drain and site stormwater system.

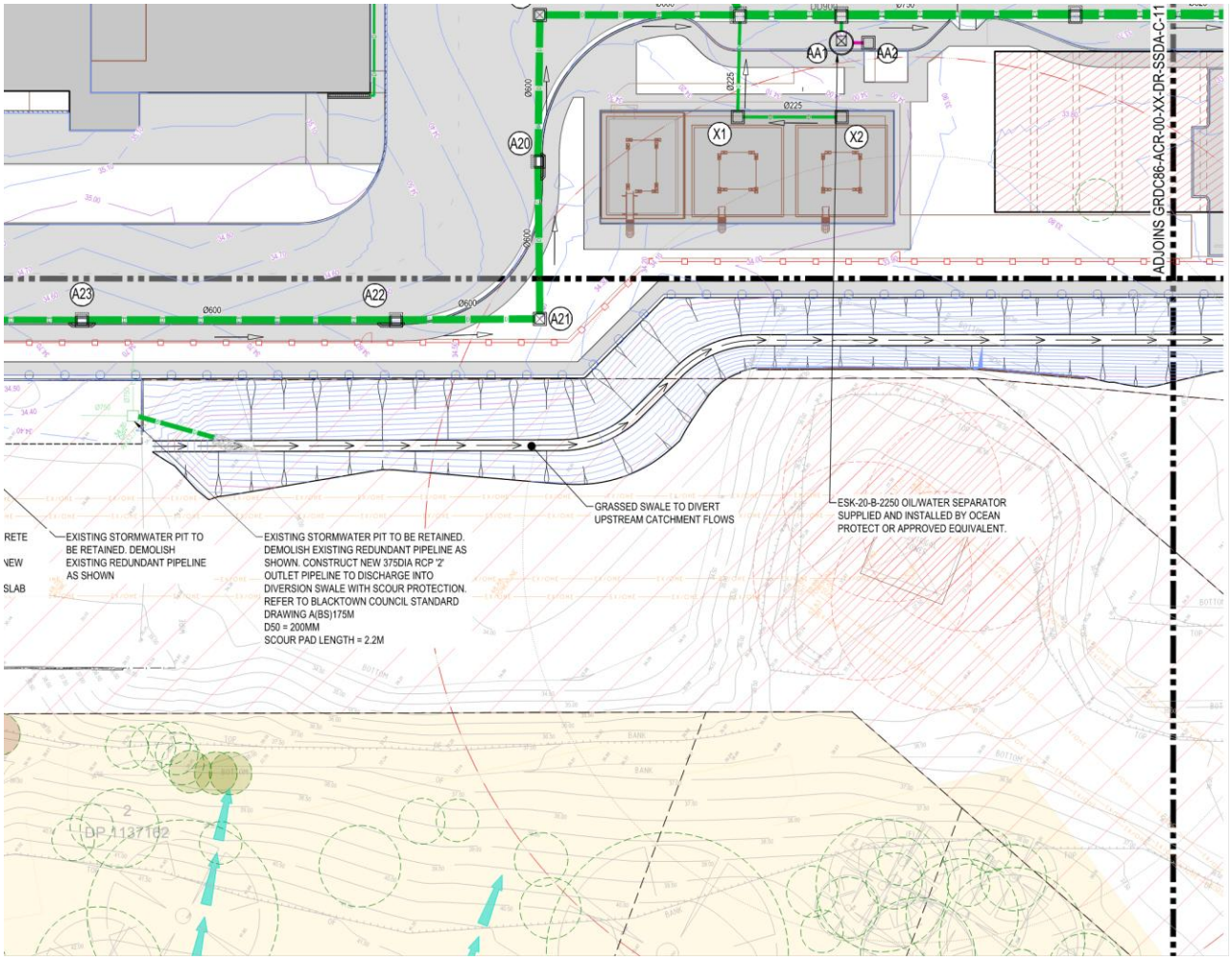



**Figure 3. Post-Development Scenario – Swale Drain and Site Stormwater System**

The above explanation has been presented to Blacktown City Council, and based on Council Engineering feedback, this solution was accepted. We expect that Blacktown Council will provide return comments to our revised SSDA submission to resolve and close out their concerns regarding flooding with no further flood modelling required.

In regards to the flood events greater than the 1% AEP (up to and including the Probable Maximum Flood (PMF) event), we note that review of flood data in the Blacktown Overland Flow Path Study indicates that the most frequent simulated overland flow event that first exceeds 0.2 m deep in Glendenning Road adjacent to the site (and deemed to overtop the road and enter the site) is the 0.5% AEP (1 in 200 AEP) event.

The depth of flood water increases within the site to 0.4m depth in the PMF event. We note the following regarding these flood events:

- The proposed building floor levels provide sufficient freeboard to the flood events up to and including the PMF event. Each building has greater than 500mm freeboard to the circulation roadways which would convey flood water in extreme flood events.
- Glendenning Road has an existing sag point adjacent to the trunk drainage channel along the northern site boundary. In the event of minor post-development flood behaviour changes within the site, the Glendenning Road sag point would overtop into the northern drainage channel. This is shown in Figure 4 below.

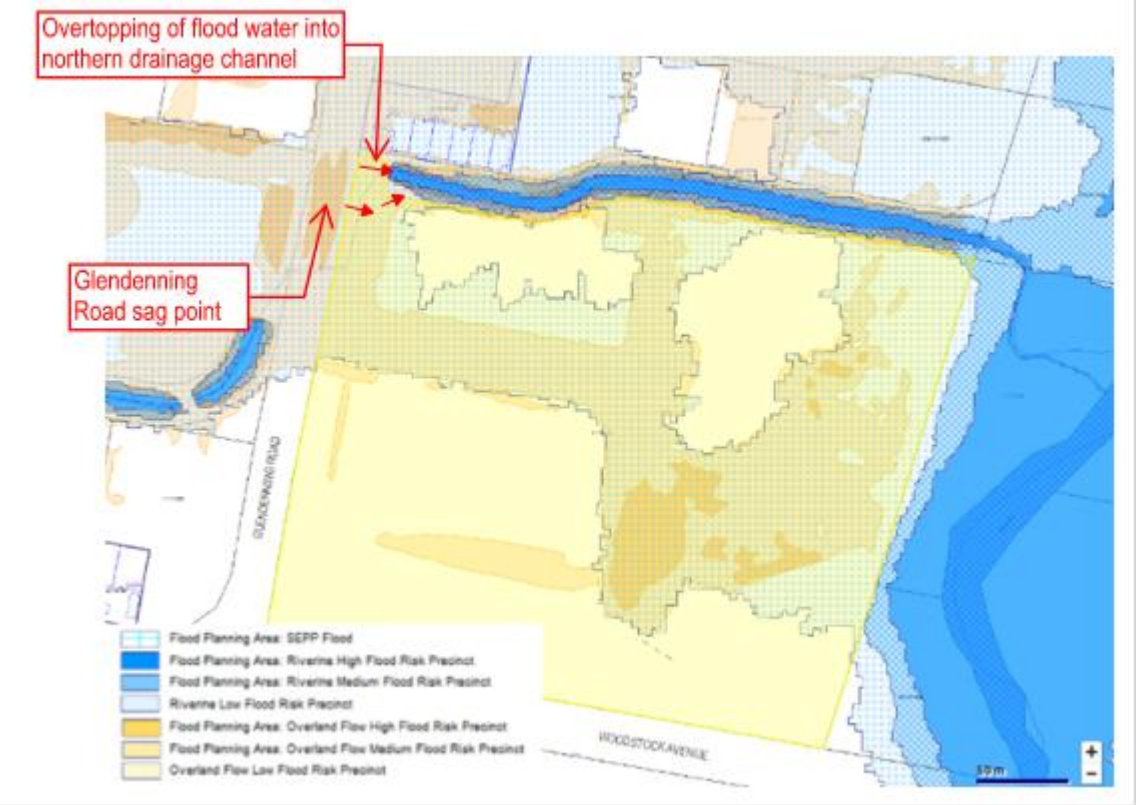



**Figure 4. Glendenning Road Sag Point – Flood Water Overtopping into Northern Drainage Channel**

- Notwithstanding the above, the site accommodates overland flow through circulation roadways, as shown in Figure 5 below. Post-development flood modelling of the 0.5% AEP, 0.2% AEP and PMF events is expected to yield similar results based on the catchment topography.

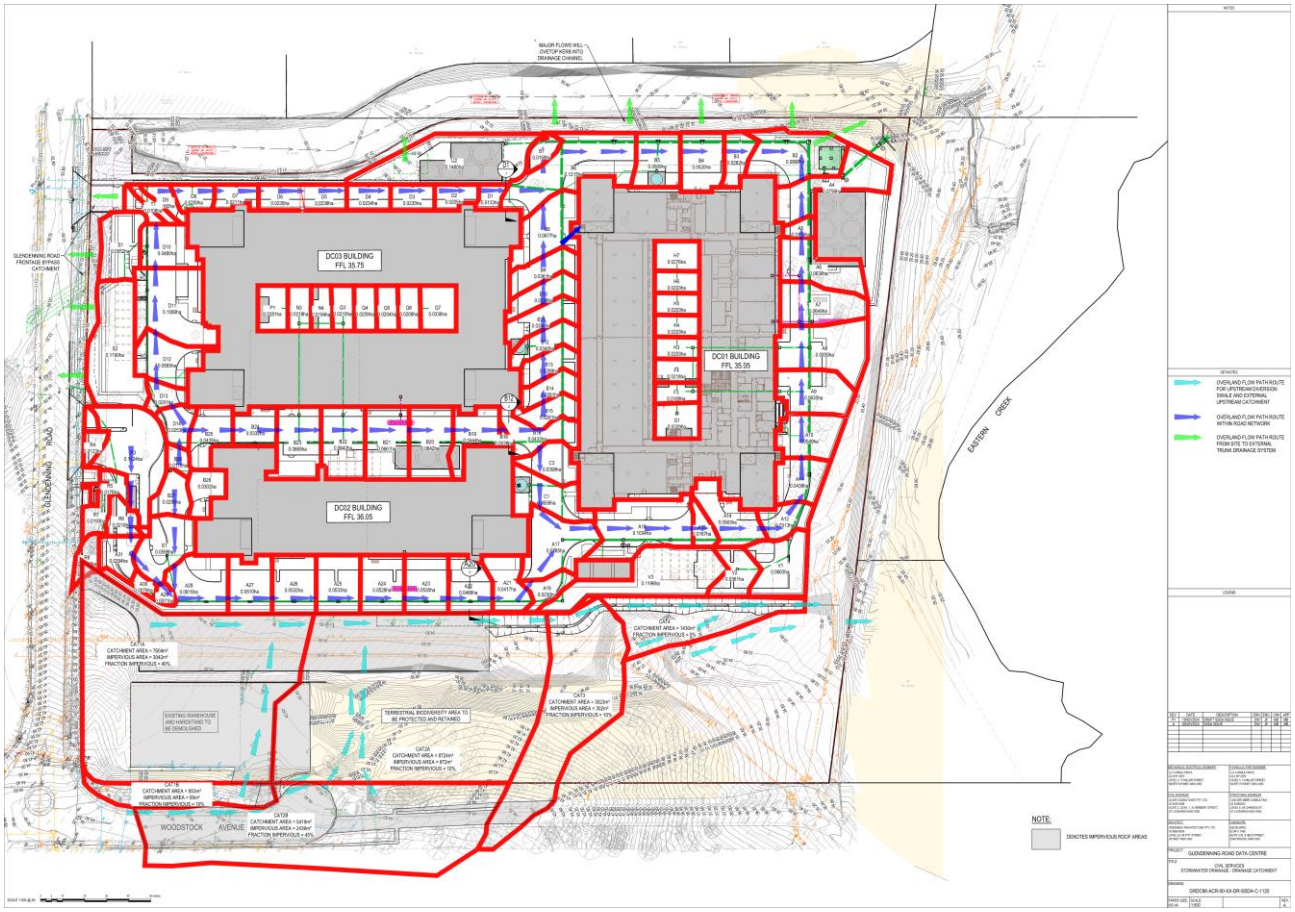



**Figure 5. Site Catchment and Overland Flow Path Plan**

**CPHR Item 8 –Stormwater Outlet Impacts**

ACOR Response:

The proposed stormwater outlets for the site can be summarised as:

a) North-East Stormwater Outlet – discharging piped flows into the Northern Drainage Channel; and
b) South-East Stormwater Outlet – Overland flow cutoff swale within the Endeavour Energy easement.

**(a) North-East Stormwater Outlet**

The trunk drainage channel along the northern site boundary has been confirmed with Blacktown Council as the legal point of discharge for the site stormwater system.

The north east stormwater outlet will discharge via headwall and scour protection to the northern drainage channel. The position of this outlet is to minimise impact to existing trees whilst keeping the outlet and scour protection within the subject site lot boundaries. Thus, extending or changing the position to drain into the drainage channel will have a larger environmental impact than the current design.

Figure 6 illustrates the impacts to existing trees if a shift in the stormwater outlet position is undertaken.

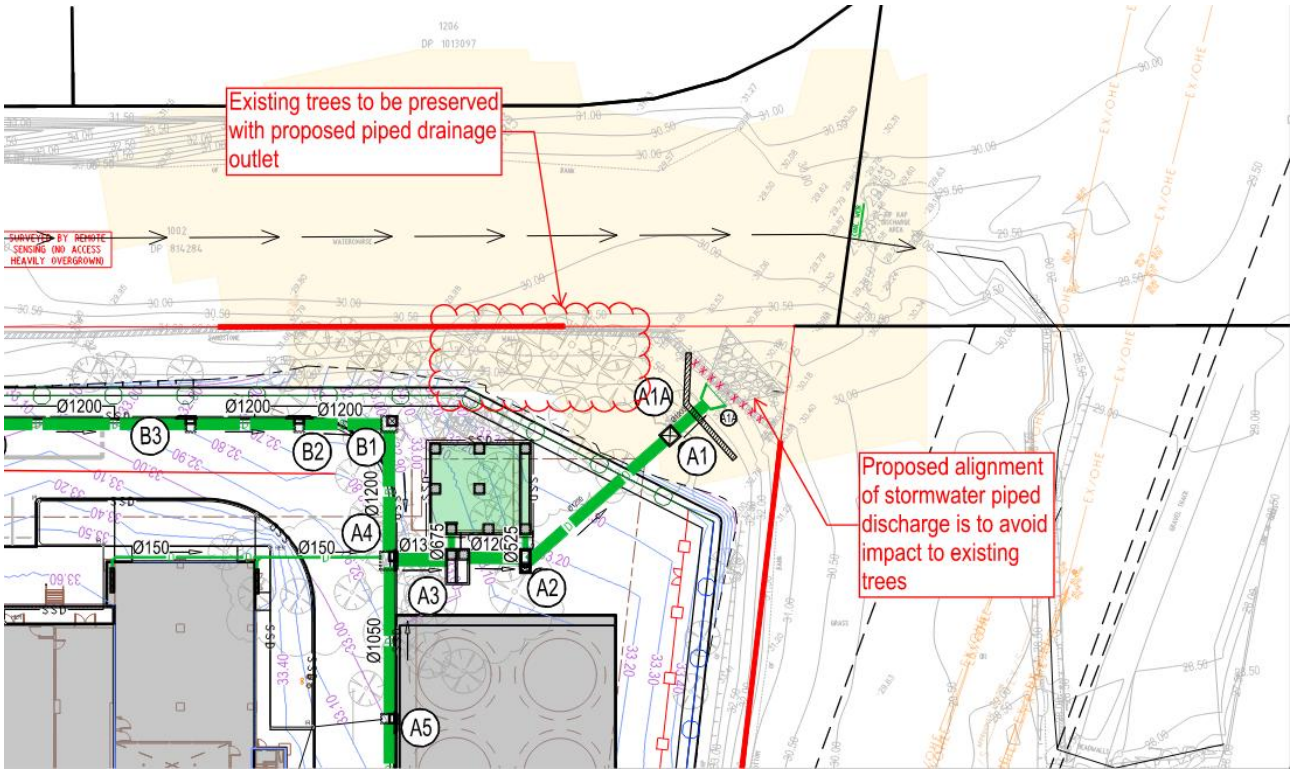



**Figure 6. North-East Stormwater Outlet Position**

The scour protection for the north-east stormwater outlet has been designed to reduce outflow velocity to less than 1.0 m/s in accordance with Blacktown Council requirements. This will protect the downstream environment from scouring and erosion.

**(b) South-East Stormwater Outlet**

The south-eastern drainage outlet is conveying overland flows from the southern upstream undeveloped land and Woodstock Avenue along the Endeavour Energy easement. The swale drain has been provided with scour protection to reduce flow velocity to acceptable levels (<1.0 m/s) to avoid scouring of existing pervious surfaces and the maintenance trail. This scour protection was discussed with Endeavour Energy as part of consultation to demonstrate negligible impact to their access route and infrastructure.

Correspondence with Endeavour Energy regarding the endorsement of this swale drain is included as Appendix A to this letter.

Note the use of raingardens or infiltration on this site is not an acceptable solution due to the low permeability clays present on site.

Should further clarification of the above responses be required, we would be pleased to discuss with CPHR in a meeting.

Yours faithfully,
**ACOR CONSULTANTS PTY LTD**

Matthew Buttarelli
Project Director & Principal Civil Engineer

Encl. Appendix A – Endeavour Energy Endorsement of Swale Drain

## Appendix A – Endeavour Energy Endorsement of Swale Drain

## Matthew Buttarelli

**From:** Noor, Mufrat <mufrat@amazon.com>
**Sent:** Wednesday, 7 August 2024 10:44 AM
**To:** Nuner, Kevin
**Cc:** Shayegan, Paul; DSouza, Priya; Matthew Buttarelli
**Subject:** RE: 2 Glendenning Road, Glendenning

Team,

We have received approval below from EE to proceed with the works within their easement.

The conditions of approval seem fairly standard, my only concern is with their requirement for ASP3 approval for any changes at ground level which I've highlighted.

**Kevin** - considering ground level changes are exactly what we are proposing, do we need now need ASP3 approval also?

Regards,

**Mufrat Noor**
DC Civil Engineer (APAC)
Amazon Web Services
e: mufrat@amazon.com
m: +61 478 035 255

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**From:** Jeff Smith <Jeffrey.Smith@endeavourenergy.com.au>
**Sent:** Wednesday, 7 August 2024 10:31 AM
**To:** Noor, Mufrat <mufrat@amazon.com>
**Cc:** Kek Tang <Kek.Tang@endeavourenergy.com.au>; Nuner, Kevin <kvnuner@amazon.com.au>; DSouza, Priya <dsopriya@amazon.com>
**Subject:** RE: [EXTERNAL] 2 Glendenning Road, Glendenning

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Dear Mufrat,

Thank you for your email.

**RE: LOT 2 DP1137162 HN 2 GLENDENNING ROAD, GLENDENNING.**

Endeavour Energy has now assessed the attached plans for works within it's Transmission Easement, at the abovementioned address.

As of such, Endeavour Energy has No Objections to the proposal but subject to the following conditions:

- That the excess water runoff through the scour protection must be controlled, as not to cause future erosion of the adjoining access track.
- That full access is available for Endeavour Energy Vehicles (which can weigh up to 30tonnes) through the easement adjacent to the swale and scour protection area.
- No encroachment into the Transmission Easement will be permitted within 10metres of the closest steel structure and 5metres of the closest pole.
- That the driveway from Glendenning Road into the easement will allow Endeavour Energy's Vehicles, including Cranes, EWP's etc. to travel through without any hindrance.

For any ground level changes within Endeavour Energy's Transmission Easements, a detailed report from a Level 3 Accredited Service Provider (ASP) must be obtained.
This report must confirm that all the work performed within the easement and in close proximity of our infrastructure complies to Endeavour Energy's Standards.
The ASP may require a Centre-Line-Profile to determine if the ground level changes are acceptable within the easement.

If you require any further information, please do not hesitate to contact me.

**Regards**

**Jeffrey Smith | Easement Management Officer – Property Services.**
**Easements@endeavourenergy.com.au**
**PO Box 811 Seven Hills NSW 1730**
**endeavourenergy.com.au**
**Teams: 0408665193**

**Endeavour Energy respectfully acknowledges the Traditional Custodians on whose lands we live, work, and operate and their Elders past, present and emerging.**

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**From:** Noor, Mufrat <mufrat@amazon.com>
**Sent:** Friday, August 2, 2024, 4:18 PM
**To:** Jeff Smith <Jeffrey.Smith@endeavourenergy.com.au>
**Cc:** Kek Tang <Kek.Tang@endeavourenergy.com.au>; Nuner, Kevin <kvnuner@amazon.com.au>; DSouza, Priya <dsopriya@amazon.com>
**Subject:** RE: 2 Glendenning Road, Glendenning

Hello Jeff,

Thank you for your response.

The proposed grass swale through the Endeavour easement has been sized to convey the 1% AEP flows which have been estimated to be 0.93m³/s based on the upstream catchment size. For the 1% AEP, the grassed swale has a flow depth of 375mm and a velocity of 1.3m/s prior to the scour protection.

We have relocated the swale scour protections further to the west, so that the scour protection tail out is upstream to the existing 1V:6H vegetated batter.

The scour protection has been sized to spread the flows from the swale and reduce the velocities prior to travelling over the 1V:6H batter. The scour protection has been sized based on the *Catchments and Creeks* Publications, which we consider to be best practice.

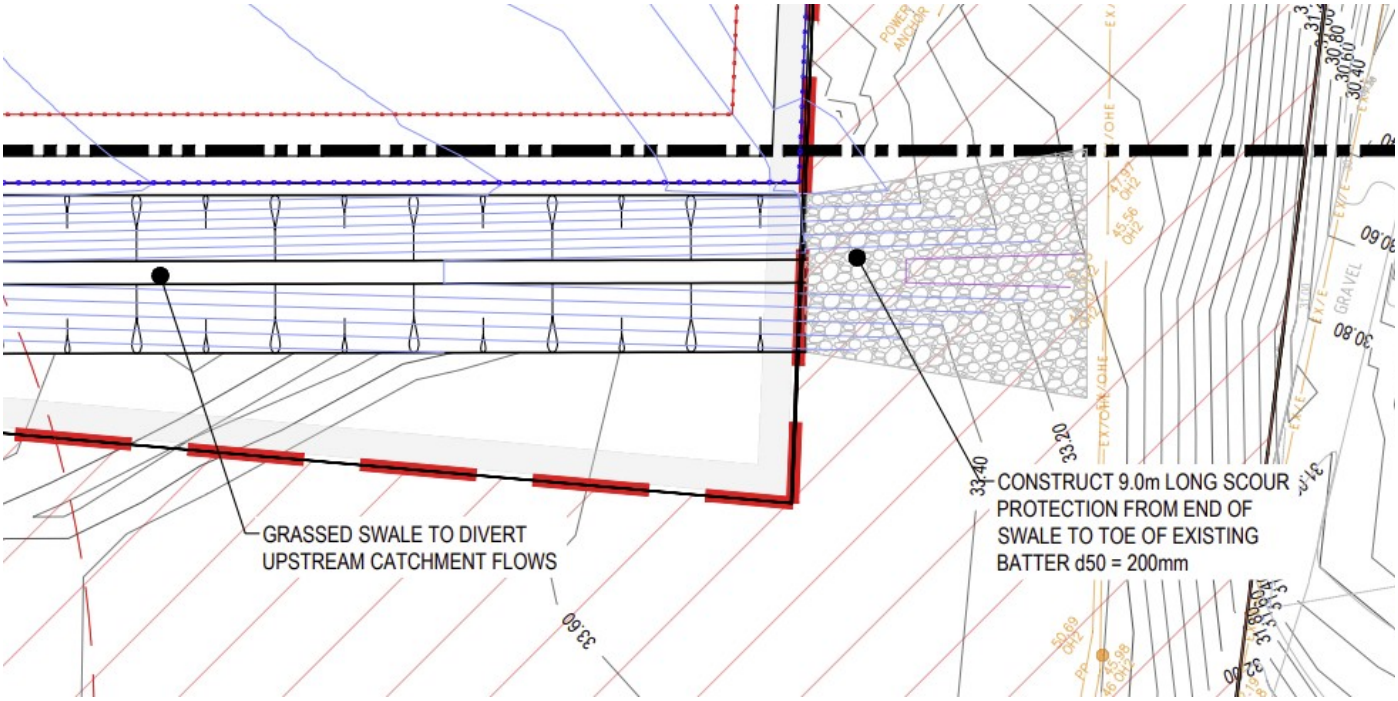
The maximum outlet velocity at the end of the scour protection is **1.0m/s** for a partially vegetated batter of approx. 15% slope (ref: *Grass Linings – Drainage Control Techniques* by Catchments & Creeks)

- Recommended mean rock size (d50) for scour protection is 200mm
- Minimum length of scour protection required is 3.0m for a maximum depth 375mm swale (refer to Table 4 below)
- Actual scour protection length provided = 9.0m

**Table 4 – Minimum length (L) of rock pad relative to cell height (H) for culvert outlet protection [1,2]**

| Outflow velocity (m/s) | Culvert height or pipe diameter (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 300 | 375 | 450 | 525 | 600 | 750 | 900 |
| 0.50 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1.00 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1.50 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2.00 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2.50 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3.00 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3.50 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |
| 3.75 | 3 | 3 | 3 | 3 | 4 | 4 | 4 |
| 4.00 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| 4.25 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| 4.50 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| 4.75 | 3 | 4 | 4 | 4 | 4 | 4 | 5 |
| 5.00 | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| 5.25 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| 5.50 | 4 | 4 | 4 | 6 | 6 | 6 | 6 |
| 5.75 | 4 | 4 | 6 | 6 | 6 | 6 | 6 |
| 6.00 | 4 | 6 | 6 | 6 | 6 | 6 | 6 |

The scour protection to be provided is shown in the image below and will reduce the flow velocities sufficiently to ensure that erosion downstream is not an issue. An updated civil works sketch can be resubmitted as required to reflect the below change in outlet structure.




In addition, the image below shows the 1% AEP flood extents from Council's flood mapping information. The existing easement access track is flooded during the 1% AEP storm events.


Site area flood results

Existing conditions
1% AEP water level (m AHD

(0.1% AEP extents similar)

Have a great weekend and please let me know should you have any queries.

Regards,

**Mufrat Noor**
DC Civil Engineer (APAC)
Amazon Web Services
e: mufrat@amazon.com
m: +61 478 035 255

**From:** Jeff Smith <Jeffrey.Smith@endeavourenergy.com.au>
**Sent:** Monday, 22 July 2024 3:41 PM
**To:** Noor, Mufrat <mufrat@amazon.com>
**Cc:** Kek Tang <Kek.Tang@endeavourenergy.com.au>
**Subject:** RE: [EXTERNAL] 2 Glendenning Road, Glendenning [Filed 24 Jul 2024 12:09]

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Dear Mufrat,

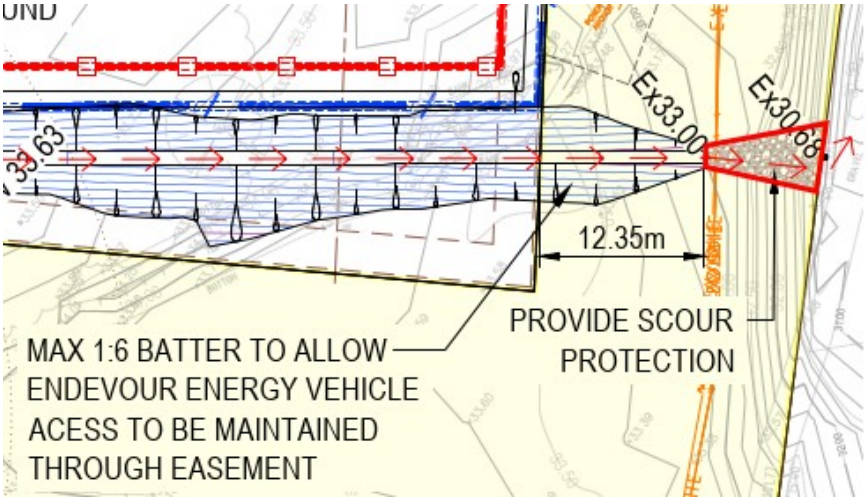
Thank you for your email.

**RE: LOT 2 DP1137162 HN 2 GLENDENNING ROAD, GLENDENNING.**

Endeavour Energy has identified that we have an easement access track located on the adjoining property as indicated below.

How will the excess water runoff through the scour protection be controlled, as not to cause future erosion of the track.

This track is used by multiple utility and emergency service organisations.



**Regards**

**Jeffrey Smith | Easement Management Officer – Property Services.**
**Easements@endeavourenergy.com.au**
**PO Box 811 Seven Hills NSW 1730**
**endeavourenergy.com.au**
**Teams: 0408665193**

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**From:** Noor, Mufrat <mufrat@amazon.com>
**Sent:** Friday, 12 July 2024 4:33 PM
**To:** easements@endeavourenergy.com.au
**Cc:** Nuner, Kevin <kvnuner@amazon.com.au>; Shayegan, Paul <mrpauls@amazon.com>; DSouza, Priya <dsopriya@amazon.com>; Matthew Buttarelli <MButtarelli@acor.com.au>
**Subject:** 2 Glendenning Road, Glendenning

Hello,

Hope this email finds you well. We are undertaking a project at 2 Glendenning Road and are seeking feedback on some minor works being completed as part of the project detailed below.

SHEET 1

- We are proposing a cut off drain that extends from west and continues east towards Eastern Creek. The cut off drain is initially a small v-drain (Section C) to be constructed within the existing pavement and subsequently transitions to a channel (Section D) where the concrete portion of the easement finishes. This channel continues along the north of the existing pylons where a new retaining wall is proposed (height subject to detailed design).
- We note that the existing clear height to the overhead transmission lines will not be impacted and a 10m offset radius from each stanchion of the eastern pylon has been maintained

SHEET 2

- The driveway from Glendenning Road into the easement area has an existing width of 9.00m which is being reduced to 7.35m
- A swept path has been undertaken using a 10.5m vehicle as presented in the sketch

**Input required from Endeavour Energy**

- We are seeking feedback from Endeavour Energy on the above works within the easement to 1/ create and v-drain within the pavement which transitions to an open channel and 2/ reduce the width of the existing driveway.

Please let me know if you have any questions or require any further information.

Many thanks,

**Mufrat Noor**
DC Civil Engineer (APAC)
Amazon Web Services
e: mufrat@amazon.com
m: +61 478 035 255

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