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Attention: Ashlee Farrow

Dear Ashlee

## **C&D Landfill: SEV review**

### **1 Introduction**

A construction and demolition materials landfill is operated by C&D Landfill Ltd (The Applicant) at 2 Landfill Rd, Happy Valley, Owhiro Bay, Wellington. The Applicant is proposing an extension to the landfill in a gully located to the north-west of the existing site.

The proposed landfill extension would impact on perennial and ephemeral tributaries of the Owhiro Stream. The main stem of the impacted stream is known as the C&D Landfill Stream. The C&D Landfill Stream is currently piped for around 500 m beneath part of the existing landfill site, Landfill Road and the Wellington City Council waste recycling centre. The proposed landfill development would result in about 1,015 m further piping/reclamation of the C&D Landfill Stream and its ephemeral tributaries.

An ecological effects assessment report was prepared in support of the consent application by Wildlands Consultants (2012). That report assessed the impacted streams as being of high ecological value. GWRC subsequently requested that a Stream Ecological Valuation (SEV) was undertaken to assess mitigation requirements for the project. The SEV assessment was undertaken by Opus International Consultants Ltd (Opus) on behalf of The Applicant and in September/October 2012.

Tonkin & Taylor (T&T) has undertaken a review of the SEV assessment report prepared by Opus and submitted to Greater Wellington Regional Council (GWRC). The review has been undertaken on behalf of GWRC in accordance with the T&T proposal dated 13 November 2012.

### **2 Methods**

No site visit has been undertaken for the purposes of the review and no SEV calculations were provided. Our review has therefore been desktop based using the information provided in the Opus (2012) and Wildland Consultants (2012) reports. Our review has considered if good practice has been followed and has assessed the appropriateness of the SEV scores, restoration sites, environmental compensation ratio (ECR) and mitigation works proposed.



### 3 Review comments

This section sets out our comments on the SEV assessment for the landfill development. While we make comment and suggestions on various aspects of the report, overall, we found the assessment to be robust.

#### 3.1 Methods used

The report shows the stream reaches that would be affected by the proposed filling works on Figure 1. Neither the report text nor Figure 1 is clear in regard to what drainage and/or culverting works are proposed as part of the development.

The assessment has followed the 2011 version of the SEV methodology prepared for Auckland Council and for use in the Auckland Region (Storey *et al.* 2011). GWRC has approved this version of the SEV for use in the Wellington Region without specific modification, other than reference site data. We do not have any specific information on the reference site streams used in the SEV calculations. We understand that these data were provided by GWRC, and so have assumed that the three reference sites used are appropriate.

The macroinvertebrate sampling and sample processing techniques used appear to be appropriate given the nature of the stream habitats.

Freshwater fish data used by Opus in its SEV has comprised a combination of New Zealand Freshwater Fish Database (administered by NIWA) records (as presented in Wildlands, 2012), spotlight survey data collected by Wildlands Consultants and net survey data collected by Opus as part of the SEV assessment. No electric fishing survey was undertaken.

We agree that the combination of the available records and recent spotlight and net survey information would result in a reasonably comprehensive species list for the catchment. However, the final species list used for the fish IBI and SEV calculations for each site is unclear (i.e. were all fish database records included).

It would be helpful if the fish species list used in calculations was included in the, particularly as restoration of galaxiidae spawning habitat is included as an objective of restoration works in estimating "potential" SEV scores in the calculations (see Section 4.5 of the Opus report).

#### 3.2 Sites assessed and SEV scores

The assessment has included SEV assessments on the impact stream (C&D Landfill Stream) and to potential compensation sites: one located on the main stream draining the landfill catchment along Landfill Rd (Landfill Rd Stream) and one on the Owhiro Stream, of which the impact stream and the Landfill Rd Stream are tributaries.

As a general comment, no general descriptions of the stream habitat in the impact and compensation reaches are provided. This would help provide some context for the reader in terms of what restoration might achieve and the inclusion of photographs that show the typical habitat characteristics of the impact and compensation sites assessed would have been useful. Only two photographs of the Owhiro Stream were provided in the report. Our comments on the appropriateness of SEV scores for the various sites assessed are therefore based on the descriptions provided and aerial photographs (Google Earth images dated April 2011).

An SEV was conducted on one reach (around 600 m in length) of the C&D Landfill Stream. This assessment site covered the bulk of the main stem of the stream that would be impacted by the proposal. The overall SEV score for the reach was 0.816 which reflects relatively high scores for most functions and compares closely with Wellington Reference Site data. A poor score was obtained for

connectivity for species migrations (reflecting the extent of existing culverts) and moderate scores were obtained for invertebrate fauna intact and riparian vegetation intact. Overall, based on the available information an overall SEV score of 0.816 appears to be appropriate for the site.

SEVs were conducted at two potential compensation sites: n SEV was undertaken on an 870 m reach of the Landfill Rd Stream and a 450 m reach of the Owhiro Stream at locations shown on Figures 1 and 2 of the Opus report.

Both the Landfill Rd Stream and Owhiro Stream compensation sites scored similarly in terms of their overall SEV scores (0.450 and 0.439 respectively), and scores are within the range of 0.4 to 0.8 that determine in general if restoration is appropriate. Low function scores at both sites were obtained for floodplain effectiveness, riparian vegetation intact, invertebrate fauna intact and instream particle retention. Biodiversity function mean scores were particularly low for both the Landfill Rd Stream and the Owhiro Stream at 0.19 and 0.16 respectively.

The main contributing factors to the reduced scores at the Landfill Rd Stream were considered to be the modified channel form and riparian margin as well as influences of the Landfill Rd, industrial areas on the true left floodplain and potentially the impact of the Wellington City Landfill upstream. Limiting factors for Owhiro Stream were considered to be the modified channel form, stormwater inputs, the Wellington City Landfill upstream and potentially septic tank leachate from urban areas. Overall, the SEV scores obtained for the two compensation sites seem fair based on the descriptions provided and the various catchment and channel influences on habitat quality and stream function.

### **3.3 Ephemeral streams**

No SEV assessments were undertaken on the five ephemeral headwater tributaries that flow into the C&D Landfill Stream main stem, although parts of each of these tributaries will be affected by the proposed filling works. Rather, the SEV score for the main stream was applied to these tributaries. In our opinion this is likely to be a conservative approach given that the overall main stream SEV score for the main stream was reasonably high (0.816) and the calculation of function scores for ephemeral streams would require ephemeral stream reference data (including fish and invertebrate data) (Storey, 2010a) that may not be available.

Three of the five ephemeral stream sections mentioned above were included in compensation calculations (see Figure 1 in the Opus (2012) report). Sites labelled "Ephemeral 2" and "Ephemeral 5" were not included in the compensation calculations as they comprised "trickles through large scree" (Opus, 2012).

"Trickle" and or seepage headwater habitats are known to support unique invertebrate communities and such headwater habitats are under pressure in general in the Wellington Region (Storey, 2010a; Storey, 2010b). Therefore the inclusion of trickle or seepage habitats in a mitigation package for the proposal may be justified. However, we recognise that the length/area of trickle and seepage type habitat impacted may be more difficult to quantify, compared to reaches of ephemeral stream that have a defined channel that can be measured. Therefore a more qualitative approach to mitigation for these habitats may be appropriate (e.g. include two small seepage areas in the restoration package).

We recommend that ephemeral stream and seepage habitats are considered in the final restoration proposal, ideally in areas linked to main stream restoration sites (see below).

### **3.4 Environmental Compensation Ratio and restoration length**

The Owhiro Stream restoration site is favoured by Opus over the Landfill Rd Stream site. Owhiro Stream is favoured on the grounds of easier access and that the Landfill Rd Stream offers limited

areas where re-vegetation can occur due to its deeply incised nature, scree banks and proximity to Landfill Rd. Owhiro Stream SEV scores have been used to calculate the Environmental Compensation Ratio (ECR).

Without having visited the site it is difficult to meaningfully comment on the appropriateness of the “potential” function scores selected for use in the ECR calculation. However, the numbers included in Table 4 appear reasonable on face value and the overall calculation has resulted in an ECR of 5.38 which is relatively high in our experience. Based on the information available we consider that this is likely a conservative figure and appropriate to the scale of impact.

Calculations for the areas of stream impacted and the area of stream to be restored are summarised in Table 5 in the Opus report. Stream area figures appear to be based on estimates of stream length and width. We would question if stream width figures used for the two SEV reaches could be more precisely based on cross section measurements collected as part of the SEV field assessment. We also note a small issue in Table 5 in that the “Area to be Restored Figures” for the ephemeral streams have been transposed, however, the overall total figure is correct. As pointed out earlier the compensation calculations have not included the streams labelled Ephemeral 2 and Ephemeral 5.

The calculations result in an overall restoration area requirement of 2,964 m<sup>2</sup>. This would mean a restoration length of 1,186 m on the Owhiro Stream, based on its estimated average width of 2.5 m. This compares to a total impacted stream length of 1,015 m and an impacted stream area of 551 m<sup>2</sup>.

### 3.5 Restoration options

The restoration proposal favoured by Opus is to undertake riparian enhancement work over a 1,186 m length of the Owhiro Stream. This option would be dependent on landowner approval, mainly the Wellington City Council, as 935 m of the proposed restoration reach is on its land. If not all restoration is possible on the Owhiro Stream then Opus proposes that the balance of the restoration work would occur at selected sites on the Landfill Rd Stream.

We agree that the restoration package recommended by Opus represents a favourable option if landowner approval can be gained. The restoration site/s are in the same catchment as the impacted reaches, and the Owhiro Stream in particular would likely benefit by robust riparian restoration works, has no existing barriers to migration and is already the subject of restoration efforts that can be built upon. However, we make the following comments and recommendations for GWRC’s consideration:

- GWRC could request that the applicant seeks approval in principle from the Wellington City Council for the proposal to restore stream margins on their land. This may provide some comfort that the recommended restoration package is possible prior to granting consent.
- We recommend that if granted, the consent include a condition requiring the preparation of an Environmental Compensation Plan to be approved or certified by GWRC. The ECP should include detailed descriptions of the restoration works proposed, planting plans, programme, monitoring and maintenance of restored areas.
- The restoration of a large stream (2.5 m wide) is not necessarily “like for like” mitigation for the impacted streams that are smaller and including some ephemeral headwaters. We recommend that opportunities to restore ephemeral stream and seepage habitats adjacent the main restoration reach on the Owhiro Stream are investigated as an alternative to diverting the balance works to the Landfill Rd Stream. It appears from aerial photographs that such headwater habitats are present adjoining the proposed restoration reach of the Owhiro Stream and on Wellington City Council owned land.

- If sections of Landfill Rd Stream are to be enhanced with a view to improving fish habitat then it may be appropriate to improve fish access for other species that would find suitable habitat in this stream. A review of the available fish data suggests that some species have been recorded in the Owhiro Stream upstream of the Landfill Rd Stream confluence but not in the Landfill Rd Stream (e.g. giant kokopu and inanga). An assessment of fish passage conditions at the culvert on the Landfill Rd Stream below Happy Valley Rd would be useful.
- The SEV method does not include the collection of specific water quality information and no water quality data are included in the Opus (2012) or Wildlands (2012) reports. However, some potential water quality issues are alluded to in the Opus report (stormwater discharges, discharges from the municipal landfill and septic tank leachate). The proposal will not address these contaminant sources. There is therefore potential for biodiversity gains as a result of good practice restoration to be limited at the restoration sites by ongoing water quality issues. Some water quality and/or sediment quality sampling and testing appropriate to the potential contaminants from identified sources to confirm this or otherwise would be useful.
- The proposed restoration plan will need to carefully consider planting works undertaken to improve for fish spawning habitat. Clearing of flood terrace areas and re-planting with native sedges is mentioned in the Opus report. We note that some native sedges can be shaded out by taller riparian vegetation near the stream banks and this should be considered. A range of exotic grasses and herbs are also suitable for galaxiid spawning and these may already be present (see Richardson & Taylor, 2004).
- The Opus report mentions a five year maintenance programme for restored areas. We note that wandering jew (*Tradescantia fluminensis*) is currently prevalent at sites on the Owhiro Stream. Wandering jew is difficult to eradicate completely and can re-colonise from fragments carried from upstream areas. A dense ground cover of native species would be required to limit wandering jew from becoming prevalent and ongoing maintenance may be required.

## 4 Conclusion

We have reviewed the SEV report on the C&D Landfill Stream prepared by Opus (2012) and the ecological report prepared by Wildlands Consultants (2012) that provides further background information. Comments, suggestions and recommendations in regard to the Opus assessment and restoration proposals are included throughout this letter report.

Overall, we found the assessment to be robust, the SEV scores to be appropriate for the sites assessed and environmental compensation ratio to be appropriate to the scale of effects. We consider that the restoration package proposed as compensation for the loss of stream habitats is generally appropriate to mitigate for the identified effects but with one concern around achieving “like for like” compensation.

Benefits of the preferred compensation site (Owhiro Stream) include that it is in the same catchment as the proposed development, is likely to be accessible on the whole (i.e. most of the reach is on Wellington City Council owned land) and builds on existing restoration initiatives. However, the restoration package is not strictly like for like in terms of stream size and order. We therefore recommend that opportunities to include restoration of at least some headwater habitats are investigated in preference to restoration of parts of the Landfill Rd Stream.

We trust that this review meets with your requirements. We are happy to discuss further if required. Please feel free to contact Dean Miller on (07) 8347316 or [dcmiller@tonkin.co.nz](mailto:dcmiller@tonkin.co.nz).

## 5 Applicability

This report has been prepared for the benefit of Greater Wellington Regional Council with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

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