Tonkin+Taylor

Memo

To:	**Julie Price**	**Job No:**	**1015067.1000**
From:	**Mai Skudder**	**Date:**	**09 July 2021**
cc:	**Craig Davanna, Dave Taylor**		
Subject:	**Resource Consent Application Queries - Revision 02**		

Further to your emails on 04 March and 29 June 2021, we have the following response to your queries to assist with the resource consent application for the Omanawa Falls project.

The design of the carpark has been modified from a sealed pavement to an unsealed pavement, with the exception of the entranceway (road reserve).

This memo supersedes the previous revision (01) issued on 21 April 2021.

1 Carpark engineering detail

1.1 Entranceway design

As recommended by the Omanawa Falls Access Improvements, Traffic Impact Assessment (TIA) report undertaken by Beca Ltd, a rural basic left-turn treatment for the entranceway has been proposed and designed. This has been designed in accordance with Austroads, Guide to Road Design Part 4A, Unsignalised and Signalised Intersections.

The entranceway design requires a diverging lane from Omanawa Road that entails:

- A 42 m long diverging taper
- 25 m long leading straight prior to the entranceway kerb return
- An additional 4 m carriageway width
- 10 m radius kerb return for entry
- Approx. 20 m wide entranceway mouth

The position of the proposed carpark entranceway is the same position as the current entranceway to 1031 Omanawa Road. This has been determined as the most optimal position to achieve the maximum available sight distance for both north and south bound exiting from the carpark.

1.2 Pavement design

Utilising traffic volume data from the TIA, a sealed pavement design has been undertaken in accordance with Austroads, Guide to Pavement Technology Part 2, Pavement Structural Design.

Pavement design details:

- 200 mm thick GAP65 sub-basecourse
- 150 mm thick M/4 AP40 basecourse
- Two coat grade 3/5 chipseal surfacing

The sealed pavement design will be utilised within the road reserve (diverging lane and entranceway).

The carpark has been specified as unsealed for construction cost saving purposes. A nominal 200 mm thick GAP40 has been proposed as the pavement.

Consideration has been given to potential upgrading of the overflow carparking. It is proposed that the levels for the overflow carpark be constructed to allow for an increase in pavement thickness and sealing, while maintaining design gradients.

1.3 Kerbs and edging

There are three edging details proposed as detailed on the drawings:

1 *Mountable kerb & channel:* This has been proposed as the edging for the entranceway diverging lane.

2 *Nib kerb & channel:* This has been proposed along the northern edge of the carpark and entranceway mouth.

3 *Timber edging:* Where there is no requirement for concrete edging.

1.4 General geometric design

In conjunction with stormwater considerations, the site has been graded downwards to the north. This generally follows the predeveloped contours and directs stormwater away from the existing building. Longitudinal and crossfall grades vary from 2 - 3% with resulting grades varying from 2.5 - 3.5%.

1 vertical to 5 horizontal (1V:5H) cut and fill batter slopes have been designed around the perimeter of the carpark, with a 1V:2H batter slope, and kerb and channel are required from the edge of seal of the entranceway diverging lane due to road reserve boundary constraints.

The Ministry of Business Innovation & Development, Acceptable Solutions and Verification Methods, for New Zealand Building Code Clause E1 Surface Water has been used for determining finished levels and grade direction around the existing building.

2 Carpark stormwater design

The design approach to manage stormwater for the proposed carpark is summarised below addressing conveyance, disposal and water quality treatment.

2.1 Stormwater disposal

- The existing site has an approximate area of 0.95 ha and is largely undeveloped with an existing dwelling. As a result of the proposed carpark and associated infrastructure, the impervious footprint (assuming a future fully sealed carpark) will increase from approximately 6% to 53% of the total site area.
- The increased runoff and volume from the main carpark as a result of an increased impervious area is required to be disposed of to not adversely affect neighbouring properties.
- The options for stormwater disposal considered were:
  - Ground soakage;
  - Discharge to Omanawa Road (noting that there is no piped reticulation available); and
  - Discharge to Omanawa Stream via the existing 4WD track drain.
- Onsite soakage for stormwater disposal was investigated and deemed to not be feasible due to low infiltration rates.

- It was confirmed by WBoPDC that discharging runoff to Omanawa Road was not an option given there is no existing formed roadside drain.
- It is therefore proposed to discharge runoff to the existing 4WD track drain. Sections of the existing 4WD track drain will be rock lined as and where required to reduce erosion and improve conveyance. Drains will be monitored for future erosion and addressed as required.
- It is expected that peak runoff into the Omanawa Stream will be increased by up to 5% during a 2% AEP storm event assuming a fully sealed carpark area. It should be noted that this increase in runoff will be less with the carpark being unsealed.
- The peak runoff for the 10% Average Exceedance Probability (AEP) storm was calculated from a fully sealed main carpark area to be approximately 95 L/s (or 61 L/s with a fully unsealed carpark). This is less than the maximum discharge rate of 125 L/s to comply with a permitted activity under DW R20 in the BoPRC Regional Natural Resource Plan.

2.2 Stormwater conveyance

- The carpark gradient plan has been simplified to limit the number of stormwater inlets and length of pipe.
- The proposed stormwater piped system for the main carpark area has been generally designed in accordance with the WBoPDC 2009 Development Code, where rainfall intensities from NIWA HIRDS V4 have been used and adjusted to allow for climate change to 2100 (RCP6.0).
- The piped network has been designed to collect and convey both primary and secondary flows (i.e. up to a 2% AEP storm event) to avoid discharging overland flow to neighbouring properties to the north. The piped network will discharge to the 4WD track drain.
- The pipe network has also been sized for peak flow assuming the overflow carpark is sealed, to allow for any future upgrade without the requirement to replace existing pipes.

2.3 Stormwater treatment

- Stormwater treatment has been considered for the carpark area as water quality is significant given the ultimate discharge point at the Omanawa Stream. It is also understood to be a key concern for Ngati Hangarau (governing Iwi).
- A gravel surface will initially generate less stormwater runoff than fully sealed carpark, given it is more permeable. However, over time it is expected that a gravel surface will become more impermeable with vehicular compaction and behave closer to fully sealed carpark, in terms of stormwater runoff. With larger storm events it is unlikely there will be a significant difference between the stormwater runoff generated between sealed and unsealed pavements.
- Carparks are generally high contaminant generating areas with common contaminants being sediments, metals (zinc and copper), hydrocarbons and gross pollutants. There would expected to be a significantly higher sediment load with a gravel carpark than fully sealed, as fines from the gravel can be mobilised.
- Stormwater treatment will be provided for approximately 65% of the carparking area. The remaining 35% of the carpark area will drain to catchpits with inserts to remove gross pollutants. Green infrastructure (i.e. swales/planted areas) has been favoured over proprietary treatment devices to tie in with proposed planting. Due to the high expected sediment loads, maintenance requirements and frequency of inspections are expected to be significantly greater than with a sealed carpark. Additional measures may need to be incorporated into the detailed design to mitigate effects caused by sediment.
- The gravel overflow area of the carpark area will drain to catchpits with inserts to remove gross pollutants. Given the area is used for overflow parking, it will likely have less vehicle

numbers than the main carpark. It would be expected that contaminant concentrations in the runoff from the overflow carpark will therefore be less than the main carpark.

- The design allows for the retrofit of a raingarden if the carpark is sealed in the future, or vehicle numbers and hence contaminant concentrations are increased. It should be noted that the Auckland Unitary Plan requires water quality treatment for parking areas that carry more than 50 vehicles per day.
- Overall, sediment runoff into the Omanawa Stream is expected to be decreased by incorporating erosion protection of the 4WD track drain.

3 Carpark earthworks

The proposed carpark will require the following construction activities:

- Site clearance i.e removal of select existing trees, removal of existing structures (i.e water tanks), etc. The site clearance will need to be disposed of appropriately, off-site.
- Topsoil stripping to stockpile, and uplift from stockpile and placing to finished levels.
- Excavation works. This will require cut to stockpile/fill (stockpiling, placing excavated material elsewhere to finished levels) as well as cut to waste (disposal off-site).
- Importing of fill i.e pavement aggregate, concrete, etc.

All earthworks will be undertaken in general accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities by Environment Bay of Plenty Regional Council. It is expected that the use of silt fencing and maybe decanting earth bunds will be used, but is subject to the contractor's methodology. A sediment retention pond will be required if the contributing catchment exceeds 3,000 m2.

Approximate volumes from the existing ground level to design finished level are a cut volume of 1,700 m3 and a fill volume of 600 m3. Our understanding is that these volumes do not meet the threshold for requiring an earth disturbing consent.

4 Track and upper viewing platform erosion and sediment control

All works required for construction of the tracks and upper viewing platform will be undertaken in general accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities by Environment Bay of Plenty Regional Council. Given the nature of the densely vegetated environment, this will predominantly mean the use of silt fencing and/or vegetation slash for those exposed areas requiring stabilisation. It is envisaged that the walking track will be surfaced with clean metal-course as the works progress to limit the potential for sediment generation.

The works are expected to be on a relatively small scale (constructed predominantly with hand tools), with small open areas and stabilised as works progress.

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