



Dear TWRA member,

In this email about issues of importance around Stockland's DA for Twin Waters West, we want to address the issue of Flooding. This has been one of the most important and contentious matters since Day One, even back to the first development proposal in 2008. All parties involved, whether us as TWRA, Stockland, Council and the State understand the importance of this issue. Without doubt, it is the issue that has been subjected to the most investigation and assessment by the stakeholder parties and several independent and professional hydrology specialist consultants. It was a "big deal" in the first development application and the resulting Planning & Environment Court case and it is a big deal this time. We understand that this is probably the main point of concern for our TWRA members and Twin Waters residents.

The Flooding Issue

It is worth examining exactly what the "flooding issue" is as far as the existing Twin Waters is concerned as we consider our response to the Twin Waters West DA.

Twin Waters was engineered and built to the then prevailing very high standards over the period from 1996 to 2005. Lend Lease, one of Australia's leading developers, built Twin Waters. We can confidently say that exposure to flood risk is not something that is a concern in Twin Waters. Despite several weather "events" since 1996, there has never been anything remotely approaching any riverine flood risk to homes in Twin Waters and we do not expect that to change in the foreseeable future. To be specific, homes in Twin Waters are built on land with a minimum height of 2.8 metres AHD (Australian Height Datum - the standard terminology for measuring height). Floor level of built homes are probably at least 0.3 m higher than this. Because of "climate change" concerns, the State government has mandated that the corresponding minimum heights for coastal communities in Queensland should be increased by 0.8 metres, which is the "forecast" height for sea level increase by 2100 according to some climate models. It is not for us to debate "climate change". We must accept what is mandated by our elected (State) representatives.

TWW is intended to be built to a minimum land height of 3.5 metres AHD. It will have a waterway system that draws water from our existing lake (connected via our weir to the Maroochy River) and discharge back to the Maroochy River at a different location west of Twin Waters closer to the bridge. In broad terms, the saline water from the Maroochy River will enter our lakes and flow through our waterways to be pumped into the TWW lake at the north-eastern end and then discharge from the southern end of the new lake back to the Maroochy River. The concerns about the flooding Issue are two-fold:

- Will the design of the new TWW lake have an adverse impact on our Twin Waters lake, either under normal everyday circumstances or during high rainfall/flooding events?*

- Will the fact that TWW itself will be at a higher level than Twin Waters have any effect on the exposure of Twin Waters to flood risk i.e. will it change our risk of flooding e.g. by acting as a barrier for water to reach flooding levels in Twin Waters.

So, there are two "flooding issues" that we need to be satisfied about:

- Water quality in Twin Waters lake
- Any adverse change in flood risk that could affect Twin Waters properties

The short answer to both is that the TWRA Sub Committee is satisfied on both counts.

After considerable study and review, we believe it is reasonable for us to conclude that there will not be adverse changes on either count. Indeed, our situation is improved both in terms of water quality and in terms of risk of flooding. While our mantra of "equal to or better than Twin Waters" was intended to apply strictly to the proposed new development as outline in the DA, in fact, we can also conclude that as far as the flooding issue is concerned, we will also achieve an improved position.

Because this is such an important issue, we wish to explain our thinking further as we reviewed all the information available (not just from the DA).

Water Quality

The design of the proposed interconnected waterways system is such that it is relatively easy to understand that water quality in our lake will be improved.

As mentioned, currently saline water from the Maroochy River enters our lake system at the weir. It currently also exits at that point, influenced by normal tidal flows on a daily basis. As you will know, when we have heavy rains the water becomes dirty with stormwater from here and upstream in Pacific Paradise and, probably to a lesser extent, from storm / flood waters in the Maroochy River.

With the proposed TWW lake system, water will be pumped from our lake to the new lake from a point in the Wattlebird Road canal where it will flow thorough the lake and exit at the southern end of the new lake back to the river. This will increase the flows through our lake, thus increasing the volume of "fresh" river water flowing through our lake system. After rain or stormwater events, the dirty water will be flushed out more quickly from our lake and this will result in an overall improvement in our average water quality. The water quality in the Twin Waters West lake is designed to be fully compliant with Council and State Government guidelines under all conditions. The new development will also have water sensitive urban design measures such as bio-retention basins to remove pollutants from stormwater, which will also help support good water quality in the new waterway. This will be a benefit from the proposed new TWW lake waterway system.

To see more information from the DA on the Water Quality issue, please go to the Council Web site at: <https://publicdocs.scc.qld.gov.au/hpecmwebdrawer/RecordHtml/14270553>. Look for Attachment 2 and following. (The report is too large for us to embed in this email. Sorry.)

Exposure to Adverse Change in Flood Risk

Flood risk is a much more difficult concept to examine. It is a field for experts - those who are professionally qualified and very experienced. Hydrology is a specific and specialised branch of engineering. The main tool is computer-based very sophisticated flood modelling. The critical factors are the model itself and the assumptions that are fed into the model, both assumptions relating to the physical

conditions (topography, river systems, tides and riverine flows, availability and capacity of stormwater drains and systems, and other over-land water flows and obstacles such as roads, built-up areas, thick vegetation and the like) plus very importantly assumptions about climate (rainfall, frequency of storm and flood events and more recently climate change which may be impacting storm intensity). There is extensive information about all of this in the documents submitted by Stockland as part of the DA and members who would like to know more are encouraged to look at this information. We are not qualified to “audit” this information but we have looked through it and we can say that from our point of view, we consider that the work submitted as part of the DA is impressive and, frankly, reassuring. Reassuring in the sense of the amount of detail reported in the studies and in the scope of the assumptions made for the flood modelling. That said, we are not representing that we know that the results are accurate from a technical point of view, but we are reassured by what we have seen (and also by what we have discussed with Stockland over a long period of time). Stockland and their expert have explained that onsite flood immunity with offsite benefits are achieved through a combination of (a) an internal lake with capacity to receive stormwater (b) stormwater collected in the lake drains out to Maroochy River (c) new and enhanced stormwater systems surrounding and internal to the site which improves stormwater conveyance and (d) filling on the site, with land profiled with gradient to draw water towards the lake or the onsite wetland.

To provide just some technical detail, as it relates to our situation and perspective as Twin Waters residents, the following is perhaps relevant:

- A 1 in 100 year (known technically as a 1% Annual Exceedance Probability AEP) flood event, would result in a peak flood level of 2.1m AHD in Twin Waters, compared with the existing ground level of 2.7 - 2.9 m AHD. Further, because of the existence of Twin Waters West, the 1% AEP peak flood level is reduced by up to 15 mm compared with no development at TWW.
- In the 1% AEP plus climate change events, there is a significant decrease in peak flood levels of up to 40 mm throughout the existing Twin Waters. (Climate change is defined as a 20% increase in rainfall, plus 0.8 m rise in sea levels at the mouth of the Maroochy River. This would seem to be a drastic scenario, based on actual experience to date).
- The reason there are actually reductions in peak flood levels under these scenarios is that floodwaters would be conveyed through the new TWW lake more efficiently than occurs under existing conditions on the Canelands.
- One more interesting technical point is that the proposed water level in the new lake will allow some water retention in the initial stages of a flood rain event, thus assisting with flooding mitigation

Members who are interested may review the Flood Study Report by going to the Council web site at: <https://publicdocs.scc.qld.gov.au/hpecmwebdrawer/RecordHtml/14270557>. (Once again, this report is too large for us to embed in the email.)

Some More Considerations

Our view about the flooding issues is also informed by some factors that are not actually part of the Stockland DA, but which we believe are relevant for our consideration:

- Flooding issues were the subject of very detailed examination by independent Council and Stockland expert consultants during the last Planning & Environment Court hearing. Both sets of

consultants were recognised as experts in the field. The flooding issues were reconciled and settled under Court supervision.

- *The consultant used by Stockland for the design and engineering of TWW was the same person who did comparable work for Lend Lease when Twin Waters was designed, engineered and built. We live the experience of confidence in that work.*
- *The consultant is a recognised authority in this field with more than 40 years of experience. He commented to us that he has never seen a comparable project that has been subjected to such detailed examination and modelling, including by such a number of different professional experts.*
- *Expert hydrology consultants who have been involved include those from Stockland and their consultants, Council and their consultants and also the State and their consultants. All of them have been engaged knowing that their professional reputation is at stake (and their professional indemnity insurance!) and also knowing that this has been and is a contested matter. It is very reasonable to conclude that the final decisions by the experts have been informed and updated by their collective expert inputs, both at the preliminary phase and now at the final phase.*
- *Finally, and most importantly, Council is very aware that there is a statutory legal obligation for them to review the DA and be satisfied that there will be no adverse effects from the development on adjacent communities before they give approvals.*

In Summary

The Sub Committee believes that it is reasonable to take a view that the so-called Flooding Issue should not be a concern to Twin Waters residents. Our reasons are set out above but, in summary, there is a legal obligation on Council and Stockland to ensure that development does not have adverse effects on adjacent properties and the flooding issue has been the subject of virtually unprecedented specialised expert analysis and studies over an extended period, including against very robust assumptions nominated by both Stockland and Council, including climate change assumptions.

We think we are therefore able to suggest to members that this should not be a concern for us in forming our view about the proposed Twin Waters West DA. However, if you do have concerns, we encourage you to investigate further and attend one of Stockland's upcoming Information Sessions that we have previously referred to.

Regards

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