



APPENDIX D

Lakes A Zone Map

Rotorua District Planning Map



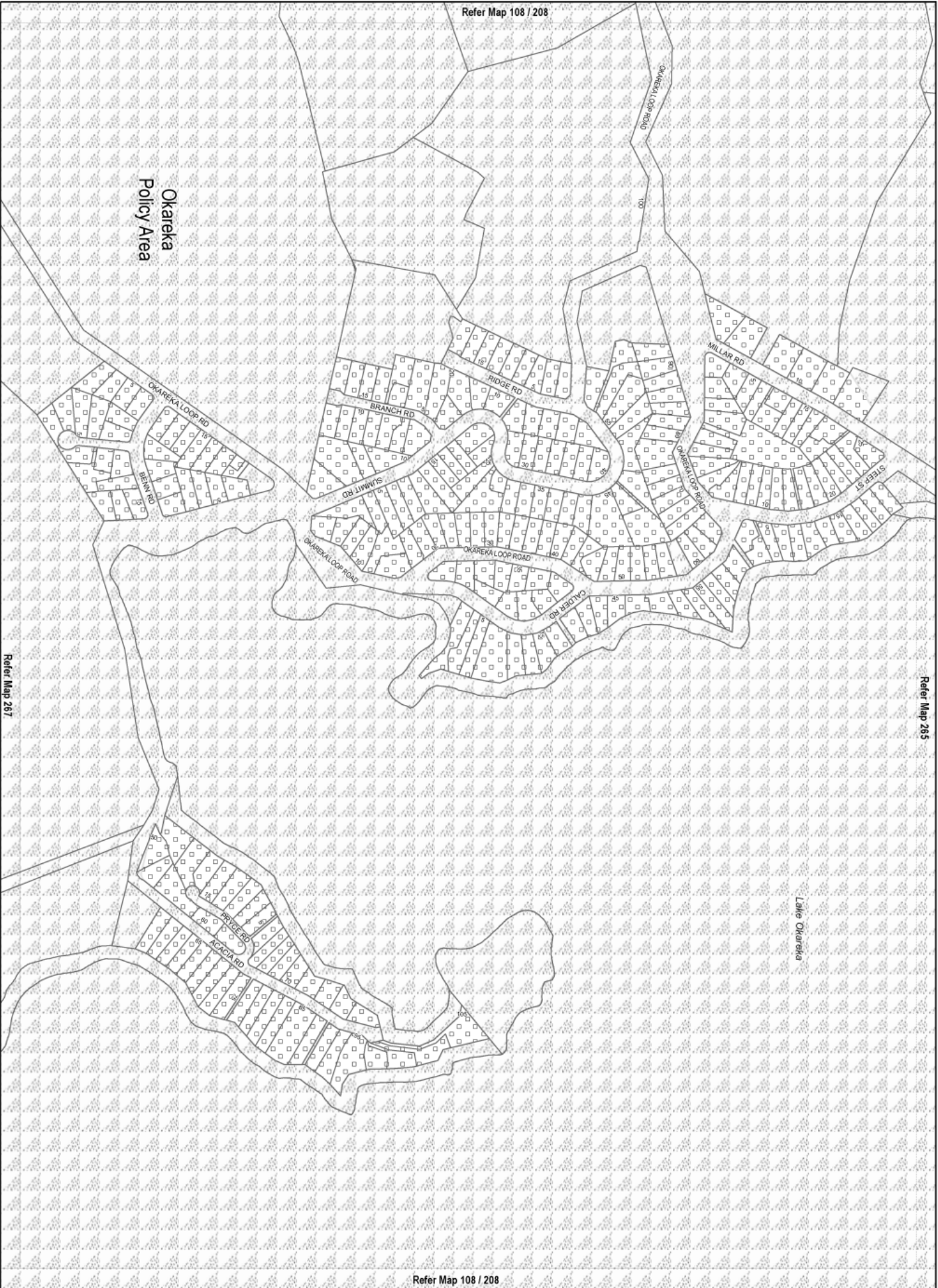
Refer Map 108 / 208

Okareka
Policy Area

DESTINATION
ROTORUA
Rotorua District Council
17-29309

Policy 266

- Lakes A Zone
- Bush Setback
- Less Sensitive Rural
- Sensitive Rural
- Settlement
- Scheduled Site



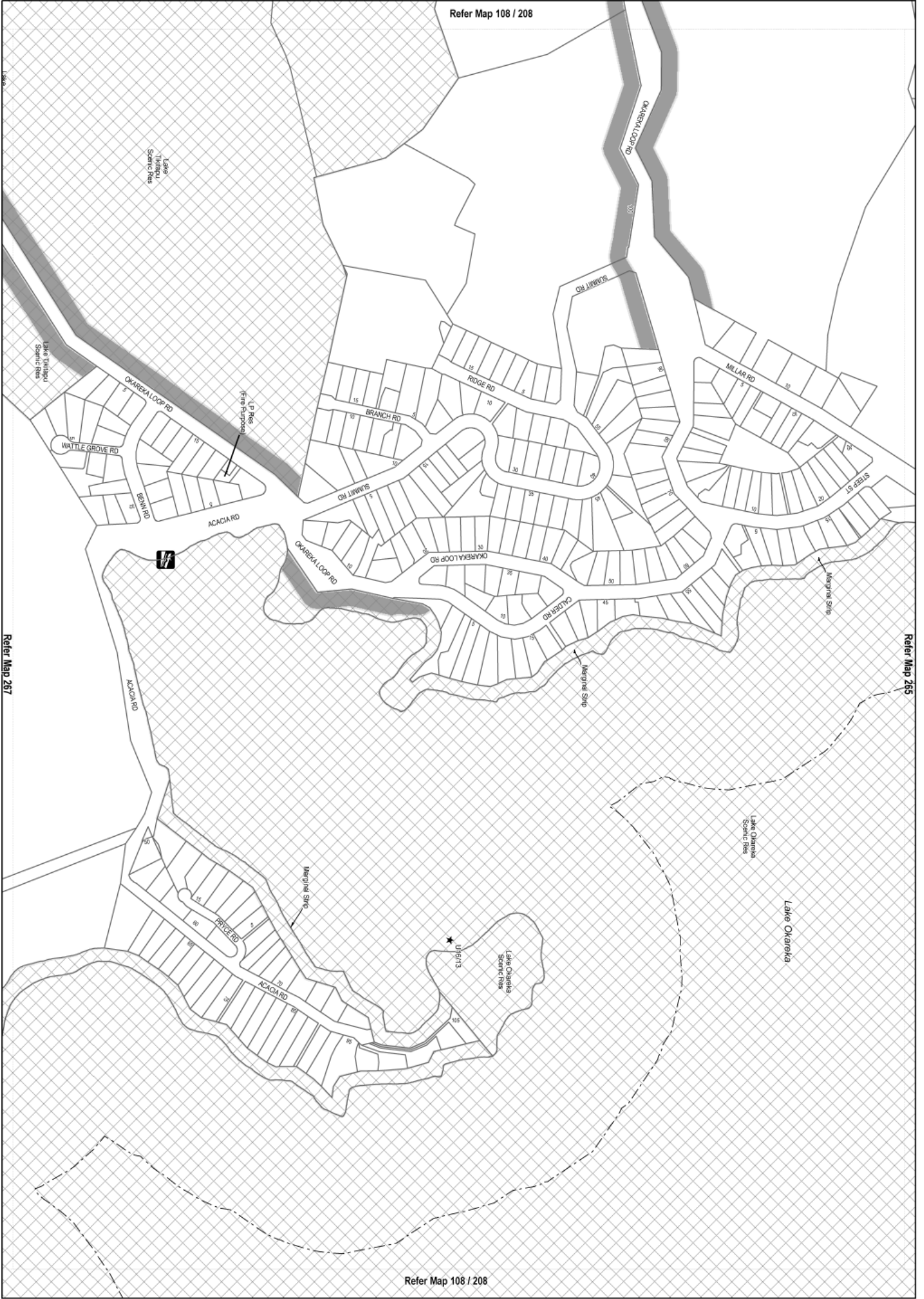
Refer Map 287

Refer Map 285

Lake Okareka

Refer Map 108 / 208

- Lakes A Zone
- PNA
- RAP
- Access lanes (Lanes)
- Scenic Road Buffer
- High Pressure Gas Pipeline
- Electricity Transmission Line
- 20m Lake Edge Buffer
- Historic Building or Structure
- Historic Site
- Significant Tree
- Archaeological Site
- Designation (Reservoir) see Appendix 4 Vol 2
- Designation (Bore) see Appendix 4 Vol 2
- MR
- Boat Ramp
- Refer to Structure Plan



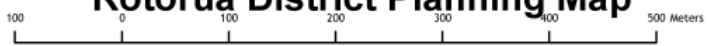
Refer Map 108 / 208

Refer Map 265

Refer Map 267

Refer Map 108 / 208

Rotorua District Planning Map



Constraints 266
 IT-29310

DESTINATION
 ROT@RUA
 Rotorua District Council



APPENDIX E

Historical Lake Levels





APPENDIX F

Consultation

COMMENTS ON RDC DRAFT LAKE OKAREKA CATCHMENT MANAGEMENT PLAN JUNE 2010

General:

The Plan appears to have been written by somebody whose first language is not English. There are innumerable spelling and grammatical as well as typographical errors, and many sentences do not make sense. It should have been proofread and the errors corrected before being printed and circulated outside RDC.

The name of the Plan is inappropriate and too easily confused with the EBOP Catchment Management Plan. A more appropriate name would be Lake Okareka Settlement Stormwater Management Plan.

While it purports to be a comprehensive catchment management plan it seems to be aimed at meeting EBOP's requirements for such a plan without committing to any significant work. The only 'management' proposed is the clearing of part of the wash (which may have already been done), despite the evident need for various other actions. These and many other deficiencies in the plan are detailed below.

- 1.1: The third para. would more logically be the first.
- 1.3: In the last para. it is not correct to say there is no statutory requirement to provide public stormwater drainage works. While this function is not specifically mentioned it is implicit in the wording of section 31 – a necessary means of meeting the requirements.
- 2.1: In para. 2, there is also farmland on the northern side, and a native forest backdrop on the western rather than northern side. In para 3, the rationale for delineating the the catchment covered by the plan should be explained.
- 3.1: In para. 1 it would be clearer to say the valley was dammed by a lava flow from the Okareka volcano 13500 years ago. The wording in para. 3 is too technical to be understood by anyone other than a soil scientist. I doubt the high land is underlain by lake sediments. It is overlaid by layers of volcanic ash and pumice, which are very permeable (= high hydraulic conductivity). The lower land, where *much* of the settlement is located, consists of alluvial deposits. The Rotomahana mud, which overlies most of both areas and is fairly impermeable, should also be mentioned.
- 3.2: I know of no research establishing that water from the Blue Lake flows into Lake Okareka, and think this is most unlikely given that the saddle between them is much higher than that between the Blue Lake and Rotokakahi and is composed of solid volcanic rock. There is clearly a large underground flow draining this significant (123ha) part of the Okareka catchment to the lake, some of which surfaces in springs which feed the drains alongside Loop Rd and Benn Rd when the water table is high enough. The water table is controlled by the lake level, and when the lake level is high the water table is very close to the surface in much of the Benn Rd block, restricting drainage and resulting in occasional flooding. It is therefore not correct to claim the underground flow does not interact with the surface water, or that there are no

significant groundwater issues; and the flow in the drains should be mentioned.

- 3.3:** In para. 1 '1960' should be 'the 1960s'. In para. 2 the lake overtopped the weir only once to my knowledge, in 1998.
- 3.4:** In para.1 the reference should be to the final plan published in 2004. The latest TLI should be quoted, not just that in 2002. In para. 3 LOCMAP did in fact identify stormwater as a source of nutrients and other contaminants to the lake – refer section 8.3.1 and appendix 2 table 6. In terms of section 8.3.2 and the last action in chapter 10 table 4 RDC was to review the stormwater infrastructure to identify areas where swales, grass strips, wetlands or other filtering systems could be put in place to reduce nutrients and improve the quality of stormwater entering the lake. This plan should refer to the relevant parts of LOCMAP and set out what RDC has done or will do to implement the identified action.

Para. 3 is also incorrect in stating that the total discharge originates from direct runoff or through flow. The drain alongside Loop Rd from the settlement boundary to Summit Rd flows most of the time and discharges through the stormwater system. It is a significant source of pollution as past sampling by EBOP has shown high levels of nitrates and bacteria, indicating septic tank effluent is leaching into it. It is hard to understand why this drain has been ignored in this section and 3.2, as well as on figures 7 and 8 and drawings 1 and 2, when so much attention has been given to the wash which flows only occasionally.

- 3.5:** In para. 3 it may not be valid to assume there is no spatial temporal variation in rainfall in the catchment. Rain gauge records are available which suggest there can be considerable variation between parts of the settlement.
- 3.9:** To make sense para. 1 line 2 should read 'a detailed survey of the network as built', and para. 2 last line should read 'are generally steep enough to convey'. In para. 3 it should be mentioned that the Rotorua Quarry is also within the catchment of the wash. This was a major source of sediment flow down the wash in the past, until a detention pond was constructed. 71 Loop Rd would be better identified as the Hall reserve. It would be a good idea for the remainder of the wash within the settlement to be covered by a drainage easement, to facilitate maintenance.
- 3.9.1:** This section should be renumbered 3.10 and renamed Past Stormwater Flooding. In para. 3, 77 Loop Rd apparently refers to the tennis courts reserve. Under the heading of Existing Stormwater Management Issues the occasional flooding in the Benn Rd block, particularly the Acacia Rd frontage near Loop Rd should be mentioned. There may be other areas where flooding issues can be reported by residents.
- 4:** The last line should read 'to estimate the effects of the resulting increase in runoff' or similar, to make sense. In 4.1 para.1 (and in the References, p.15)

the reference should be to Chapter 20 of the Rotorua District Plan, in which the Lakes A Zone provisions are incorporated.

- 4.2:** In para. 2, the Waingaehe catchment is adjacent to Lake Rotorua, not Okareka. In the last para, in addition to clearing the bed of the wash, would it not be desirable to build up the banks where they have been identified (in figure 11) as being too low to prevent overtopping in a 2% AEP flood?
- 4.3:** In para. 4 the bush area (Lake Tikitapu Scenic Reserve) is owned by the Crown and *administered* by DoC. As some of the flow from this catchment enters the drain within the road reserve of Loop Rd and discharges into the stormwater system this drain is just as much an issue for RDC as the wash. There is no discussion of how the capacity of the pipe network relates to predicted storm flows, and this is not apparent from Table 1. Are all the pipes adequate to carry a 10% AEP flood or not?
- 4.4:** In the last para. another option raised by EBOP was to replace the pipes through the weir at the lake outlet with an open-topped overflow channel, which may be helpful. However the resource consent granted to EBOP for the outlet control did not provide for any change to the existing structure.
- 5:** It is unlikely that catchment 05 is reliably representative of all 9 catchments, which vary significantly in nature. For example large amounts of sediment and organic matter are carried from catchment 06 and build up at DP6. To obtain an adequate picture of the quality of stormwater entering the lake, samples from all catchments should be analysed. As the first flush of stormwater is significant for water quality, sampling should include, not avoid this.

The high level of suspended solids found is a matter of concern as they will contain nutrients and silt up the lakeshore. This suggests a need for filtering systems, probably on most if not all outlets. The levels of acidity, phosphorus and zinc in excess of the triggers are also of some concern, particularly phosphorus which is a limiting factor for algal and weed growth in Lake Okareka, and warrant investigation as to the sources. The plan should identify the probable need for these actions, subject to the results of more extensive sampling and analysis. The results of the very limited sampling to date are far from *proof* that the residential catchments do not generate significant heavy metal concentrations as claimed in para. 6.

- 6:** In the last para, I trust residents along the wash have been instructed not to dump garden rubbish in it. Given the problem described in para. 1 it would also seem appropriate to ask the residents to modify or remove the structures across the drain which are most likely to cause blockages.
- 8:** In point 1, the plan fails in my view to set out how the stormwater discharges will be managed more effectively and efficiently, other than by clearing the wash. I have identified several other necessary or desirable actions in my comments on sections 3.4, 3.9, 4.2, 5 and 6.

In point 2, the outlet control structure needs to be upgraded *now* rather than eventually, given the problems caused by excessively high lake levels every winter in recent years.

In point 5, I disagree that the plan shows adverse effects to be less than minor. Point 6 should specify what proposal (or the plan as a whole) is not contrary to what Act and what planning documents.

Figures:

In figure 1, the label on the small map does not point to Lake Okareka.

The locations of stormwater outlets in figure 3 might be more clearly and accurately shown on the aerial in figure 2, in which case figure 3 would be redundant.

The map and legend in figure 4 are illegible at this scale and the relevant parts need to be enlarged.

Figure 5 needs to be lightened to show the detail more clearly.

The drain along Loop Rd should be shown on figures 7 and 8.

In figure 10 chainages along the wash should be marked to enable the data in figure 11 to be related to the map.

In figure 11 it should be shown more clearly, perhaps by shading, where banks would be overtopped in a 2% AEP flood.

The coloured lines in figure 12 need explanation: what historical lake level is shown, and what is the restriction on development – this is not mentioned in the plan and I am not aware of any such restriction in planning documents.

The map legend in figures 13a and 13b is illegible.

Tables:

In table 3 the absence of trigger levels in the shaded cells should be explained.

In table 4 the colour of the cells should be shown as denoting above/below trigger levels.

Drawings:

The drain along Loop Rd should be shown on both drawings.

Rod Stace

COMMENTS ON LAKE OKAREKA WATER LEVELS AND CATCHMENT MANAGEMENT PLAN

To: Sandra Goodwin
Secretary
Committee
Lake Okareka Residents Association

1. LAKE OKAREA WATER LEVELS – REPORT BY EBOP DECEMBER 2008

1.1 We should support the installation of a new weir.

The weir would have a low level outlet pipe with a locked valve. This valve would only be opened if the water level had to be lowered to undertake maintenance on the weir structure. A pedestrian bridge (small structure) would be constructed over the weir section to allow access to the start of the northern track through the DoC reserve.

1.2 To reduce the effects of air trapped in the outlet pipe a PE pipe could be inserted through the 450 mm steel pipeline. However a second pipeline would have to be laid beside this pipeline to take the flow lost by downsizing the existing pipeline.

1.3 A second pipeline or new single pipeline could be installed at the same time that the rising main from the Tarawera sewerage scheme is laid through the cutting. However we should not put on hold the outlet pipeline upgrade to wait for the Tarawera scheme to start.

1.4 Obtain advice from Fish & Game on the construction of a fish passage past the outlet weir. There may be no need for a fish passage as the canal may be too small a habitat for fish species that need to migrate to the lake.

1.5 A staff gauge should be constructed at the weir to provide a visual display of lake level.

1.6 We should encourage the funding of this upgrade project in the EBOP annual plan for the 2010 / 2011 financial year.

1.7 We should encourage the new manager of the EBOP Rivers and Drainage department (Colin Meadowcroft) to visit the site with Peter West, RDC staff and LOCA members to discuss the way forward.

1.8 The key points from Peter West's report should be included in the RDC's Catchment Management Document as the weir system forms part of the stormwater system for the lake's catchment.

2. LAKE OKAREKA CATCHMENT MANAGEMENT PLAN – REPORT BY RDC JUNE 2010

In general majority of the key information is contained in the report. Suggestions for improvement are set out below.

2.1 The title should be revised to reflect the importance of stormwater.

Lake Okareka stormwater catchment management plan

2.2 Provide a table of contents and a set of appendices.

A - Figures

B – Drawings

C – Photographs

D – Tables

E – Community consultation

F – References

2.3 Introduction

2.3.1 Plan objectives

2.4 Management plan background

2.5 Existing environment

2.5.1 Geology and soils

2.5.2 Groundwater

2.5.3 Lake Drainage

2.5.4 Land use

2.5.6 Roading network

2.5.7 Sewerage reticulation

2.6 District and regional planning

2.7 Water quality

2.7.1 EBOP catchment management plans etc

2.7.2 Effects of sewerage reticulation and land use

2.8 Lake outlet structures

2.8.1 EBOP P West's report and history of outlet pipelines and proposals for the way forward.

- 2.9 Community consultation
 - 2.9.1 Draft to LOCA for comment
 - 2.9.2 Open community evening to discuss draft No. 2
 - 2.9.3 Input from EBOP, DoC, Fish & Game, Federated Farmers and other affected parties.
- 2.10 Catchment analysis
 - 2.10.1 Design parameters
 - 2.10.2 Rainfall data
 - 2.10.3 Principal sub-catchments
 - 2.10.4 Stormwater pipeline network
 - 2.10.5 Stormwater open channel network
 - The wash etc
- 2.11 Stormwater management issues
 - 2.11.1 Historic flooding
 - 2.11.2 Road runoff
 - 2.11.3 Farm run off
 - 2.11.4 Open channel flow obstructions
- 2.12 Conclusions
- 2.13 Recommendations

11 July 2010

ADDITIONAL COMMENTS ON RDC DRAFT LAKE OKAREKA
CATCHMENT MANAGEMENT PLAN JUNE 2010

Support all comments made by Rod Stace.

3. Existing Stormwater Disposal

Not enough recognition of stormwater problems at Hall reserve. Submissions made to RDC by Hall Committee in ~~June~~ ^{May} 2010 and earlier. ^{Nov 2009}

4. Catchment Analysis

Dwelling numbers – what was this projection based on? LOCA (Lake Okareka Community Assn, ex LORRA) believes that there was some allowance under the Environment Court decision if sewerage was installed at Okareka that up to 44 more houses could be built. Reference made to this in LOCMAP

7. Stormwater Discharge Consents

Ongoing concern when new houses are built or houses are altered that more impervious surfaces are being laid. Cotrary to lakes A Zone rules but inadequate control over what is happening – discharges to lake of cement wash – exposed aggregate surfaces.

Sandra Goodwin
Secretary
LOCA and Landcare Okareka

Sandra and Mike Goodwin

From: "Sandra and Mike Goodwin" <sgoodwin@actrix.co.nz>
To: "Sue White" <sue.white@rdc.govt.nz>
Cc: "Geoff Palmer" <geoff.palmer@xtra.co.nz>
Sent: Wednesday, 19 May 2010 12:07 p.m.
Subject: Lake Okareka Hall & Carpark

Dear Sue

During the course of the last 12 months Lake Okareka Hall Committee have raised these 2 matters with you.

We hope these items have been included as budgetary items for this coming financial year.

1. Boundary fence between playground and neighbour

Most of the Hall boundary fence is of solid board fencing, and good sound condition, but there is a 16m section in the back corner of the playground area that is of punga logs. The punga logs are disintegrating and the fence is failing in places.

This playground area is used extensively both during school terms when Lake Okareka Pre School is in session at the Hall, and at weekends and holiday times.

Weekend, after school and holiday time use is only expected to grow as the tennis courts are being resurfaced and there is growing interest in tennis and netball (on the resurfaced courts) within the Okareka community. Children are using the playground while parents play tennis.

As a children's playground area it is important that the fence is child proof and safe.

The Pre School group spent some money last year to make some repairs to the fence, but these were really only temporary until such time as the fence is replaced.

2. Lake Okareka Community Hall Car park

The car park at the Lake Okareka Hall requires some attention. This car park is used a lot by the Pre School every school day with teachers and parents coming. The Hall is now being hired much more regularly for both community groups and private functions.

a) There is a problem with **storm water drainage** which comes under Okareka Loop Road, and flows through the hill planting and across the lawn. There is also storm water coming off the sealed hill driveway and probably part of Loop Road as well, into the Hall. All of this water accumulates at the bottom on the unsealed section of the car park.

b) The **storm water drain that runs down beside the fence and Robin Trewin's place, frequently floods at the bottom into Mr. Trewin's property and also backs up into the hall car park grassed area, creating ponding.** The piped drain that carries the water from this drain under the Hall playground to "The Wash", is **no where near big enough** to handle all the water which comes from the area. It would also appear that the **height of this piped drain** appears to be **too high** in relation to the surrounding land surface. There is plenty of fall to allow for better drainage to "The Wash".

c) This drain is cleaned occasionally **but the drain cleanings are not removed.** Sometimes they are piled up against the fence (not good for the boundary fence) and sometimes on the car park side of the drain. So we now have a situation where the drain bank in some parts is higher than the car parking area and water is not flowing freely into the drain. There is now a very large muddy puddle that appears near the metal double gate into the playground area, to the right of the Hall. This was partly caused last year when Castlecorp came to change the bark in the playground, but is exacerbated by the higher drain bank in the area as well. **This hole needs filling with metal, and the drain cleanings on both sides of the drain need to be removed.**

d) We currently have the contractors undertaking the sewerage work at Lake Okareka

and they are often leaving heavy equipment and vehicles in the Hall car park, on the dirt / grassed area. We did suggest some months ago that this could be an opportune time to **sort out some of the drainage issues at the car park. Maybe some metal beyond the extent of the seal could help in the short term.**

e) Some of the local residents who know a bit about drainage etc, have had a look at the car park and they think **the levels and falls are all wrong** and the best thing to do to solve the problem is to shoot heights with a builders level and see how the car park levels relate to the bottom of the drain, as many suspect that they are close to the same level, especially in front of the metal gate. **Perhaps what is really required is a complete make over** of the car parking area, with a larger diameter piped drain, correct fall heights and a larger sealed area that slopes to the drain.

Many thanks
Yours sincerely
Sandra Goodwin
Secretary
Lake Okareka Community Hall Committee

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