



## CIVIL ENGINEERING LTD

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Steve de Laborde  
TCDC  
Private Bag  
Thames 3500

THAMES-COROMANDEL  
DISTRICT COUNCIL

27 AUG 2012

RECEIVED BY:

Ref:187

27 August 2012

Dear Steve,

**Re: Otahu Road stormwater catchment upgrade, Whangamata**  
**PROJECT COMPLETION REPORT**

This completion report contains details of completed works, including photos, as-built documentation, an asset schedule, and recommendations for additional work in the future.

**1. Background:**

During moderate to heavy storm events, stormwater was ponding around the Otahu / Pohutukawa / Tangaroa intersection and flooding existing house floors. In May 2011, I was asked to project manage the assessment of the existing stormwater catchment at the Otahu Road eastern end. The project goal was to reduce existing flooding problems.

**2. Completed upgrade works:**

For this project we had a limited budget of \$150,000 and limited time within which to complete the design and construction of the works. From previous modelling by Tim Lockie of Hydraulic Analysis, we understand that the Otahu Road catchment is large, flat and with no obvious secondary flowpath which does not affect and flood residential property.

The following design philosophy was adopted:

1. Verify the model parameters and check the assumed secondary flow paths that the model has created from the available LIDAR data.
2. Construct soakage cells within the available budget to reduce the ponding level as much as possible within the available financial resources.
3. Prepare a report showing what additional works would be required to reduce the ponding to an acceptable minimum.

As part of the physical construction works I have designed and supervised the construction of the following new works:

1. Given Avenue:  
Installation of a new catchpit and lead plus manhole inlet to maximise the stormwater flowing into the existing reticulation
2. Otahu Road 700-702, north and south sides:  
Installation of new double soakage trench catchpit inlets and 86m of Triton S22
3. Installation of a new Atlantis soakage cell (12.3m long, 9.0m wide, 1.7m deep) in the reserve at the Otahu/Tangaroa/Pohutukawa Road intersection with associated inlets and pipework.
  - Note: this pit has been sized to the budget constraints rather than to the catchment needs- additional pipes and possibly an extension to the cell will be required in the future.



### **3. Consents and consent documents:**

No consents were required for the above construction works.

### **4. Catchment modelling:**

Tim Lockie of Hydraulic Analysis has assisted in this project with catchment modelling. Assumptions for the model have been:

- Consider the Maximum Probable Development (MPD) of all residential sites (with 75% sealed surfaces)
- Rooftops occupy 35% coverage with rooftop stormwater taken to in-ground soakage for the 10 minute, 10 year event
- The remaining 40% driveways and other paved area has no attenuation and flows over land ( $C = 0.9$ )
- The remaining 25% residential land has a run off coefficient of  $C = 0.45$
- The road corridor runoff has a coefficient  $C = 0.70$

Since the completion of the new stormwater works the catchment has been remodelled; during the 10 year event the ponding at Otahu Road end has been reduced to a theoretical level of RL3.9m from RL4.3m. This model is not complete as it lacks an assessment of the 50 and 100 year events. I recommend completing the model suggested in section 6 point 1 prior to any future works.

### **5. Maintenance:**

In order to ensure the long term sustainability of these new works it is imperative that your roading or stormwater contractors stop sand ingress into the soakage cells. This can be done by regular emptying of the catchpit traps upstream of the soakage cells. Attached to this report is a plan showing all Council owned recently (less than 5 years old) built soakage cells (known to this office) in Whangamata which also need maintaining.

### **6. Possible future works:**

		Priority
1	<b>Otahu Road end secondary flow path:</b> Construct a grass swale down the eastern side of Tangaroa Road, from the Otahu Road ponding area to the reserve by 118 Tangaroa Road. Lower the reserve and drop the weir level in the dunes-see plan	<b>High</b>
2	<b>Otahu Road end Atlantis cell:</b> Monitor performance during rain events and compare to design rainfall events to assess performance	<b>High</b>
3	<b>Otahu Road end Atlantis cell:</b> Seal existing metal car park to stop chip ingress into the catchpits. Add additional inlets and extend the soakage cell into the reserve	Moderate-High
4	<b>Soakage cells:</b> Install Triton cell soakage pits (say 12m long) and associated inlets every 60m or so throughout the catchment (see plan)	Moderate
5	<b>Catchpits:</b> Upgrade existing catchpits to improve stormwater flow into the existing stormwater pipe system. See plan and sketches	Moderate
6	<b>Pump:</b> Monitor the existing pump flow and check frequency and volume/rate of flow with a view to removing the pumps when the catchment is fully upgraded	Moderate
7	<b>Gravity outflow:</b> Stabilise the gravity overflow outlet onto the beach following specialist advice	Low
8	<b>Patuwai Drive catchment</b> Excavate a secondary flow path from the existing ponding area through the dunes to the estuary	Low*

\*This is currently a low priority however there are houses in this ponding area with relatively low finished floor levels which could be flooded. To date there are no recorded instances of flooding.

**7. As-Built and photos:**

Attached to this report are: an RMS surveyors' as-built plan and typical cross sections, an asset schedule (sent by email), a plan showing possible future upgrades, a photo record of the construction, and a plan showing other Whangamata soakage sites.

**8. Conclusions:**

Thank you for the opportunity of working with you on this project.

Please contact me on 07 868 9939 if you have any queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Niel Smith', with a large, stylized initial 'N'.

Niel Smith  
CPEng (250139)  
THAMES CIVIL ENGINEERING Ltd

Enclosed:

- As Built & Typical Cross Sections
- Modelling Results Email
- Possible Future Upgrades
- Photo pages
- Existing Whangamata soakage sites

**AS-BUILT &  
TYPICAL CROSS SECTIONS**







# THAMES

CIVIL ENGINEERING LTD

Sheet No. 1 of 1

Author NS

Date 27/8/12

Client ETHAN ROAD STORMWATER

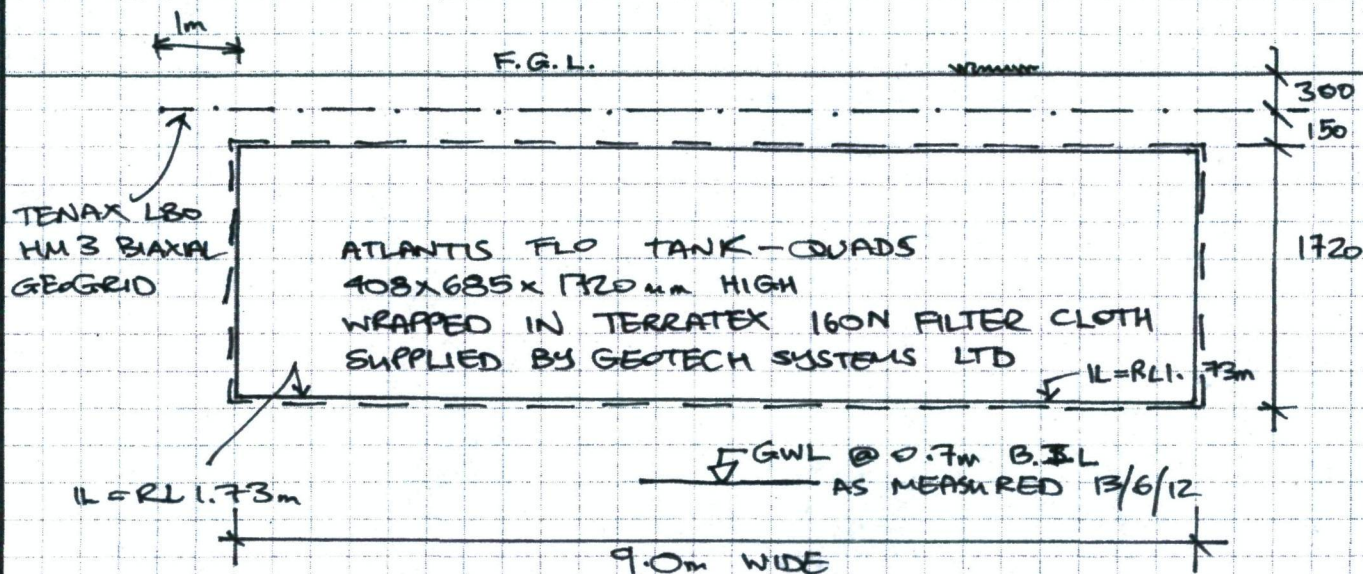
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Details TYPICAL CROSS SECTIONS - AS BUILT

## SKETCH

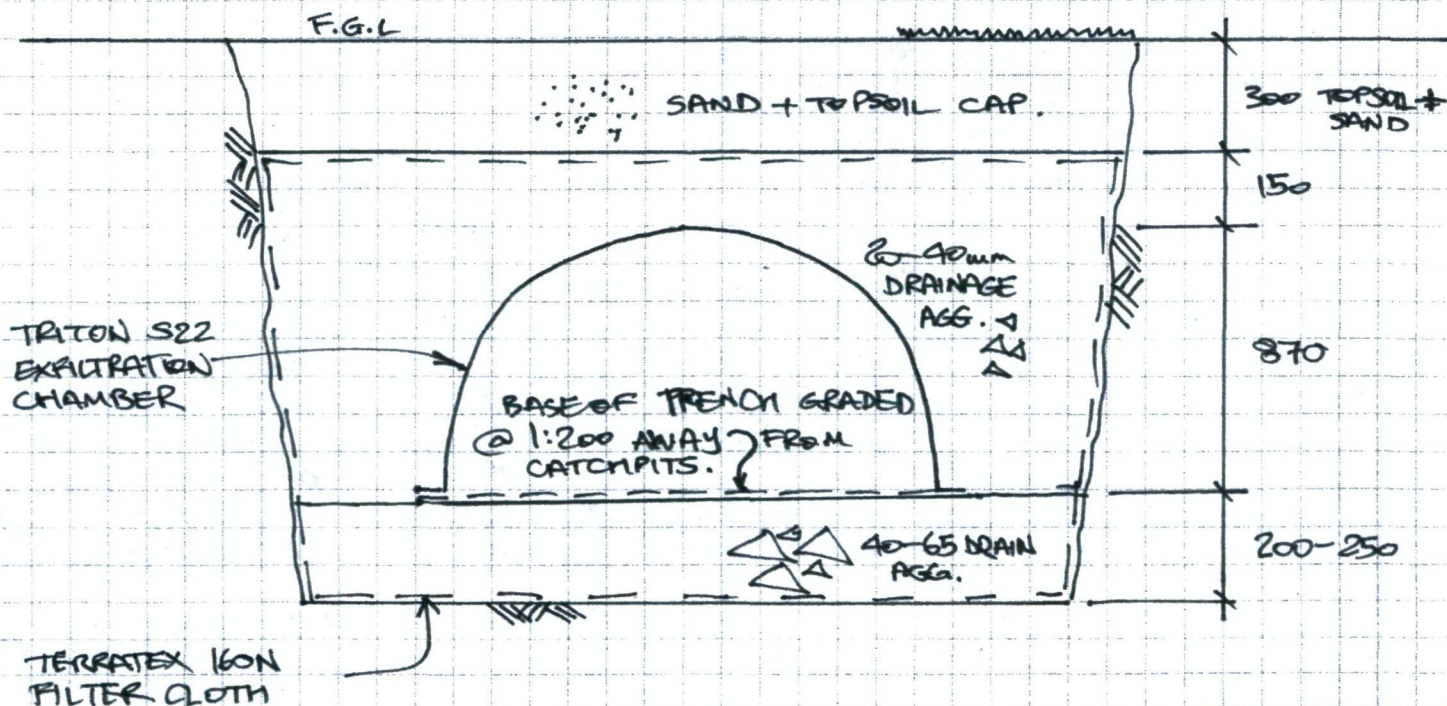
### ATLANTIS CELL

N.T.S.



### TRITON CELLS

N.T.S.



# **MODELLING RESULTS EMAIL**



## Niel Smith

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**From:** Tim Lockie <tim.lockie@hydraulicanalysis.co.nz>  
**Sent:** Tuesday, 17 July 2012 9:44 p.m.  
**To:** 'Niel Smith'  
**Cc:** Steve de Laborde  
**Subject:** RE: TCDC Otahu Road SW - completion of model  
**Attachments:** Slide2.JPG; Slide1.JPG; OtahuRd\_10yrMPD\_SWMModelAnalysis.pptx

Hi Niel,

See attached for model results from the Otahu Rd Analysis. Where I have included the Atlantis and Triton Soakage Cells (note I have not modelled any inlet capacity constraints to the cells i.e. flow is controlled by the soakage cell outlet capacity).

The below table summarises water levels at the Otahu Rd depression, with the soakage cells in place for the 10yr MPD design storm with climate change. The below table shows that with the soakage cells in place the simulated peak water level reduces from 4.3m RL to 3.9m RL (the attached figures show the change in flood extents). Therefore the soakage cells are simulated to keep the 10yr MPD flood level below the targeted flood level of 4.0m RL.

Model Node ID	Description	Max Water Level (m RL)	
		10YR MPD Base	10 Yr MPD With Soakage Cells
DEP005	Otahu Rd Depression	4.3	3.90

Again I apologise for taking so long to get this to you.

I hope this is enough detail for you – let me know if you need anything else.

Cheers,

Tim

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**From:** Niel Smith [<mailto:nielsmith@slingshot.co.nz>]  
**Sent:** Thursday, 7 June 2012 20:24  
**To:** Tim Lockie  
**Cc:** Steve de Laborde  
**Subject:** TCDC Otahu Road SW - completion of model

Tim,

Following our meeting last week with Steve, please find attached:

- 3 x spreadsheets for the stormwater soakage pits being constructed now – note that the 24m Triton
- The proposed construction sketches for those works.
- A site plan showing location of the new pits.
- Additional survey plans which you may not have.

You will note that the following figures are applicable for the new pits being constructed:

Soakage pit:	Critical event:	Max inflow for	Max CA area
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		the critical event*: L/s	value: (no units)
Atlantis 9mx12m cell	1h	140.5	7850
Triton 48m cell:	30min	75.2	3240
Triton 24m cell – (future possible)	30min	37.7	1625

\*Note: the 10 minute inflows are much higher

Some other things to note:

#### 1. Final catchment:

Long term we will ideally add more of the 24m Triton cells around the catchment. From my calcs I get that they can cater for approximately 6 sections plus half the road corridor using the following assumptions:

- That each section has 75% sealed surfaces, of which:
- 35% is rooftop to soakage with a capacity of 10min 10 year event.
- 40% is impermeable.
- Remaining 25% is permeable.
- Cperm = 0.45. Cimp = 0.9.
- Road corridor = 61% imp / 39% perm giving Croad = 0.7.

#### 2. Design events:

I think we should design our stormwater systems around the 10 year event using Hirds v3 + 20% for global warming.

For secondary events I will draw up some long term aims for the catchment being:

- To create an outflow to the estuary for the Patuwai road ponding area.
- To create a flow path for the Otahu Road end to the north into the next catchment low spot and then to create outflow from that onto the beach.

#### 3. Other information:

The low lying house at 800 Otahu Road with the garage / basement shown as FFL RL3.60m is actually a garage and the rest of the floor level is up at 4.35m as per the plan. I think we should therefore stick to Steve's proposed max ponding level of RL4.00m

Anything else you want – best to send me an email.

#### 4. Revised model:

Can you now think through the above and revise your model accordingly. I want to produce a final report for Steve before the 20<sup>th</sup> July so if I can have your model conclusions by the 1<sup>st</sup> July that would be good.

Regards,

Niel Smith  
CPEng (250139)  
Thames Civil Engineering Ltd.  
202 Bella Street, Thames  
Ph. 07 868 9939





Figure A: Otahu Rd – SW Model Summary Results – For the 10yr ARI MPD Design Storm – Base Network



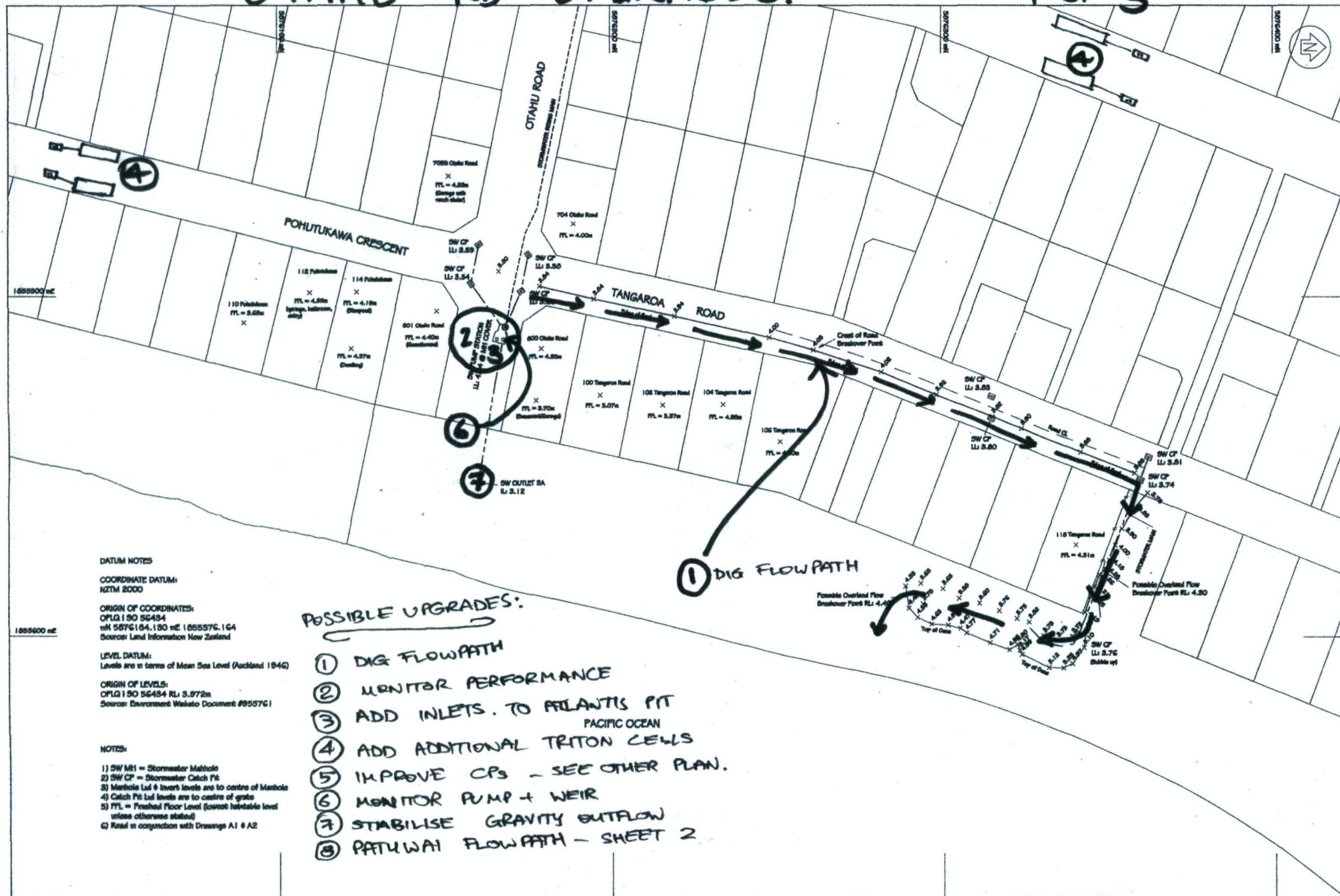




## **POSSIBLE FUTURE UPGRADES**

# OTAHU RD UPGRADES.

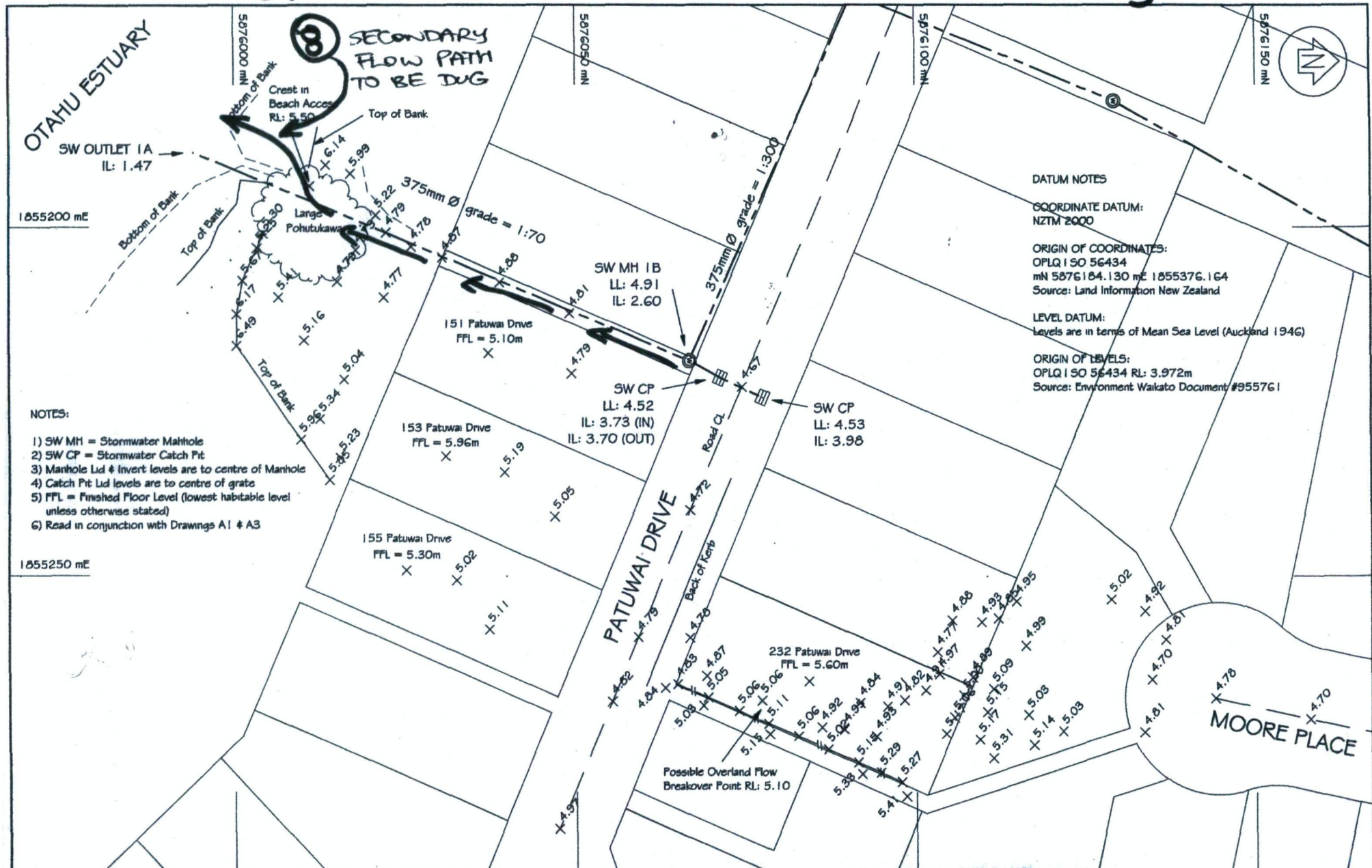
1 of 3





# OTAHU RD UPGRADES

2 of 3



Date: 13 April 2012 | Scale: 1:500 @ A3

**TOPOGRAPHICAL SURVEY OF SECONDARY STORMWATER  
OVERLAND FLOW - PATUWAI DRIVE, WHANGAMATA  
THAMES COROMANDEL DISTRICT COUNCIL**

Drawn	Date
CRB	
Designed	Date
Verified	Date
Approved	Date

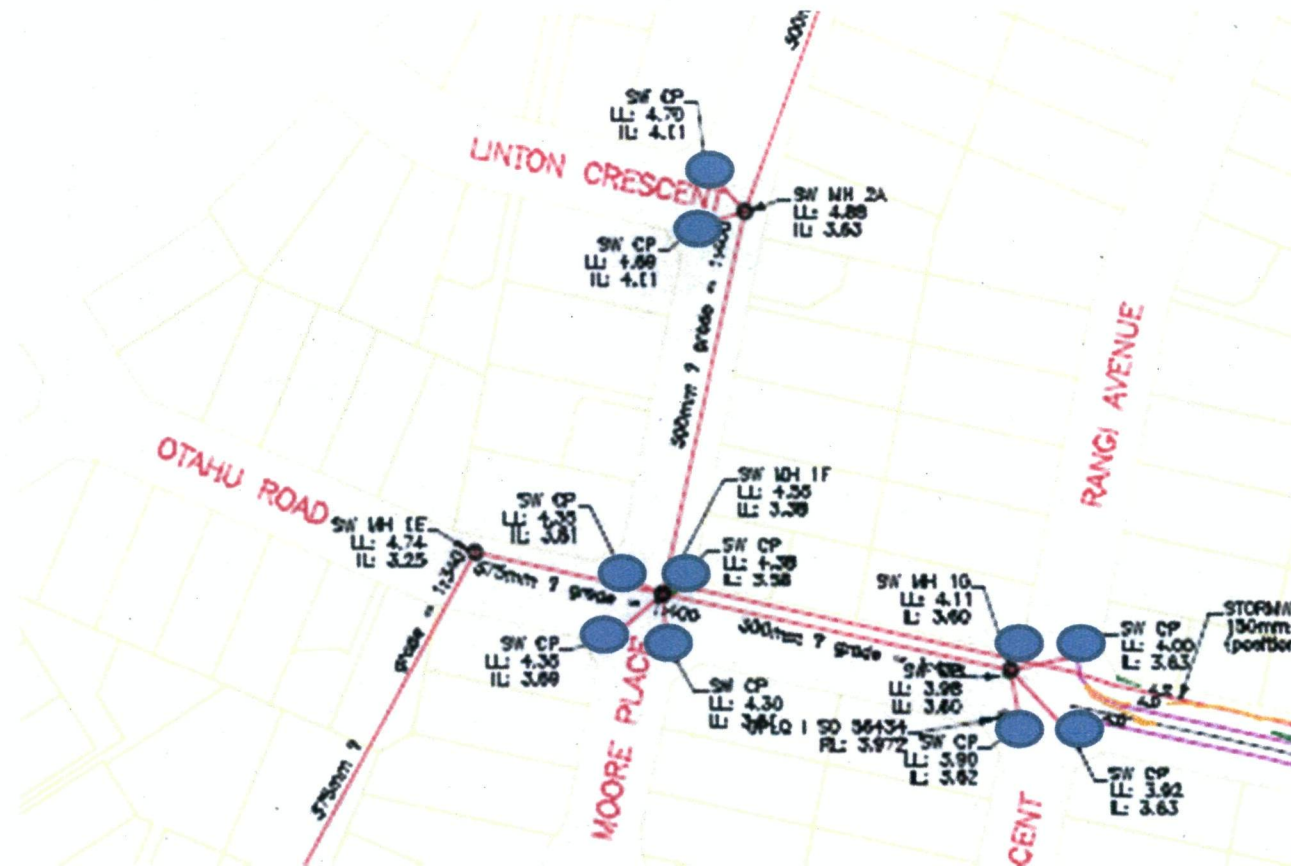
**RMS**  
SURVEYORS

Stewart Group Limited

Land & Engineering Surveyors • Property Development Consultants • Resource Management Consultants

804 Port Road  
P.O. Box 83, Whangamata, NZ  
Ph 0-7-885 8883  
Fax 0-7-885 8883  
FREEPHONE 0800 367 767

Project No.  
**F6830**  
Drawing No. Rev.  
**A2**



**TCDC Otahu Road stormwater catchment – catchpits which could be upgraded:**

- Add Back entry plates and concrete aprons and ensure flows do not pass the pit except in high flow events

## **PHOTO PAGES**





Atlantis soakage cells during construction

14/06/12



New discharge pipes from the existing pump chamber  
to the new soakage cells

18/06/12





Atlantis soakage new catchpit and lead  
18/06/12



Atlantis cells completed catchpit  
28/06/12





Triton cell North side mid construction  
2/07/12



Triton cell end cap at existing sewer bypass  
2/07/12





Triton cell - backfilling drainage metal  
2/07/12



Triton cell – inlet catchpit and manhole  
2/07/12





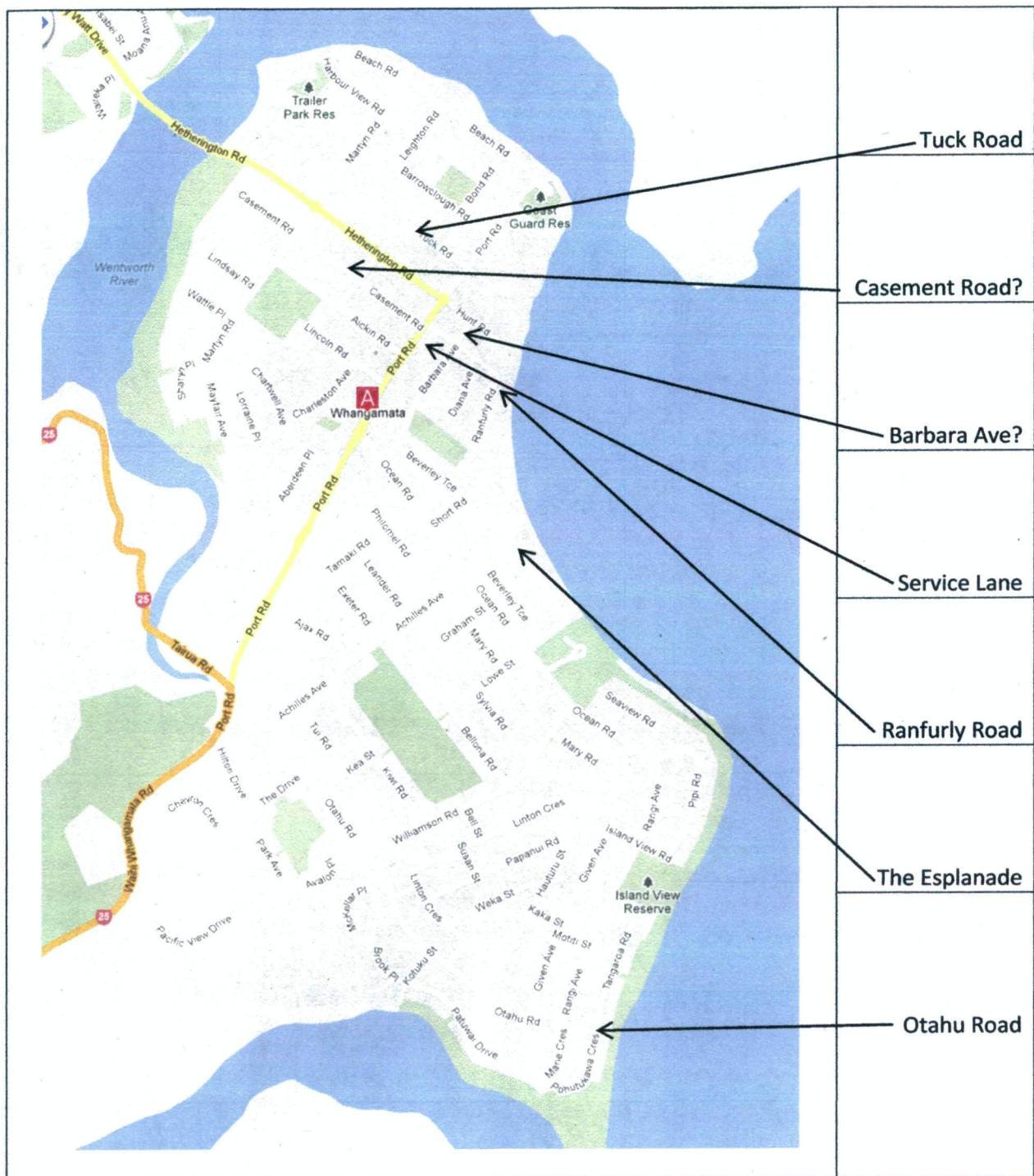
**Triton cells completed works**  
08/08/12



**Atlantis cell completed works**  
08/08/12

**EXISTING WHANGAMATA  
SOAKAGE SITES**





**Recently constructed TCDC Whangamata stormwater soakage pits  
requiring regular maintenance**