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George Khouri
Astoria Developments
PO Box 6215
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Dear George

Re: Response to Submissions - Surface Water and Groundwater Assessment – Lakes Estate Residential Subdivision Development, North Boambee Valley, Coffs Harbour

This letter has been prepared to address specific items raised during the public exhibition period of the Environmental Assessment (EA) for the 'Lakes Estate' Residential Subdivisions - Lakes Drive and North Boambee Road, North Boambee Valley, Coffs Harbour LGA (MP 05_0129). This letter has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Astoria Developments and addresses comments relating to the Surface Water and Groundwater Assessment (Umwelt 2008) raised by Department of Planning (DoP), Department of Environment, Climate Change and Water (DECCW), Department of Planning - Northern Regional Office (DoP - NRO) and Coffs Harbour City Council (council).

The Project Application for the Lakes Estate Residential Subdivision (refer to Plan FS_010 Revision C) refers to proposed development within two sub-catchment areas of the North Boambee Valley.

The eastern sub-catchment area includes the existing Lakes Estate and its associated stormwater detention and water quality control lake/wetland system. A series of five lakes, one wetland and interconnecting channels and culverts has been constructed as part of a residential development in the Lakes Estate, North Boambee Valley, Coffs Harbour. The five lakes and one wetland system provides a whole of catchment solution and as such caters for the stormwater detention and water quality requirements for development within the entire catchment area. The design of the water management systems for the catchment area was approved by Council and subsequently the five lakes and one wetland system has been constructed.

In the western sub-catchment area two ponds were proposed to be constructed in an EIS prepared by GHD (1997). The ponds were designed to trap and store stormwater runoff from the urban residential development areas of the valley and treat the stormwater flows using the wetland components. The two proposed ponds consist of a dry basin (G4) and a wet pond (G2). The ponds were designed to trap and store stormwater runoff from urban residential development in the valley and treat these stormwater flows through natural biological processes. This drainage strategy has been accepted by council.

As such the surface water and groundwater assessment for the Project has considered how the proposed development will fit both with the existing and approved stormwater management systems as described above and in the Surface Water and Groundwater Assessment.

1. Department of Planning

Submission

> The intersection of North Boambee Rd and the Pacific Highway is subject to serious flooding during significant rainfall events. The additional 196 residential lots are expected to increase the amount of stormwater run- off directed to the south –east towards North Boambee Road. There are concerns that businesses located along North Boambee Road and on the intersection of the Pacific Highway will be detrimentally affected by the increased stormwater flows, particularly if the five lake system is at full capacity. This issue is required to be addressed.

Response

As outlined in Section 2.0 of the Surface Water and Groundwater Assessment (Umwelt 2008) the previously approved stormwater detention system has been designed to incorporate residential development within the proposed subdivision. The original, Council approved stormwater detention system (GHD 1997) and the five lake system (Umwelt, 2003) was designed to reduce the subdivision's post-development peak flows to less than or equal to that of the pre-development peak flows.

Potential impacts on downstream flows and affects of tailwater levels, outlined in Section 2.0, were addressed in the Supplementary Report (Umwelt 2005) and were subsequently approved by council.

As outlined in Section 5.0 of the Surface Water and Groundwater Assessment (Umwelt 2008) the proposed development will not modify the surface water impacts assessed during the design of the Lakes Estate detention system (Umwelt 2004). As such the proposed development is expected to have negligible impacts on flood flows downstream of the Lakes Estate detention system. This includes the area highlighted by DoP (i.e. along North Boambee Road and the Pacific Highway).

Submission

> Outline the water sensitive urban design techniques that will be implemented to ensure runoff and pollutants associated with urban development do not detrimentally impact on areas of high habitat value.

Response

A series of five lakes and one wetland has been constructed as part of the residential development in the Lakes Estate, North Boambee Valley, Coffs Harbour.

The stormwater management system for this development was originally designed by Gutteridge, Haskins and Davey (GHD) in 1997. During 1997 the proposed stormwater management system design was described and the impacts assessed in an Environmental Impact Statement (EIS) prepared by GHD. This EIS was prepared to support a Part 5 activity under *Environmental Planning and Assessment Act* (*EP&A Act*) (1997).

Council approved the project, as outlined in the EIS (GHD 1997), in February 1998.

Umwelt was engaged by Astoria Developments (Astoria) to design a five lake and one wetland system to replace the stormwater management system proposed by GHD (1997). This design (Umwelt 2003) was approved by council and subsequently the five lake and one wetland system has been constructed. The five lake and one wetland system provides a whole of catchment solution and as such caters for the stormwater detention and water quality requirements for the development within the entire catchment area.

Urban development has the potential to increase runoff volumes and associated runoff rates through the increase in impervious areas. In addition, changes to land use have the potential to increase export of nutrients (e.g. phosphorus) from urban areas to downstream watercourses.

The original stormwater management system (GHD 1997) and the constructed five lake and one wetland system (Umwelt 2003) were designed to meet the following objectives:

- **Stormwater Detention** – post-development peak flows from the site will be limited to less than or equal to the pre-development peak flows from the site for each storm event up to the 100 year Average Recurrence Interval (ARI) storm event.

- **Water Quality** – export rates of 0.5 mg/L of total nitrogen (TN) and 0.05 mg/L of total phosphorus (TP) are not exceeded for more than six months of a median rainfall year.

Proposed catchment scale controls are based on an integrated creek and detention basin network designed to assist in the nutrient and pollutant removal from stormwater generated within the site.

2. Department of Environment, Climate Change and Water

Submission

> It is assumed that the design rainfall estimates for the flood assessment have been derived from Australian Rainfall & Runoff, 1987. The Coffs Creek Flood Study and the draft Newports Creeks Flood Study identified increased design rainfall intensities caused by orographic rainfall effects on the escarpments. It is therefore recommended that the flood assessment use the hydrology adopted in the draft Newports and Boambee Creeks Flood Study.
>
> The flood assessment has not reported the behaviour of the probable maximum flood. This is required to identify all flood prone land and whether any emergency management needs to be addressed.

Response

The flood assessment builds on previous studies undertaken and approved by council for both the eastern and western areas of the Project that provided whole of catchment solutions to surface water management, including flooding. In addition, as discussed earlier in this response, and in the Surface Water and Groundwater Assessment Report, the stormwater management system for the Lakes Estate consisting of a series of five lakes and one wetland has been constructed.

Submission

> It is noted that the proposal includes fill within the 100 year flood extent. The assessment did not consider the cumulative impacts of similar developments across the complete Newports and Boambee Creek catchments. It has been found that such fill has had an adverse impact on the flood behaviour in the adjacent Coffs Creek. It is recommended that the planning controls adopted for Coffs Creek be adopted for this catchment viz, no net filling within the 100 year flood extent except where compensatory cut/fill within the flood storage is permitted.

Response

The assessment indicates that the potential impacts associated with the proposed fill are offset by the detention provided for within the stormwater management system (refer to Table 5.1 of the Surface Water and Groundwater Assessment). As such compensatory cut/fill has already been provided for within the design and construction of the existing stormwater management system for the Lakes Estate.

Submission

> The flood assessment has identified a small, yet measurable downstream impact associated with the fill on the floodplain and channelisation of the stream. Freeboard is not provided to accommodate this. Further, the cumulative impacts can be significant. It is recommended that the proposal not cause any detrimental impacts on other properties.

Response

As discussed earlier the proposed stormwater management systems for the Project are either already approved by council and/or constructed. As outlined in the Surface Water and Groundwater Assessment there is a small downstream impact associated with the proposed development (refer to Table 5.1 of the Surface Water and Groundwater Assessment). It should be noted that the modelled impact is a reduction in flood levels compared to the existing approved development. As such the assessment states '*The existing approved and constructed detention system was designed for and will cater for stormwater detention from the proposed development within the Lakes Estate catchment area. As the proposed development is consistent with the catered ultimate development levels for the catchment, the Lakes Estate detention system will also cater for the water quality control requirements from the proposed development as is demonstrated in Table 5.1.*'

Submission

> The potential impacts of climate change are noted. It is agreed that an increase in ocean levels would have a significant impact on flood levels at the subject site. The assessment considered the sensitivity to a 30% increase in rainfall intensity and volume. The 30% increase may be too conservative – CSIRO reports indicate that an upper bound of 10% may be more appropriate for the North Coast. This will result in a reduced impact compared to that provided in the flood assessment. It is generally inappropriate to use freeboard to accommodate the impacts of climate change, particularly for new developments. In this case, an appropriate response to giving consideration to climate change may be to include the climate change impacts in the design flood estimates.

Response

As noted by the Department of Environment, Climate Change and Water the potential impacts of climate change are addressed in Section 6.2 of the Surface Water and Groundwater Assessment (Umwelt 2008).

Potential climate change impacts were addressed in accordance with the *Floodplain Risk Management Guideline (Practical Consideration of Climate Change)* (DECC 2007) which is recommended to be used as a basis for examining climate change projects.

Astoria developments will consider including climate changes impacts associated with a 10 per cent increase in rainfall intensity and volume in the design flood estimates and associated flood planning levels for the future development areas of the site.

3. Department of Planning – Northern Region

Submission

> The Director-General's EA requirements included the consideration of the likely effects of fill on the flood regime of the site and adjacent lands. Stage 2 includes some low lying land to be filled. The application does not appear to have addressed this in Section 6.5.5 or the Stormwater Management Plan.

Response

The potential impacts of fill works are addressed in Section 6.3 of the Surface Water and Groundwater Assessment (Umwelt 2008). The modelling indicates that channelisation of these flows and associated filling will not increase flood levels downstream of the proposed development areas.

In addition, the proposed modifications to the development plans remove the need for some of the filling works within the 100 year ARI flood extent. Potentially two lots within the western catchment area are located within the 100 year ARI flood extent, however the layout provides sufficient land for a building envelope to be located outside of the modelled flood extents.

4. Coffs Harbour City Council

Submission

> [Lots 91, 93, 102 and possibly other nearby lots] run across a drainage depression. Some of these lots appear to occupy a 7A Environmental Protection zone. These lots need to be reviewed in terms of their suitability to drainage, zoning and other environmental constraints.

Response

The proposed development layout within this area has been modified to reduce the lots both within the 100 year ARI flood extent and the 20 metre buffer for endangered ecological communities. The current proposed development layout only proposes to develop land within 2A land zoning.

Submission

> Proposed Lots 87 to 106 are affected by flooding. From the Flood Study the 1 in 100 year flood level is estimated at 9.9 metres AHD for the majority of the area and rises to approximately 12.2 metres AHD around Lot 104.
>
> The small catchment that flows from the north is estimated to have a 1 in 100 year flow of 5.5 m^3/s. The 9.9 metre AHD would be backwater from the watercourse downstream. This part of the subdivision needs to be reviewed in relation to flooding.

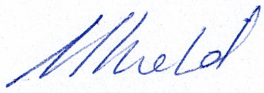
Response

As discussed in Section 3 of this letter, the potential impacts of fill works are addressed in Section 6.3 of the Surface Water and Groundwater Assessment (Umwelt 2008). The modelling indicates that channelisation of these flows and associated filling will not increase flood levels downstream of the proposed development areas.

In addition, the proposed modifications to the development plans remove the need for some of the filling works within the 100 year ARI flood extent. Potentially two lots within the western catchment area are located within the 100 year ARI flood extent, however the layout provides sufficient land for a building envelope to be located outside of the modelled flood extents.

We trust that this response to submissions provides you with the information required. Please do not hesitate to contact me on (02) 4950 5322 if you require any additional information.

Yours faithfully



Susan Shield
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