The Stormwater Engineer

Thames Coromandel District Council

Refer Williamson Pond and Golf Course Drainage

My name is Eric Thorn I am a retired Professional Engineer with over 40 years of experience in the design and maintenance of stormwater, sewer and water reticulation. Among other activities for several years I ran stormwater design courses for Engineers.

I attended and spoke at a meeting at Williamson Pond on Monday 6th February. Councillor Terry Walker spoke giving an outline of the works that council were proposing to help alleviate the flooding problems in the area. I have concerns with much of what is proposed. Below are the items that I believe need to happen and the reasons for them.

**Williamson Pond Outlet**

There was discussion at the meeting of installing a lower level bypass pipe so that when the pond level got above some level (maybe soffit of incoming pipe?) that water could flow out this pipe. The pipe diameter would have less capacity than the existing weir which would remain.

In principle I think this is a good idea, but care would be required with the detail. A conventional pipe with a flood gate would soon block with sand or be washed out by the sea. If the pipe were installed either through the existing weir or adjacent with the weir width being extended over the new pipe then if / when the flood gate blocked the water flowing over the weir would clear it. The extended width of weir could be installed slightly lower that the existing so that it washes the flood gate.

**Williamson Pond Cleaning**

I do not know what frequency the pond is scheduled to be cleaned. Whatever the frequency is it is inadequate. I have been told that the cleaning was meant to be on a 5 year cycle. This may well have been the expected required frequency at the time was built. The pond is not being sealed by silt as would generally be assumed but by slime that is growing in the pond. With this slime I would expect the pond to require cleaning at least once a year and potentially more often.

When the pond is not cleaned it causes a number of other problems

* The capacity of all the upstream pipelines is compromised as the inlet pipes are flooded to over their soffit level
* The surrounding groundwater levels raise by about 1.2m as the groundwater only drains to the raised pond level and not the normal operational level which should be at or below the inlet pipe inverts
* The raised groundwater levels give less capacity in the aquifer to absorb water when rainfall does occur hence increasing surface flooding in the area.
* The higher pond levels gives more volume of water to grow slime that results in even less infiltration from the pond.

**Repairs to pipeline upstream of Williamson Pond**

A number of tomo have occurred on the pipeline upstream of Williamson Pond. I have been told that this is due to the original pipeline not being installed with rubber ring joints. Not installing rubber ring joints was not uncommon on stormwater pipes at the time that this line would have been installed.

The pipes do need to be sealed to stop the tomo’s forming but other measures are then required to allow the groundwater to enter the pipeline. This is necessary to lower the groundwater level so that it has storage capacity at the times of rainfall and to allow the existing soakage pits to work efficiently.

Provision could be made to drain groundwater into the pipeline with say 10-20m of novaflo pipe installed each side of the manholes along the pipeline. The most efficient place to install this would be at or about pipe invert but in practice this is difficult. A pipe laid on the top of the existing stormwater pipe and broken into the manhole above the pipe in the manhole would be the easiest. It is very important to ensure that filter cloth is wrapped around the novaflo pipe and that it has no gaps.

Previous information given by Council to Opus at the time of the preparation of the 2005 Catchment Management Plan gave a depth to groundwater at the intersection of Ocean Road and Williamson Road that was approximately half pipe level which indicates that at that time the groundwater level was being controlled at least in part by the stormwater pipeline.

**Drainage of existing building to the stormwater system**

It was stated at the meeting that some areas were going to be permitted to connect to the existing stormwater system. There was also an inference that this system was to be extended in some area(s)?

I do not have a copy of the Opus 2005 Catchment Management Plan but I would be surprised if it was not written on the assumption that the reticulated area would not be extended. (I am trying to get a copy of this report to confirm this.) Allowing more areas and more flow to connect to the piped system will make it worse for many.

The Williamson Pond was almost certainly not designed for more flow. Residents who have problems with ponding on their sites need to install their own soakage devices. I have heard some say that they do not work on their particular site.

It is also most probable that the stormwater pipelines were designed on the basis that the pond level would be at or below the inlet pipe invert levels. The higher pond level at weir overflow level would decrease the pipe capacity be roughly 50%.

The sand in Whangamata like most (all?) east coast beaches has layers often very thin of sand that is cemented with iron. This is significantly less permeable than the surrounding sand. To get permeability this layer needs to be broken. A simple hole drilled with a post hole borer below where infiltration is proposed is generally all that is required.

**Williamson Golf Course**

The hydraulic grade from the pipe in Williamson Golf Course is about 0.41% if the pond is at or below the inlet pipes into the pond but only 0.24% if the pond is at weir level. In VERY ROUGH terms the capacity of the pipeline will be about halved when the water reaches the weir level. A similar capacity reduction will be occurring in the rest of the reticulation when the pond is at weir level.

The golf club have excavated drains to direct the water from the course into the council reticulation. The flow from the golf course on 5th February was roughly 15 l/s. It has reduced slightly to about 12 l/s. With these drains now slowly lowering the surrounding groundwater levels the flow will slowly decrease but this may take many months.

They are proposing to recontour parts of the course to make swales to lessen the ponding on the course. The drains are in practice acting to lower the groundwater level that will give more storage in the aquifer for the disposal of stormwater to all properties in the catchment.

I hope this information is useful and will be taken into account before any more works are undertaken in this area.

I am most happy to discuss this either by phone or in person if you wish.

Eric Thorn

0274830845