

From: [REDACTED]
To: [Strategic Planning](#)
Cc: [REDACTED]
Subject: Planning Scheme Amendment C217ball - [REDACTED]
Date: Wednesday, 27 May 2026 1:56:41 PM
Attachments: [REDACTED]

Your attachments have been security checked by Mimecast Attachment Protection. Files where no threat or malware was detected are attached.

Good afternoon,

Please find attached our submission on behalf of the landowner at [REDACTED].

Regards

 [REDACTED]
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Beveridge Williams acknowledges the Traditional Custodians of the land it works on and pays respect to their Elders, past and present

Our Ref: 2600624

25 May 2026

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To: City of Ballarat Strategic Planning

RE: Submission to Amendment C217ball – [REDACTED] – Proposed Flood Overlay Application

I write on behalf of the landowner regarding Amendment C217ball and the proposed application of flood-related overlays to land at (the Subject Land) [REDACTED]

This submission objects to both the application of the exhibited overlay and its mapped extent across the subject land derived from the Ballarat 11 Waterways Flood Study – Canadian Creek and Tributaries Hydrology and Hydraulics Report (Water Technology, December 2023) (The Technical Report), pursuant to Section 23 of the Planning and Environment Act 1987.

I request that the proposed flood overlays affecting the Subject Land be withheld, deferred, or removed from the Amendment pending completion of more reliable modelling that adequately addresses the deficiencies identified in this submission. Alternatively, I request that the Council direct the City of Ballarat and its consultant to respond with due consideration to the matters raised below before any overlay is applied to the Subject Land.

1 – Inadequate Drainage Infrastructure Data Downstream of the Subject Land

The Technical Report states at Section 2.4: "*City of Ballarat provided a GIS database containing information of Council drainage assets in the municipality... The provided layers were reasonably complete with pipe dimensions and pit depths. However, pit/pipe inverts were generally missing from the data sets. Where pit depths were available, inverts were assumed by subtracting these depths from the ground surface. In case of missing pit depth, pipe inverts were assumed by subtracting pipe diameter and standard pipe cover depth.*"

It is our review that in the vicinity of and downstream of the Subject Land along the relevant tributary, there is a significant absence of pit and pipe data in the Council GIS database. As a consequence, the modelled 1D drainage network in this area either:

- omits pipes and pits that exist on the ground and through which stormwater is conveyed, resulting in the model over-predicting surface flooding because it cannot route flows underground; or
- includes assumed infrastructure with invert levels derived from the generic cover depth table in the report, which may have no relationship to the actual constructed invert depths and grades of pipes serving the area.

In either case, the hydraulic model does not accurately represent how stormwater actually behaves in the drainage catchment draining from the Subject Land. Where the model assumes flows remain at or near the surface due to absent or incorrect pipe data, it will produce flood extents and depths that are not representative of real conditions. The resulting overlay boundaries cannot be considered reliable for the purposes of imposing statutory planning controls on private land.

We request that the City of Ballarat and Water Technology:

- **Confirm specifically which pipes, culverts, and pits downstream of the Subject Land along the relevant tributary are represented in the 1D network, including their modelled invert levels;**
 - **Identify which of those assets have confirmed survey invert data versus assumed cover-depth-derived inverts;**
 - **Confirm whether any drainage infrastructure in this reach was absent from the Council GIS database and therefore entirely omitted from the model;**
 - **Capture additional pit and pipe information through survey that is likely to assist in the rerouting of flows; and**
 - **Provide a sensitivity analysis demonstrating the effect on modelled flood levels and extents at the Subject Land of using realistic invert levels versus the assumed values.**
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2 – Climate Change Scenario Selection

The flood maps exhibited on the MySay Ballarat portal and forming the basis of the proposed overlays are explicitly captioned "1% AEP RCP 8.5". This indicates that the most extreme Representative Concentration Pathway (RCP) scenario – representing a future of no climate policy and approximately an increased dependence on fossil fuels used relative to today – has been selected as the operative basis for statutory overlay mapping.

The Technical Report confirms that three climate scenarios were modelled: RCP 4.5, RCP 6.0, and RCP 8.5. The results for all three have not been made publicly available. Only the RCP 8.5 outputs appear to have been published and used for overlay generation. Submitters and landowners have therefore been unable to assess how the overlay boundary across the catchment and at the Subject Land changes between scenarios, and whether a more moderate and defensible scenario would result in the Subject Land falling outside the overlay extent entirely.

It is further noted that the Victorian Government released the Victorian Climate Science Report 2024 (VCSR24) subsequent to the preparation of this Technical Report. VCSR24 adopted the updated Coupled Model Intercomparison Project Phase 6 (CMIP6) Shared Socioeconomic Pathway (SSP) framework rather than the CMIP5 RCP framework used in the Technical Report. The climate change inputs to this study may therefore not reflect the best available climate science at the time of exhibition.

Additionally, the justification to adopt RCP 8.5 is contrary to the intent of the Corangamite Natural Resources Management Plan for Climate Change which "aims to support the region to incorporate climate change mitigation and adaption into NRM planning". The publication of these strategies among others confirms the CCMA intends to combat RCP 8.5.

Finally, the global climate models cannot provide information on variations in the climate that occur on smaller scales than the grid cells of that model. As such smaller scale grids are required to inform local climate conditions. Given Ballarat's unique climate, due to its high elevation and temporal patterns, it is highly distinct from the rest of Australia's mainland. It is understood that CCMA are currently undertaking region specific downscaling, which would be more representative of the existing climate change scenario.

Applying an overlay boundary derived solely from an outdated, most extreme modelled climate scenario – without transparent comparison against intermediate scenarios or justification for that selection – is not an acceptable basis for imposing permanent statutory constraints on private land.

We request that CCMA finalises local climate downscaling and Council adopt the SSP3-7.0 – 2100 in line with industry best practice (Melbourne Water), and Victorian Climate Science Report 2024 and remodel the overlays.

3 – DEM Resampling from 1 m to 3 m Grid Resolution

The Technical Report states at Section 4.2.1 that the raw LiDAR data was available at 1 metre grid resolution and was resampled to a 3 metre grid for inclusion in the TUFLOW hydraulic model. While this is a practice made for computational efficiency, it introduces a systematic, well-understood bias toward over-prediction of surface flooding in upper-catchment urban tributary areas such as that imposed on the Subject Land.

The specific mechanisms by which resampling from 1m to 3m inflates predicted flooding are as follows:

- Loss of channel and drainage line geometry: Narrow drains, swales, and shallow cut channels that are 1-2 metres wide are poorly resolved at 3m cell size. Each resampled cell averages the drain invert elevation with the higher surrounding terrain, raising the apparent invert of the conveyance feature. Flows that in reality route through a defined channel are instead represented as spreading across a shallower, wider surface, producing larger inundation extents.
- Loss of kerb and road cross-section geometry: At 3m resolution, the cross-section of a standard residential road – including kerb lines that in reality direct flow to pits – occupies only 2-3 cells. The kerb geometry that blocks and channels overland flow is blurred, causing water to be modelled as spreading across a flat surface rather than being directed into the piped drainage system.
- Elevation of critical low points: Where a terrain depression corresponds to a pit inlet, culvert entry point, or an overland flow to nearby waterbody, the 3m cell that contains it also captures surrounding higher ground. The averaged cell elevation raises the apparent threshold at which water overtops that low point, affecting both flow routing and the modelled onset of surface flooding.

The net effect in the upper tributary catchment near the Subject Land is that the 3m model cannot represent the sub-grid drainage conveyance features that in reality move stormwater away from the surface. Water that would be intercepted by kerbs, pits, and drains visible in the 1m source data is instead modelled as remaining on the surface and spreading laterally. This is a conservative (flood-exaggerating) bias that is inherent to the resampling decision and is not acknowledged or quantified in the Technical Report.

It is noted that the 1m source LiDAR data was available to Water Technology for the entirety of the model domain. The choice to resample to 3m was made for run-time efficiency, not because finer data was unavailable. No sensitivity analysis has been published comparing 1m and 3m model outputs for the upper tributary area, and no justification is provided for why the computational saving was prioritised over modelling accuracy in a context where the outputs are to be used as the basis for permanent statutory planning controls on private land.

We request that Water Technology confirm whether a 1m or 2m resolution model was tested for the upper tributary catchment, and if not, that a sensitivity run be completed and published prior to finalisation of the overlay boundaries affecting the Subject Land.

4 – Misclassification of Waterbody as Grassland in the Hydraulic Roughness Layer

The Technical Report identifies a Manning's roughness value of $n = 0.03$ for "Ponds & Other Waterbodies" as a discrete land use category available within the hydraulic model (Table 4-1). However, multiple permanent waterbodies exist, including one approximately 120 metres south of the relevant tributary reach within the Subject Land catchment. It is my concern, based on review of the hydraulic roughness map (Figure 4-2) and the aerial imagery of the area, that this waterbody along with nearly all others, have been classified in the model as grassland (Manning's $n = 0.035$) rather than as an open water surface.

This misclassification gives rise to two compounding errors in the model results, potentially affecting the Subject Land:

- Elimination of storage attenuation: A permanent waterbody has depth and volume. During a flood event, a dam or pond absorbs an initial volume of runoff before it spills or overtops, attenuating the

peak flow delivered to the downstream creek/tributary. Where a waterbody is modelled as a flat grassed surface with no hydrography, the model holds no storage volume. All inflow that would in reality be temporarily detained in the waterbody passes through as immediate surface runoff at full peak rate. This overstates both the peak flow rate and the corresponding flood depth downstream at the Subject Land, compounding upstream conditions.

- Incorrect flow velocity: Manning's $n = 0.035$ (grass) produces higher flow velocities than an open water surface ($n = 0.030$). Flow routed through a misclassified waterbody cell travels faster, arrives at the tributary junction earlier, and produces a sharper, higher peak than would occur in reality. This affects the timing and magnitude of the flood peak modelled upstream at the Subject Land.

The correct treatment of a permanent waterbody in a TUFLOW 2D model would be to: (a) identify it from aerial imagery or council cadastral data; (b) assign it the appropriate Manning's n value from the model's own roughness table ($n = 0.03$); and (c) if a dam wall or bund is present, represent it as a raised terrain feature with a defined spillway or overflow path. The fact that the correct roughness category was included in the model's land use table but appears not to have been applied to multiple online and offline water features represents a demonstrable and correctable error.

We request that Water Technology confirm the roughness classification applied to all waterbodies located within the catchment, and provide a sensitivity run demonstrating the effect on modelled flood levels at the Subject Land.

Individually, each of the deficiencies identified above would be grounds for concern. Taken together, they are mutually reinforcing and all point in the same conclusion – model over-prediction of flood depths and extents at the Subject Land and across the catchment.

Each individual deficiency introduces an upward bias in predicted flooding at the Subject Land. Their combined effect is a material and systematic overstatement of flood risk that is not an acceptable evidentiary basis for imposing permanent statutory planning controls on private land.

For these reasons and others, we object to the application and extent of the proposed overlay affecting the subject land.

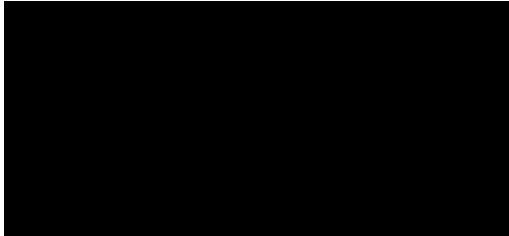
Not withholding those set out above, I respectfully request that the Council and the City of Ballarat:

1. **Defer or withhold** the proposed flood overlay planning scheme amendment C217ball pending completion and remodelling the deficiencies identified in this submission.
2. **Instruct Water Technology:**
 - a. to audit and confirm the completeness of the 1D drainage network with corrected survey verified invert data before the overlay is applied.
 - b. to model corrected waterbody roughness classifications and demonstrate sensitivity analysis.
 - c. publish a sensitivity analysis, comparing 1m and 3m resolution model outputs for the tributary catchment relative to the subject site, otherwise the entire catchment to quantify the flood extent.
3. **Await** CCMA to finalise their regional grid downscaling to accurately reflect the unique climate of Ballarat.
4. **Coordinate** between CCMA and City of Ballarat to formally adopt a consistent climate change scenario in line with State and Federal objectives, be it SSP3-7.0, and assess the changes to the overlay.

We would like to reserve the right to appear before the Council and to call expert evidence in support of the matters raised herein.

Thank you for your consideration of this submission.

Yours sincerely

A large black rectangular box redacting the signature of Beveridge Williams.

BEVERIDGE WILLIAMS