

14th October 2025

BBO

PO Box 9041

Hamilton 3240

Attention: Chris Dawson

Dear Chris,

**RE: RUAKIWI ROAD RESERVOIR DEVELOPMENT
RESOURCE CONSENT – LIGHTING – EFFECTS ASSESSMENT**

As requested, we have liaised with the project team to produce the concept lighting design for the above project, to inform potential environmental effects. This report is a lighting effects assessment (**LEA**).

EXECUTIVE SUMMARY

Lighting will be provided to the following:

- Downward directed 2700K colour temperature façade lighting will be integrated into the Corten panels of the new Reservoirs, on the Ruakiwi Road face. This will be a bespoke solution developed in conjunction with the Architect and the Artist. The lighting will operate from dusk to 11pm.
- Downward directed 2700K colour temperature functional lighting will be provided to the working space between the Reservoir tanks and the Corten façade to assist. The lighting will operate on motion sensors, with a master override switch.
- If windows are provided for the Valve Room, then all interior lighting will be 2700K colour temperature.
- Exterior lighting at the Clarence Street Booster Pump Station will be minimal. It will comprise motion sensor activated lighting at the personnel street entry and at the rear plant access.

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Lighting will not be provided to the following:

- The lakeside façade of the Reservoirs
- The existing concrete water tower
- The elevated path behind the Reservoirs
- The proposed path from Ruakiwi Road to the lakeside
- Any exterior lighting beyond that mentioned above, to the Reservoirs, Valve Room or the Booster Pump Station.

In addition, the current exterior lighting at the plant room beside the concrete water tower will be removed.

Based on this approach, I have assessed the lighting effects as follows;

- The exterior lighting will satisfy the permitted activity limits in the District Plan
- Where relevant, the recommendations contained in AS/NZS 4282 (Control of the obtrusive effects of outdoor lighting) & AS/NZS 1158 (lighting for roads and public spaces) will be satisfied
- The understood intent of the Department of Conservation Interim Advice Note (Steps to take to reduce the impact/effect of artificial light on pekapeka (bats): Version 1: 19 August 2025 will be satisfied

1.0 BACKGROUND

The project will comprise the staged introduction of 2 new reservoir tanks with an associated Valve Chamber, near the intersection of Ruakiwi Road and Clarence Street. An elevated walkway is proposed to the rear of the tanks and a path is proposed to connect to the existing lakeside walkway.

These elements are shown in Figure 1.

Concept Design

SITE PLAN

The plan shows the final landscaping outcome, with both new reservoirs in place.

The plan will be further developed with input from mana whenua and feedback from community consultation.

The design aims to:

- Reduce the visual impact of the new built forms.
- Maintain view shafts from the intersection of Ruakiwi Road and Clarence Street.
- Create and enhance views to and from the existing water tower and elevated walkway around the new reservoirs.
- Provide a network of connecting paths.
- Provide mitigation planting for the loss of vegetation required for the new built form.

KEY

-  New built form
-  Hard surface (100% concrete paving)
-  Hard surface (50% permeable paving 50% Concrete paving)
-  Garden bed and/or Storm water treatment
-  Existing Trees and Vegetation
-  Trees to be kept and protected during construction
-  New Trees



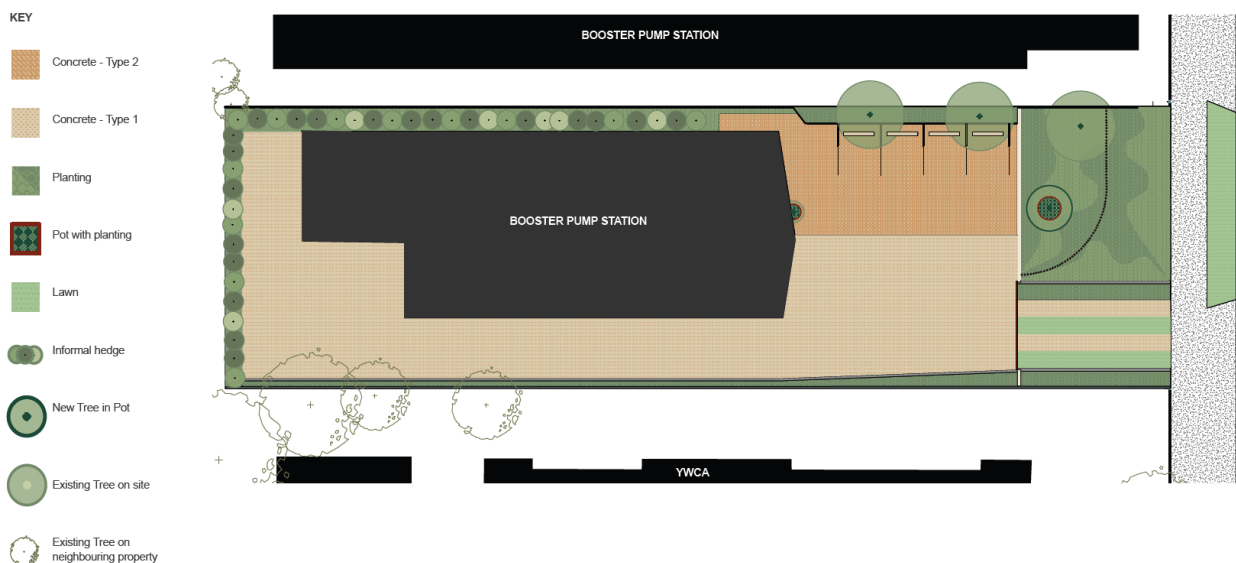
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Figure 1. Reservoir – Concept Design

In addition, a new Booster Pump Station is proposed to be located at 139 Clarence Street as shown in Figure 2.

Preliminary Design

SITE PLAN



**Figure 2. Pump Room – Preliminary Design
 (Clarence Street to the right)**

The existing plant room and associated lighting beside the concrete water tower will be demolished.

Lighting proposed is defined in section 3.0.

1.1 Bats

While the sensitivity of the New Zealand long-tailed bat (**LTB**) to light is not fully understood, it is anticipated that it could be adversely affected by excessive artificial light at night (ALAN). As such, given the national critically endangered status of the LTB, a conservative approach to exterior lighting in the vicinity of significant bat habitat is recommended. The Department of Conservation (**DOC**) has prepared an Interim Advice Note (Steps to take to reduce the impact/effect of artificial light on pekapeka (bats): Version 1: 19 August 2025) (**DOC Advice Note**), to assist in planning for any such lighting.

Past projects in Hamilton where the LTB has been a consideration have helped to form a knowledge base and to inform best practice conditions for lighting. Conditions established

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through an Environment Court process for the Weston Lea Amberfield development chose the following approach;

- No more than 0.1 lux added light at bat habitat, or a proxy of 0.3 lux outside a 20m buffer from the bat habitat (to ensure 0.1 lux at the habitat)
- 2700K LED facing the bat habitat
- Fully downward lighting. Zero upward light

The red line (i.e. the proposed new designation line) in Figure 3 which defines the proposed project boundary, will also define the "Bat Habitat Boundary" (**BHB**). Following current best practice, any new lighting should ideally generate no more than 0.1 lux added illuminance at that line.



Figure 3. Bat Habitat Boundary
(Red perimeter line, but beginning 20m from Ruakiwi Road)

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There is existing street lighting in Ruakiwi Road as well as local security lighting associated with the plant room at the base of the current water tower. While I understand that the plant room lighting will be removed, the roadway lighting generates well in excess of 0.1 lux within 10 to 20m of the road. As such, I propose that the BHB lighting limit should commence 20m from the road kerb.

The project boundary passes through an existing Significant Natural Area (**SNA**). I understand that the foliage within the project boundary will be trimmed back to the project boundary. Hence, the project boundary will effectively become the SNA boundary for most of its length. There is a small portion which is outside the current SNA and would remain so.

1.2 CPTED

While good lighting is an important part of Crime Prevention Through Environmental Design (**CPTED**), so is the avoidance of lighting that could potentially draw someone into an unsafe location. The area behind the proposed reservoirs will be hidden from passive surveillance from the street, so is potentially an area of concern that should not be lit.

The same location is very close to the BHB, such that it would not be practical to light for safe movement while satisfying the BHB spill light limit. Hence, I recommend not lighting the path behind the Reservoirs.

Similarly, I recommend that the proposed path from the Reservoirs down to the lake should not be lit. It is partially within the bat habitat and elsewhere close to the BHB. In addition, there is generally no pathway lighting around the lake edge, so there is no logical reason to light a path leading to an unlit space. Doing so would not be consistent with good CPTED design practice.

1.3 Hamilton District Plan (HDP)

The relevant lighting rules at section 25.6 of the HDP are summarised and paraphrased below:

- 25.6.3 a: Glare to motorists shall comply with AS/NZS 4282
- 25.6.3 b: Lighting for public spaces and roads shall comply with AS/NZS 1158
- 25.6.4.2 a: Light spill at 1.5m within a residential zone shall not exceed 3 lux

In addition, while strictly only applicable within Peacocke, the rules in section 25.6.4.4 (Peacocke Precinct) as they relate to bat habitat, are recommended as logical constraints next to any significant bat habitat. In particular;

- 25.6.4.4 a: No more than 0.3 lux at a Significant Bat Habitat Area boundary (typically including a buffer of 20m from the BHB, intended to limit light at the BHB to no more than 0.1 lux)
- 25.6.4.4 c.i: Emit zero upward light

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- 25.6.4.4 c.ii: Lights shall face down and be mounted as low as practical
- 25.6.4.4 c.iii: Maximum colour temperature of 2700K
- 25.6.4.4 c.iv: Security lighting on motion sensor with 5-minute timer

2.0 LIGHTING DESIGN CONSTRAINTS

Based on the above, I propose the following lighting design constraints.

2.1 Reservoirs and Valve Room

- Light spill and glare to people and motorists from new lighting, shall satisfy the Hamilton District Plan, section 25.6, permitted activity limits
- Added spill light at the Bat Habitat Boundary (**BHB**) from new lighting shall not exceed 0.1 lux horizontal or vertical [Note: "Added" means additional to any existing light spill and natural ambient light at night]
- Do not light the path behind the Reservoirs, nor the path leading to the lake edge
- Avoid façade lighting on the screen wall facing away from Ruakiwi Road (i.e. toward the significant bat habitat)
- New lighting shall;
 - Emit zero upward light
 - Face down and be mounted as low as practical
 - Have a maximum colour temperature of 2700K
 - In the case of security lighting, include a motion sensor and 5-minute timer
- Do not light the façade of the existing concrete water tower

2.2 Booster Pump Station (139 Clarence St)

The booster pump station compound is a secure private space. It is adjacent residential buildings and a public road, but remote from Bat Habitat. The compound itself is not a public space. Hence, the proposed constraints are:

- Light spill and glare to people and motorists from new lighting, shall satisfy the Hamilton District Plan, section 25.6, permitted activity limits

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- Provide movement sensor-controlled lighting at the building entrance and the rear plantroom access, each with a 5-minute timer
- Provide no other exterior lighting

3.0 LIGHTING CONCEPT DESIGN

Consistent with the foregoing constraints, the following lighting is proposed:

3.1 New Reservoirs and Valve Room

The new installation is proposed to be enclosed by a Corten screen, 6m high. A series of downward facing grazing wall lights are proposed to provide a wash of warm light to compliment the Corten. The lights would also be clad in Corten or be finished with a similar paint colour, or concealed within bespoke apertures designed by the Architect in conjunction with the Artist. They would be 2700K LED with zero upward light. Refer to figures 4 & 5.

The lighting would be energised at dusk and turned off at a predetermined time (11pm is proposed).



Figure 4. Indicative lighting effect on Corten panel



Figure 5. Indicative Corten finish wall light

The lighting will be installed on the Ruakiwi Road frontage, but not on the rear of the structures facing the BHB.

Behind the screen, additional lighting may be provided for functional use when maintenance staff are present. Lighting in uncovered space would be motion sensor controlled on a 5-minute timer. Lighting within the Valve Room will be manually controlled. If there are windows provided, then all interior lighting will be 2700K. Otherwise, if it is not visible from the public space, then there will be no restriction on interior lighting.

No other exterior lighting is proposed.

3.2 Booster Pump Station (139 Clarence St)

Lighting will be limited to motion sensor security lighting on a 5-minute timer at the front entry door and the rear maintenance access.

No other exterior lighting is proposed.

3.3 Existing Reservoir and Plant Room

Lighting for these buildings is currently beyond the scope of the project. However, I do not recommend lighting the façade.

The possibility has been discussed with the project team and it was agreed that lighting only the roadside face would look out of place and lighting the complete façade would not be possible without breaching the 0.1 lux limit at the BHB. There would also be CPTED concerns related to attracting visitors to the rear of the tower.

I understand that the existing plant room and associated floodlighting will be removed.

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3.3 Public path from Ruakiwi Road to Hamilton Lake

No exterior lighting is proposed.

4.0 ASSESSMENT OF EFFECTS

The lighting as proposed will be managed to ensure that any added effects, beyond that of any existing exterior lighting and natural ambient lighting, will be designed to:

- Ensure that glare to motorists is less than the 20% Threshold Increment (TI) limit as recommended by AS/NZS 4282
- Satisfy the 3 lux spill light limit required by the HDP in relation to residential receivers on the opposite side of Ruakiwi Road
- Satisfy the 0.1 lux best practice spill light limit at the BHB, and
- Be designed such that all exterior lighting will;
 - Emit zero upward light
 - Face down and be mounted as low as practical
 - Have a maximum colour temperature of 2700K
 - In the case of security lighting, include a motion sensor and 5-minute timer

Hence, the lighting will satisfy the Hamilton District Plan permitted activity lighting rules, accepted best practice in terms of lighting in the vicinity of significant bat habitat and best practice in terms of lighting for CPTED.

The lighting will be consistent with the recommendations in AS/NZS 4282 (Control of the obtrusive effects of outdoor lighting). AS/NZS 1158 is not applicable as no functional lighting is proposed for roads or public spaces.

The lighting proposed is consistent overall with the DOC Advice Note. However, there is a recommendation in this document to avoid illuminating facades of buildings that are close to important bat habitat. In this instance the proposed lighting is adjacent a brightly lit street and fully downward light is proposed, unlike typical building façade lighting which is generally directed upwards. The lighting is also facing away from the bat habitat. Hence, in my opinion, the intent of the DOC Advice Note will be satisfied.

Residents on the opposite side of Ruakiwi Road will be affected by some reduction in amenity due to the change in view from a dark natural space at night to an illuminated 6m high screen. However, that is partially offset by the fact that Ruakiwi Road is already a well-lit street, so the streetscape is not entirely dark. There is a potential to increase sleep disturbance, although the change in effect in this regard relative to the effect from the existing road lighting will be minimal

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in my opinion. Applying a nominal 11pm curfew for the façade lighting will also assist in mitigating effects.

4.0 CONCLUSIONS

In my opinion, the proposed lighting at the Reservoirs will have no more than moderate effects – i.e. the effects will be no more than minor.

The proposed lighting at the Clarence Street booster pump station will produce negligible to very low effects – i.e. less than minor.

Yours faithfully,

LDP Limited




LDP Leading Design Professionals
Ngāio Te Kāwhiri Hoahoa

John Mckensey

Executive Engineer MIES