Moutoa Sluicegates Operational Plan

horizons regional council

Version 1.2
May 2017

DOCUMENT REVISION HISTORY

Version Number	Date	Who	Why
1.0	November 2014	Evan Lloyd	Moutoa related information from the old ERM included here. Reviewed and updated by Allan Cook and Graham Doull.
1.1	30 November 2015	Evan Lloyd	Operations to River Management. Addition of Moutoa Floodway Manual Dial-out list to the plan (Annex B)
1.2	23 May 2017	Evan Lloyd	Manual Dial-out List updated. Leaseholders map added as Annex C. Minor changes.

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Contents

1. Introduction

The channel capacity of the Manawatu River below Moutoa is limited to1300 m^3/s. The purpose of the floodway is to divert floodwaters when the flow in the river at the gates rises above the channel capacity. The gates must be operated within certain constraints described in this section. These constraints are particularly important when the gates are first opened, and when they are closed. They include:

a. The river level below the gates has an upper limit, to avoid overtopping of the stop banks.

b. The river flow at the gates has a lower limit, to avoid silting up the river channel downstream and scouring due to excessive velocities in the river upstream of the gates.

c. The floodway velocity has an upper limit to avoid scouring, achieved by limiting the increase in gate opening allowed at any one time.

2. Preparation for Operation

The decision to open the gates is made by the Horizons Incident Controller (IC). It is likely that a Level 3 activation of the EOC will already be in place. As soon as it has been decided that the floodway will be used, a 'Special Event' should be declared.

Preparation and operation of the Moutoa Sluicegates involves a number of different groups of staff with various responsibilities. They should ensure they report to their appropriate manager, but should also liaise with one another as a matter of courtesy and efficiency.

Refer to the *Moutoa Sluicegates Activation Checklist* at Annex A.

2.1 Advising Stakeholders of Impending Floodway Operation

Leaseholders of spillway land should be advised **at least four hours prior** to the predicted gate opening to allow them time to remove all stock from the floodway. If at all possible this should include some daylight time.

Contacts for the Moutoa Floodway Manual Dial-out list are held in the "CDEM Contacts" Outlook profile (cdem.contacts@horizons.govt.nz). The Risk Management Coordinator is responsible for maintaining the contacts in "CDEM Contacts".

A copy of the list is attached here for completeness (Annex B) but an up-to-date copy is held by the EMDO. This list is to be reviewed and updated at the same time the plan is reviewed, and after each operation of the gates. It is best achieved by calling each person on the list and checking details. The Assets and Business Resilience Coordinator should also be involved in the review to ensure all current leaseholders are on the list.

A map of the Moutoa Spillway identifying lease areas is attached at Annex C.

2.2 River Management Duty Officer/Operations Manager

Ensuring that in the event of a Moutoa Gate opening being confirmed that arrangements are made for the trailer-mounted generator to be deployed to provide backup power supply at the gates. A generator is kept at the Kairanga Depot for this purpose and positioned by River Management when required.

2.3 Moutoa Gang Duties

To prepare the spillway for operation, the Moutoa Gang work under the supervision of the River Work Supervisor to carry out the following tasks:

a. Check that the power is on in the control tower and report to the Horizons Incident Controller.

b. Move down each bank of the floodway to ensure that all stock are removed, all collapsible fences are removed or lowered, and to check all floodgates on culverts through the floodway stop banks to ensure that they will close properly.

c. Open the dry gates at the Foxton Loop.

d. Unpin the gravity gates on Moutoa Main Drain.

e. On completion of the check of the floodway the River Works Supervisor or his deputy must report to the Horizons Incident Controller.

f. Check the operation of the Whirokino Scheme main outlet floodgate (Duck Creek) into the Foxton Loop.

g. Check operation of the Foxton East Drainage Scheme main outlet floodgate into the Foxton Loop.

h. Check that the road closure signs have been erected at Kere Kere Road (responsibility of Horowhenua DC).

2.4 Gate Supervisor Duties

The Moutoa Sluicegate Supervisor is appointed by the Horizons Incident Controller following the decision that the gates will need to be operated. The supervisor and his/her assigned assistant will be advised of the time they are required to be established at the gates.

The Supervisor is in charge at the gates and is responsible for the actual operation of them.

The prior planning and calculation needed to predict the opening may be completed by another person or the Horizons Incident Controller personally.

The Supervisor will be given a prediction of the flood profile, including an estimate of when the gates will need to operate. The decision on when to operate each gate and by how much is that of the Supervisor. The Supervisor

should report regularly to the Horizons Incident Controller and in particular should report immediately when the gates are first opened.

3. Instructions for the Gate Operating Team

a. The team carrying out the initial gate opening must first obtain a brief from the Horizons Incident Controller (IC). This will include instructions for the initial gate opening which may be a set time or a target river level.

b. Obtain the 'Moutoa Box' from the cupboard outside the EOC (Horowhenua Room). The two keys required for access at Moutoa are located in the box. One of the Council's standard keys will open; the gate of the control building driveway; the control building; and the control room door at the top of the stairs. A different key is required to turn on the power supply to operate the gates.

c. The code for the Control Building security alarm system is recorded on the inside of the box lid.

d. Borrow a mobile phone if you do not already have one and advise the IC of the number (two spare phones are available in the EOC).

e. f. Check that the wooden box contains the following items:

- A battery operated radio plus spare batteries
- Binoculars (to read the painted markings on the more distant piers)
- Torch plus box of spare batteries
- Topographical Map 1:50,000 NZMS 260 Sheet S24, Foxton, which shows the Manawatu River downstream of Palmerston North
- Gate opening log sheets
- Gate operating chart
- Current phone book
- Copy of the Moutoa Sluicegates Operational Plan

If any items are missing from the inventory advise the EMDO immediately.

EOC Logistics staff are responsible for making meal arrangements for the Moutoa Gate Operating Team. **Ensure that appropriate meal arrangements have been made before departure.**

g. Some other useful items will be found in the control room cupboards, which should be checked when you arrive. Included are Hi-Vis vest, to be worn if it is necessary to inspect the gates from the bridge.

h. Drive to Moutoa, allowing sufficient time to arrive at the gates at least half an hour before the projected gate-opening time (unless the IC instructs otherwise).

i. Enter the control building and deactivate the alarm within 30 seconds. The same key unlocks the upstairs door to the control room itself.

j. Turn on the power to the gates using the key-operated switch. Turn on the outside floodlights at the same time noting that they take time to fully illuminate.

k. Advise the IC that you have arrived, and check with him that the Moutoa Gang have finished checking culverts, and that all stock are clear of the floodway. On rare occasions it will be necessary to open the gates before the floodway is clear of stock, but this should not be done without the approval of the IC.

l. Setup the VHF radio which is located in the bottom right cupboard in the Control Room. Detailed instructions are with the radio.

m. Gate staff will sometimes receive reports of problems on the river from local farmers and members of the public. These should be referred to the IC. Judgement must be used, but during the rising stage of a flood, a gate staff team member (never both team members) should only leave the gates to inspect a problem under the most extreme circumstances.

4. Operation of the Gates

a. The gate operating panel is located under the window. Each gate is controlled by three buttons – up, down and off. When an up or down button is pressed, that action continues until the off button is pressed.

b. Record the times of all gate adjustments, the gate opening after each adjustment, and the corresponding readings of the river, gate and floodway recorders (see the three small LCD displays at the left end of gate operating panel). Use the A3 forms from the wooden box. Also keep a log of all problems and faults as they arise, and note the time that they occur.

c. Broad indications of the likely gate opening sequence for floods less than 1,700 cubic metres per second (m^3/s) at Palmerston North are:

i. When the water level in front of the gates reaches the target level, open all gates 150 mm. If any gates refuse to open, report this to the Horizons Incident Controller immediately.

ii. The water level will then fall or remain the same. Wait until the target water level is regained, but not less than 15 minutes before opening the gates the next increment. The actual time required for a flood less than 1700 m^3/s is more likely to be 30 to 60 minutes, although for a slowly rising flood it may be a lot longer.

iii. For further incremental openings, the overall principles are:

- The water level should be kept inside the operating range where possible;
- The openings for all gates should be kept reasonably similar; and

- There should be no sudden large changes in the gate openings.

iv. Typically the next step is that the odd numbered gates are opened a further 150 mm, and no further adjustments are made until the target water level is regained, but not less than 15 minutes later. This step is then repeated with the even numbered gates.

v. The process is repeated; alternating odd numbered and even numbered gates, so that the difference in gate openings is not generally more than 300 mm (except for clearing debris). Once again, the time interval between increments will typically be between 30 and 60 minutes. The time interval will increase as the flood approaches its peak.

vi. If too much debris builds up in front of any gate (usually gate 1 or 2), flow through the gate will be restricted. It will also make the gate markings difficult or impossible to read. If this happens on the rising stage (which is usually the case), the gate should be opened as much as necessary to allow the debris to pass through, and then returned to its previous level. If the gates are expected to be closed within the next 6 hours, debris should not be released unless the blockage is serious.

d. In a flood larger than 1,700 m^3/s, larger gate opening increments will be required. Generally 300 mm increments for odd numbered then even numbered gates will be adequate.

i. ***Important:*** **Possibility of damage to gates:** If the river is still rising after all gates have been opened 2.1 metres, the next step is to start lifting gates completely out of the flow. If a gate is opened too much but is still partly immersed in the flow, it can be forced out of the flow, then falling back under its own weight. This can then happen repeatedly and rapidly, and can cause damage. Opening gates fully causes a large increase in flow, so generally they should only be opened fully two at a time. They should be opened in the sequence 5, 3, 7, 1, 9, 4, 6, 2, and 8. This will ensure that the flow in the floodway is kept as evenly distributed as possible.

ii. When the flood has passed its peak, close the gates incrementally in the same way that they were opened. When all gates have been lowered to 150 mm, the final closure sequence is to fully close gate no. 9, then gate no. 8, then 7, 6, 5, 4, 3, 2, and 1. This will cause most of the accumulated debris to float down to the control building end of the gates for easy disposal.

e. When the last gate is fully closed, report this to the Horizons Incident Controller. Gather all written material, and put it in the wooden box. Reset the alarm and ensure that the control room and the control building are securely locked before returning to Palmerston North. Return the wooden flood box to the EMDO for refurbishment.

5. Prediction of Gate Opening and SH56 Inundation

The need to open the gates is determined by the size of the flood, as well as by other properties of the flood. The following conclusions from the history of gate operation provide guidelines:

- floods smaller than 1080 m^3/sec have never required the gates to be open;
- floods larger than 1600 m^3/sec always required the gates to be open;
- for floods between 1080 m^3/sec and 1600 m^3/sec, gate opening is a possibility but not a certainty. The larger the flood, the more likely the gates will need to be opened.

Similar uncertainties arise in predicting whether or not SH56 will be inundated at Opiki Bridge.

The uncertainty arises because river levels at Moutoa and Opiki are not determined solely by river levels at Palmerston North. It is not possible to make decisions about gate openings on the basis of a trigger level at Palmerston North. Other factors have to be taken into account, including flood duration, whether the flood has multiple peaks, and the quantity of tributary inflow between the Teachers' College Recorder and the Moutoa Gates.

There are two ways of predicting whether or not the gates will need to be opened or whether SH56 will be inundated at Opiki Bridge:

a. A computer model has been set up, with telemetered data being the input, and flood levels at various points on the Manawatu River and some tributaries being the output. The model indicates whether or not the gates will have to be opened in all except the most marginal cases, and gives timeframes. At the time of writing, Jon Bell is the only staff members able to operate the computer model.

   Note (dated December 2014): The computer model works well for the gates, but it has not given useful results for the inundation of the Opiki Road since the February 2004 flood. Before that flood, inundation of the road was not likely unless the river reached 4.8m at Teachers' College, but that level is now 4.2m. This is a consequence of channel siltation at the bend 2km upstream of the Opiki Bridge and lowering of the bend's right hand bank natural levee due to lateral bank erosion. Some surveying and minor and minor adjustments to the model are needed before computer predictions can be made about inundation of the Opiki Road.

b. Sometimes the computer model is not available. In that case the gate opening crew can be deployed to the gates well in advance of the earliest likely gate opening time. When floods exceed 1600 m^3/sec at Teachers' College, unless instructed otherwise, they should open the gates as soon as the river level reaches 8.25m, which is the target

operating level. For floods less than 1600 m^3/sec, they should initially just monitor , but be ready to open in necessary. The river level can be permitted to rise above 8.25m on these occasions, but should never rise above the top of the gates which is the design flood level at 8.7m. Sometimes the river level exceeds 8.25m, but does not reach 8.7m. In these cases the gates do not need to be opened.

Closure of the Opiki Road is the responsibility of NZTAs roading contractor. They deploy early to the site, monitor the situation, and close the road when necessary. They do not rely on any Horizons RC input, apart from receiving the automated notification from the IVR that the river at Teachers' College has reached 4.2m.

Moutua Sluicegates Activation Checklist

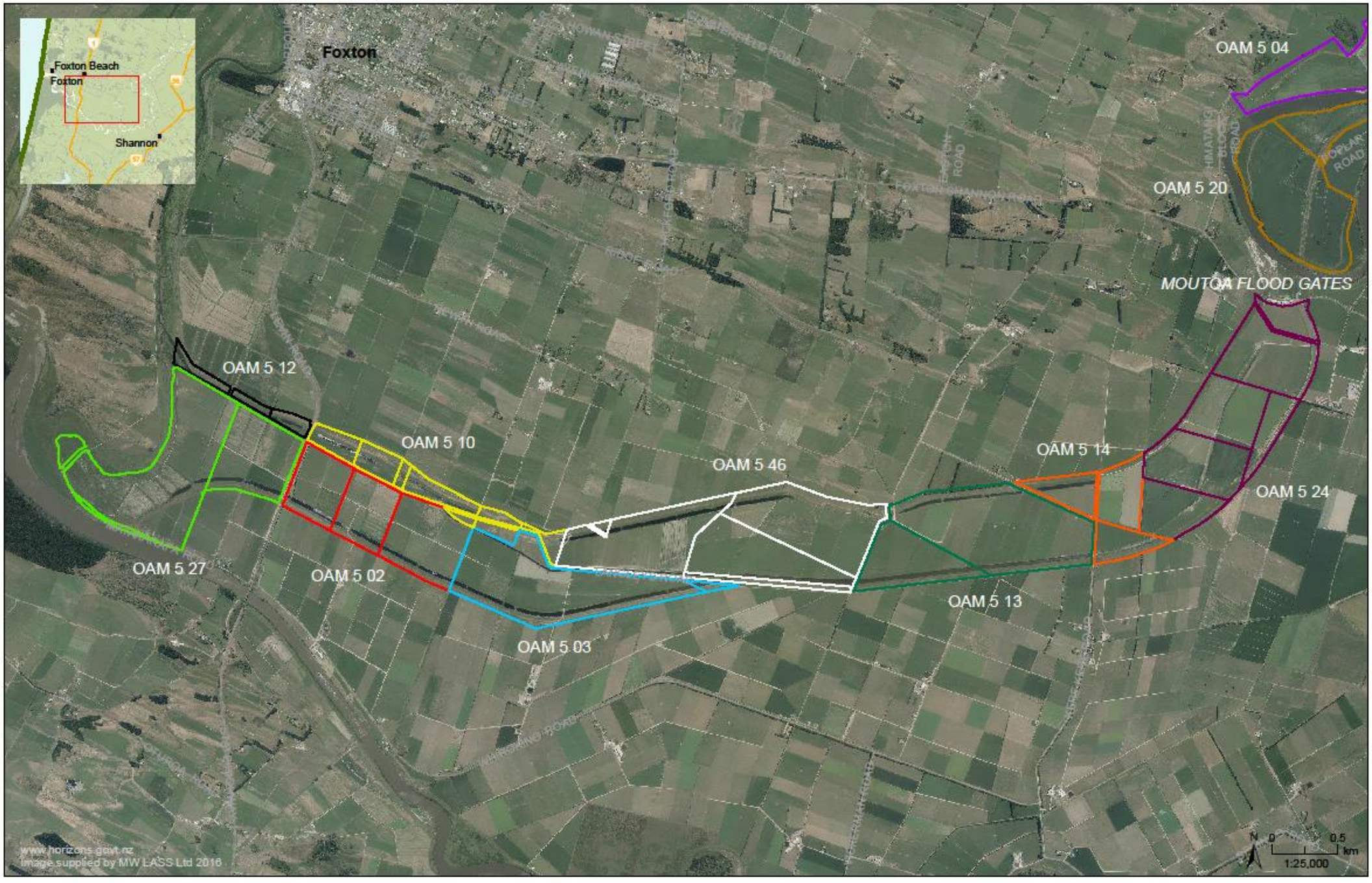
Serial	Task	Actioned	Comment
1	Call in staff as required for the manual dial-out of the spillway list.		
2	Brief the dial-out team.		
3	Manually dial-out the list in accordance with the SOP 'Manual Dial-out of a River Height Warning List' in the ERM Part 3 Flood Management Section. The dial-out list includes Horowhenua District Council and Higgins Levin (requirement to close Kere Kere Rd), Higgins PN (requirement to close the Ken Everett Cycleway) and John Leader Electrical (pre-check of gate operation).		
4	Make arrangements for the 1st shift of gate operators.		
5	Liaise with other TAs as required (PNCC and MDC).		
6	Arrange for the trailer-mounted generator to be delivered to gates before the expected opening time.		
7	Arrange a vehicle for gate teams.		
8	Prepare equipment box for uplifting by gate team.		
9	Consider refreshment needs of gate team i.e milk, biscuits.		
10	Consider meal requirements for gate team. This may require a purchase order for Horseman's Café in Shannon (06 362 7097).		
11	Arrange for EOC or EMDO coverage as long as the gates are in operation.		
12	Brief the gate team before departure.		
13	Media release as required.		
14	Update the Call Centre and/or Reception on current situation.		
15	Advise CE and Chairman.		
16	Make arrangements for further shifts of gate operators as required.		

		Received	
	Acknowledgements	**From who?**	**When?**
1	Power on at the control building (report by river gang).		
2	Mobile generator at the gates		
3	Floodway check complete (report from i/c river gang)		
4	Gate Team confirm arrival at gates		
5	Actual gate opening logged.		

Moutoa Floodway Manual Dial-out as of 18/05/2017 3:11 p.m.

Full Name	Company	Primary P...	Time Called / Comment	Alternate Phone & Notes	Home Pho...
Trevor Knight		021 155 2486		Alternate: Tony (farm manager) also answers Trevor's mobile	06 368 7367
Tony Smith	Higgins Levin	027 809 9945		Higgins Levin look after closing Kere Kere Road in conjunction with HDC; Higgins PN look after ...	
Tony Dowman	Landcorp	027 404 9857			06 329 8633
Steve Beddow	Brian Perry Civil	027 274 8926		Hi Evan, We will be starting work at the Whirokino Bridge in the next few weeks and I was hopi...	
Simon Callahan	North Power	021 536 002		Hi Evan I had a phone call from a Simon Callahan from North Power. They are apparently worki...	
Peter McErlean (Lease File# OAM 5 14)	Kopcreek Ltd	027 493 4842		In partnership with John McErlean (Kopcreek Ltd)	06 363 8348
Paul Barber (Lease File # OAM 5 12)	Koputaroa Farm Ltd	027 232 2200		Alternate: Bill Barber 021 710 861 (hm 06 354 3749)	06 329 9768
Patrick Dempsey	Brian Perry Civil	027 809 3379		10 Mar 17 – Working on Whirokino Bridge replacement	
Nigel Maxwell	OSD Ltd	027 246 3066			
Mick Longley	Horowhenua DC	027 494 4747		Alternates: Daniel Haigh 027 532 1000; Customer Services 06 357 1026	
Michael Knight		027 442 5618			06 368 7367
Justin McErlean (Lease File # OAM 5 46 & OAM 5 10)	JA & SA McErlean	027 443 6052		Alternate: Sally McErlean 027 554 2109 (TBC)	06 363 7576
John McErlean (Lease File # OAM 5 24)	Kopcreek Ltd	027 493 3072		In partnership with Peter McErlean (Kopcreek Ltd)	06 363 8302
John Leader	John Leader Electrical	027 442 1777		John will ensure Moutoa gates are fully functional before required	
Graeme Burling		027 283 8057		Alternate: Stuart Burling 027 258 5858 or 06 329 9819	06 329 9612
Glenn Weitenberg (Lease File # OAM 5 03)	Landcorp Farming Ltd	027 218 8138		Alternate: Matt Shippam-Swain 027 218 8140	
George Jarvis		027 443 2047		Alternate: Sue Kennedy 027 443 0745	06 363 6705
Evelyn Knight		027 448 8708			
Errol Wallace	Brian Perry Civil	027 243 8777		10 Mar 17 – Brian Perry Civil doing work on Transpower pylons in floodway.	
Duty Officer - Higgins	Higgins Palmerston N...	06 357 1026		Alternates: (1) Shane Thompson 027 230 7415; (2) Grant Kauri 027 455 5402 Higgins PN look aft...	
Doug Easton (Lease File # OAM 5 02 & OAM 5 27)	Easton Dairy Ltd	027 240 8518		Also ring Doug Easton's sharemilker Colin Ryder	06 368 4455
Colin Ryder (Lease File # OAM 5 02 & OAM 5 27)	Easton Dairy Ltd	021 434 894		Doug Easton's sharemilker	06 363 5151
Chris Hodder	Brian Perry Civil	027 454 0641		10 Mar 17 - Working on Transpower pylons on spillway. Also ring Errol Wallace (Foreman)	
Brendon McErlean (Lease File # OAM 5 13)	Brendon A and Trace...	027 249 1864			06 363 6077
Bradley Burling		021 882 255			06 329 9019
Bernie Milne		027 472 1442			
Arne Ganseman	Brian Perry Civil	027 839 2748		Hi Evan, We will be starting work at the Whirokino Bridge in the next few weeks and I was hopi...	

Horizons CDEM Contacts CONFIDENTIAL - Dispose of by shredding 1 of 2



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HRC Lease Map

Moutoa Spillway | Leased Area Location

Prepared by Catchment Information
12 April 2017
CI Ref: CI13304
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Private Bag 11 025
Manawatu Mail Centre
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