Lot 156 Creek Street, Hastings Point - Submission

O'Reilly Sever & Co

AUSTRALIAN WETLANDS CONSULTING PTY LTD

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Project control

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1 Introduction and Background

Australian Wetlands Consulting has been engaged by O'Reilly Sever & Co to review the Environmental Assessment report for Lot 156 Creek Street Hastings Point (Planit Consulting, 2010) and related documents to provide comments for a submission on the current Development Application for Lot 156 / DP628026. The Environmental Assessment has been prepared pursuant to Part 3A of the *Environment, Planning and Assessment Act, 1979* and in response to NSW Department of Planning, Director General's Requirements (DGR's), dated 28th October 2010.

Australian Wetlands Consulting has provided comment on aspects relevant to wetland ecology, water quality and stormwater management. Comments have been provided in the following table and key points summarised in concluding paragraphs. The context for these comments is relevant planning and policy documents and existing studies relating to the Tweed Coast Estuaries.

Of particular focus are the conclusions drawn from investigations undertaken on behalf of the applicant and numerous generalisations and omissions of key studies, quantifiable data, hydrological and ecological impacts. These flaws are detailed systematically within this report and outlines how the principles of Ecologically Sustainable Development (ESD) have not been adequately considered. Potential impacts associated with the proposal require further attention, including: inadequate stormwater treatment measures, hydrological impacts, inadequate use of buffers and lack of consideration of impacts to local wetland ecosystem function, threatened communities, cumulative impacts and climate change.

Australian Wetlands Consulting has a history of work within Tweed coast region and have written a number of key documents related to the proposal including:

- *Tweed Coast Estuaries Management Plan 2004-2008: Cudgen, Cudgera and Mooball Creeks*. Australian Wetlands (2005)
- *Baseline Ecological Assessment Report: Cudgera Creek and Kerosene Inlet, Tweed Coast*. Australian Wetlands (2010)
- *Draft Coastal Zone Management Plan for Cobaki Broadwater and Terranora Broadwater* (Australian Wetlands, 2010)

Australian Wetlands Consulting has a good working understanding of the ecology of this area and provides this unbiased review and comments which are informed by our experience and current best practice in the areas of wetland management and urban stormwater design.

2 Comments Relating to Environmental Assessment of Lot 156 Creek Street, Hastings Point

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Impacts to Surrounding Wetland Areas EA p. 19	*The objectives of the proposal are: to develop the residential component of the property without adversely impacting upon the natural features of the land and the surrounding wetland areas adjoining Christies Creek and Cudgera Creek.*	The applicant has not demonstrated, for the reasons outlined below, that there will not be adverse impacts upon the natural features of the land and the surrounding wetland areas adjoining Christies Creek and Cudgera Creek.
EA p. 31.	*Preliminary hydraulic modelling shows that the site can be filled to the design flood level with no detrimental impacts.*	While an increase in flooding and significant increase in stormwater generation is acknowledged within the application, no attempt is made to mitigate this impact or understand the potential ecological impact. All references to flooding are made with respect to Cudgera Creek, however no mention is made of the hydrological impacts associated with creating flood free access to RL2.4 at the rear of houses on Creek Street. Failure to consider flooding impacts on residential areas to the north of the proposal creates the possibility that there may be hydrological impacts upon upstream and adjoining habitats that require investigation. The proposal is considered to have not adequately addressed DGR's section, particularly the requirement to consider the impact of filling on surrounding houses (Section Three).

<table>
<tr><th colspan="2">Documentation</th><th rowspan="2">AWC Comment / Consideration</th></tr>
<tr><th>Issue / Source</th><th>Applicant's Statement</th></tr>
<tr><td>Water Sensitive Urban Design (WSUD)

EA p. 43.</td><td>Considerable time has been spent to develop a drainage system that will serve three purposes…. 2) Provide a drainage system that will mitigate any detrimental impacts to the riparian vegetation and the local waterways.</td><td>Communication of the stormwater design is inconsistent (e.g. bioretention filters proposed within Figure 13.2 are not mentioned in the body text of the Engineering Impact Assessment (Opus, 2010)), poorly conceived and likely to have adverse impacts through concentrated flows, scouring and sedimentation.

The design in no way reflects current best practice in Water Sensitive Urban Design (WSUD) by failing to consider or acknowledge physical site characteristics, and receiving environment hydrology and water quality.</td></tr>
<tr><td>Water Sensitive Urban Design

EA p. 44.</td><td>It is submitted that through the above use of Water Sensitive Urban Design treatments and actions, that the proposed Water Cycle Management Plan meets the objectives of the Tweed Coast Estuaries Management Plan 2004-2008 and will mitigate the potential for pollutants to enter the surrounding waterways.

The proposed development impacts on stormwater runoff rates by 46% -49%.

Development of the site is expected to increase the concentrations of suspended solids, nitrogen and phosphorous in stormwater runoff compared to the existing undeveloped catchment if untreated.</td><td>The stormwater strategy is at odds with best practice in WSUD design by proposing a poorly integrated end of pipe solution which will increase stormwater run-off by up to 49%, concentrate discharge and actually reduce water quality through the use of inappropriate stormwater technology.

Based on estimates found within the Tweed Shire Council (TSC) Urban Stormwater Quality Management Plan (USQMP) (2000) the sub-division will increase nutrient loads by 650 % - 1100 % from the pre-development condition. Refer to table below, adapted from Table 5.3 of TSC USQMP (2000).

<table><tr><th>Undeveloped – Urban Landuse Change</th><th>TN</th><th>TP</th></tr><tr><td>Average Year (1719mm)
Wet Year (2185mm)</td><td>1100%
1050%</td><td>650%
660%</td></tr></table>
The proposed stormwater strategy in the form of end of pipe GPT's will not reduce nutrients at all (Water By Design, 2009)</td></tr>
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		and actually concentrate and increase the quantity of nutrients and heavy metals entering the estuary (Australian Wetlands, 2009 and 2005). The proposal is in direct conflict with the objectives of the Tweed Coast Estuaries Management Plan (Australian Wetlands, 2004) and TSC USQMP (2000) since it will not only fail to achieve the water quality objectives adopted within these plans, but also concentrate pollutants to toxic levels and discharge them as pulses into the environment. DGR's Section 2, 2.1 requires that the proposal detail '*measures to show that the quality and quantity of stormwater will not adversely affect the downstream receiving environment'*. No attempt has been made by the applicant to quantify stormwater pollutant loads, nor to contextualise these loadings against the assimilative capacity of the receiving environment. DGR's Section 2, 2.2 requires the applicant '*demonstrate how the principles of Water Sensitive Urban Design will be incorporated into the development'*. The stormwater management strategy is at odds with WSUD since it relies upon a traditional approach of trunk drainage conveying flows to a proprietary device (wet sump GPT) unable to treat pollutants of concern within the estuary (Australian Wetlands, 2009 and 2005) before discharging unmitigated concentrated storm flows into high conservation value estuarine vegetation communities. DGR's Section 2, 2.4 requires the applicant have,

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		'*Consideration of the Tweed Coast Estuaries Management Plan 2004-2008 for Cudgen, Cudgera and Mooball Creeks (Australian Wetlands, 2004)*'. The application in no specific way demonstrates consideration of the content or objectives of this Plan. Two specific examples include proposed water quality objectives and recommended minimum buffer widths of 50m. The submission provides no indication that the specific aquatic ecology and water quality characteristics of Cudgera Creek have informed the preparation of the Water Cycle Management Plan. The proposal is at odds with Principle Four of the NSW Wetland Management Policy, 1996: '*Water entering natural wetlands will be of sufficient quality so as not to degrade the wetlands'.* Further in Section 4.2, this policy states: *'The needs of wetlands will be taken into consideration in the determination and implementation of water quality targets'*. No attempt is made within the application to understand the water quality requirements of adjoining wetlands, in fact no water targets have been proposed at all.
Impacts of Stormwater Discharge	0 EA p.96-107	The proposal is considered at odds with Principle Three of the NSW Wetland Management Policy, 1996: *'New developments will require allowance for suitable water distribution to and from wetlands'*

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EA Engineering Impact Assessment Table 8.14(a) p.16 EA p.84 EA p. 96-107		By concentrating and increasing stormwater run-off into the wetland and providing no mitigation measures, suitable water distribution into adjoining wetlands is not achieved. Section 4, 4.3 of the DGR's is to '*Identify measures to protect or mitigate for any adverse impacts on threatened or vulnerable fauna and flora species and their habitats, including adequate buffers, revegetation/rehabilitation, and the long-term protection of aquatic habitats and threatened fauna and flora species'*. The applicant has not satisfied the above requirement, as discussed further below. **Impacts of Changed Hydrology** *Tweed LEP 2000 Clause 31 (a) …the development will not have a significant adverse effect on scenic quality, water quality, marine ecosystem, or the bio-diversity of the riverine or estuarine area or its function as a wildlife corridor or habitat.* The plants and animals living in wetlands are adapted to variable inundation. When hydrologic patterns are disturbed, this affects the range of plant and animal species that wetlands can support. The EA acknowledges that the '*EECs may be impacted by uncontrolled changes to hydraulic regime as a result of modifications to surface and groundwater hydrology, particularly during construction'*. In this regard, if the hydraulic and stormwater quality management plan is not adequate (as argued in this submission) then the Endangered Ecological

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		Communities (EECs) are at risk. Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands is considered a key threatening process on Schedule 3 of the *Threatened Species Conservation Act 1995*. Alteration to natural flow is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems. Examples of potential impacts of altered hydrology at this site include: - Impact to Saltmarsh EEC. Shoreline development and changes in local hydrology are the biggest threats to saltmarsh (OzCoasts, 2010). Saltmarsh is dependent on very specific hydrology, topography and salinity. Saltmarsh relies on less frequent inundation than mangroves and higher salinity levels. The development may change both the salinity and hydrology of adjacent saltmarsh areas. There is also a potential cumulative impact associated with climate change-related sea level rise. Intertidal vegetation such as saltmarsh may respond to sea-level rise by migrating upslope, however there is little scope for this to occur following development of this area. There is also the potential for loss of saltmarsh due to infilling/sedimentation of this area due to discharge of sediment-laden stormwater directly to the tidal lagoons. Loss of saltmarsh will mean reduced habitat for invertebrates, fish and water birds. - Riparian zone degradation due to discharge of

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		stormwater which can lead to increased erosion. There are no mitigative measures provided to address the impacts of altered hydrology. **Impacts of Altered Physical and Chemical Water Quality** Changes to water quality may have numerous impacts, some cumulative, including to Saltmarsh and Swamp Oak Floodplain Forest (EEC), seagrass (Key Fish Habitat), acid frogs (threatened species) and associated ecological flow-on impacts. Changes to acidity (e.g. from greater freshwater discharges) can affect species dependent on acid conditions. For example, the melaleuca wetlands in the adjacent Cudgen Reserve likely provide habitat for the threatened acid frogs *Crinia tinnula* and *Litoria olongburensis.* Changes to pH as a response to increased discharge of freshwater may impact the acidity of their habitat and affect their local population. This needs further consideration. *'Wetland functions need to be considered up-front in the…. formulation of development proposals'* (DECCW, 2010). There has been inadequate consideration of cumulative effects on the wetland ecology of the adjacent Cudgen Nature Reserve and instream on Key Fish Habitat. All the local creeks, including Christie's Creek and their intertidal areas, which include areas of mangroves, saltmarsh, swamp oak forest (EECs) are mapped by TSC as Key Fish Habitat (TSC Key Fish Habitat Mapping, 2009). The intertidal areas of Lot 156

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		are mapped Key Fish Habitat. The impacts of discharge of inadequately treated urban stormwater on these areas needs detailed quantitative consideration. Impacts on local aquatic species and on the recreational fishery need investigation. The impacts of urban stormwater/changes on water quality (and construction phase sediment) on local seagrass communities needs further consideration. TSC mapping indicates the presence of seagrass directly adjacent to the development in Christies Creek, as well as in Cudgera Creek (TSC Estuary Habitat Mapping, 2006). Seagrass provides important inputs of organic matter to detrital and pelagic foodchains and are habitat/refuge for a wide diversity of crustacean and fish species (Ferguson, 2009). There is some evidence to suggest that local seagrass communities already have epiphyte growth and/or attached particulate matter on the leaves (Australian Wetlands, 2010). Elevated nutrients and suspended solids have been identified as the leading cause of these two characteristics which are known to impact the growth, survivability and expansion of seagrass in estuaries (Morris *et. al*, 2007, Frankovich and Zieman 2005, Udy and Dennison 1997, Abal and Dennison 1996). Seagrass beds are susceptible to a number of disturbances, principally reduced light availability (Abal and Dennison 1996) and increased nutrient loading (Morris *et. al*. 2007, Frankovich and Zieman 2005, Udy and Dennison 1997). Given there may be issues with existing nutrients in Cudgera and Christies Creeks, the impact of further increases in pollutants from the development site should be investigated in

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		the context of the estuary's assimilative capacity. Failure to provide adequate construction phase erosion and sediment control could see some of the 37,000m^3 of fill smothering the seagrass beds. There is also the potential of ongoing cumulative impact from increased sedimentation as a result of inadequate stormwater treatment devices leading to increased nutrient loading and turbidity that may damage the health of seagrass communities. Saltmarsh is a key structural and functional component of coastal ecosystems. Ecological and economic functions include: providing habitat for fish species, including commercially important species, filtering of freshwater surface flows, stabilisation of substrates, erosion control, provision of nutrients for other estuarine communities, and habitat for a range of other fauna, including migratory birds (Connolly, 1999). Saltmarsh provides a carbon-enriched feeding environment for fish, crustaceans and molluscs at high tide, while at low tide these animals may use other niches in the seagrass/mangrove habitat mosaic (Wilton 2002, Mazumder, 2004). DCP A5.4.7 *states: Development in or adjacent to waterways, water bodies, wetlands or within their catchments must: ensure preservation of fish and aquatic habitat* and *ensure development does not result in pollution or adversely affect quality or quantity of flows of water into the water way, water body, wetland or habitat.* The discharge of polluted urban stormwater into the EEC wetland areas which are Key Fish Habitat and in the vicinity of seagrass beds is not consistent

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		with this DCP. DCP A5.4.7 also states: *Subdivision layouts and works are to be designed to avoid adverse impacts on fish and aquatic habitat and are to comply with the NSW Fisheries (1999) Policy and Guidelines Aquatic Habitat Management and Fish Conservation and the Fisheries Management Act 1994 and Fisheries Management (General) Regulation 1995.* Inadequate treatment of stormwater and failure to provide 50m buffers to wetlands is not consistent with this DCP (see below for discussion of buffers). Protecting the health of aquatic habitat is imperative for the survival of the whole system and preservation of the significant biodiversity and recreational values of the Creek. Without appropriate WSUD measures that ensure protection of water quality and hydrologic regimes, the applicant cannot claim to be protecting aquatic habitat. Without appropriate buffers and/or site specific data the applicant cannot claim to be protecting fisheries resources, migratory bird habitat, significant vegetation communities, other recorded and potentially occurring fauna and as a water based fauna linkage between the Cudgen Reserve and Cudgera Creek estuary. The Soil and Water Management Plan (SWMP) is poorly conceived, will be difficult to implement and is sized only up to the 1 in 3 month ARI storm, meaning that polluted discharge will routinely reach Christies and Cudgera Creek. The use of bunds around the entire development area also creates the risk of failure which cannot be controlled or isolated.

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		The SWMP should provide mitigation measures on a subject and/or precinct basis, creating smaller and more manageable disturbed areas and ensuring the duration that soils are left exposed is for the shortest time practical.
Buffer to Christie's Creek EA p. 58	*The Tweed Shire Council's DCP Section A5-Subdivision Manual requires that a buffer of 30m from the top of the bank of creeks….*	Tweed Shire Council's DCP A5: A5.4.7 – Development in or adjacent to waterways, water bodies, wetlands or within their catchments must: *provide a riparian buffer of 50m along major streams (including Cudgera Creek and major tributaries.)* Christies Creek is a major tributary of Cudgera Creek and therefore a riparian buffer of at least 50m must be created. A key recommendation of Tweed Coast Estuaries Management Plan 2004-2008 for Cudgera Creek is to '*adhere to a minimum 50m buffer zone of riparian vegetation on any new development site'* (AW 2005). Maps provided by the applicant which illustrate buffers do not have a scale bar meaning that buffer widths cannot be readily checked, however there are areas where a 50m buffer to Christie's Creek has not been achieved.

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Buffer to Wetlands/ EEC's/ Consideration of Climate Change EA Figure 22 Rehabilitation Plan EA p. 76 EA p. 58 EA p. 71	*The vegetation within these tidal zones are potentially of value to fisheries resources, migratory bird habitat, significant vegetation communities, other recorded and potentially occurring fauna and as a water based fauna linkage between the Cudgen Reserve and Cudgera Creek estuary.* *The proposal, including the buffers provided by the existing vegetation and additional land areas of rehabilitation are considered appropriate and reasonable in their aim to maintain water quality in the area and enhance and preserve the existing riparian vegetation corridor of the Christies and Cudgera Creeks. Should greater buffer distances be provided as recommended by some 'guidelines', the area of the site within the 2(e) zone available for development would be unusable for any development that would achieve the objectives of the 2(e) zoning in accordance with the Tweed LEP……*	The definition of a 'buffer area' in A5.E.2 Definitions is: '*an area of prescribed width and treatment created between two or more landuses (including environmentally sensitive areas) for the purpose of mitigating the impacts of one or more of those landuses'*. The inclusion of park areas or roads within a buffer zone is considered inconsistent with the definition of a buffer. A park area is not likely to mitigate the impacts of a residential area on a sensitive wetland so should not constitute part of the buffer area. A buffer area of 50m from all EECs should be provided within environmental protection areas and not include parklands. Much of the existing wetland vegetation is mapped as EECs and as Key Fish Habitat (TSC Key Fish Habitat Mapping, 2009). As such, a buffer is required to protect these areas of existing vegetation. While the existing EECs/wetlands provide some buffer for the water quality of the creeks, the wetlands themselves need a buffer to protect their integrity as specified in DCP A5.4.5. The aim of these buffers should be to protect the EEC wetlands. DCP A5: A5.4.5 – *A 50m buffer is to be provided around any wetland. This buffer is to be managed in accordance with a management plan submitted by the applicant and approved by Council…* There are substantial planning guidelines (in addition to the DCP A5.4.5), research and expert opinion that demonstrate a clear justification for a minimum buffer to wetlands (the mapped EEC communities) of 50m:

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		- *Policy and Guidelines Aquatic Habitat Management and Fish Conservation* (NSW DII – Primary Industries, 2005) '*The width of these buffer zones may need to be increased to 100m or more where they are adjacent to ecologically sensitive areas'*. - *Coastal Design Guidelines for NSW* (Coastal Council of NSW, 2003) '*Setbacks should where possible be increased to 100m or more where they are adjacent to ecologically sensitive areas…''* - *Setbacks of **50-100m for key fish habitat** are recommended to ensure the water quality and habitat are adequately protected from adjoining developments. Council are required to recognise the value of riparian and aquatic habitat and ensure new developments have appropriate setbacks* (DII, 2005). - *Maintaining adequate vegetated buffers will be an important factor in maintaining wetland resilience to climate change, particularly intertidal wetlands that will need to migrate upslope with sea-level rise. It is critical to recognise the important role wetlands can play in adapting to the impacts and implications of likely climate change in NSW. For example, mangrove forests may reduce storm surge associated with more severe weather, saltmarshes provide essential habitat for migratory shorebirds…Protecting the wetlands of NSW is the principal way of protecting these functions – and many others – which provide benefits **beyond the wetland boundary*** (DECCW, 2010).

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		- *Buffers around wetlands play an important role in maintaining wetland health… they help to maintain and protect ecological processes and functions in the wetland. Buffers reduce changes to subsurface and surface water flows; sedimentation or erosion; increases in noise and temperature; toxins, bacteria and viruses; physical intrusions and disturbances and the introduction of weed and pest species* (DECCW, 2010). Comments received by TSC from NPWS relating to the Draft Tweed LEP 2000 Amendment No. 44 for part of this Lot/DP (2003) included: - *…the NPWS' position is that a 50m buffer should be provided between wetlands and any form of development. It is recommended that an appropriate buffer be included in the Environmental Protection zone to ensure the integrity of the wetland ecosystem in the long term* (Diacono, 2003, recommendations for Draft Tweed LEP 2000 Amendment 44). - *As an example of the value of a buffer, bird species protected under the Japanese-Australia Migratory Bird Agreement have been recorded from the estuary in close proximity of the subject site. Mangroves and/or saltmarsh provide feeding and roosting habitat for these species as well as other resident shorebirds. However they are shy and are quickly stressed by human disturbance, or disturbance by domestic animals. Other rare or threatened species also regard*

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		mangroves as important habitat. An appropriate buffer would assist in maintaining the usefulness of this habitat to significant species (Diacono, 2003, recommendations for Draft Tweed LEP 2000 Amendment 44). Without appropriate buffers they cannot claim to be protecting *fisheries resources, migratory bird habitat, significant vegetation communities, other recorded and potentially occurring fauna and as a water based fauna linkage between the Cudgen Reserve and Cudgera Creek estuary.*
Threatened Bird Species EA p. 92	*Careful management of stormwater in association with the development will, however, be required to ensure that adjacent foraging areas are not polluted which is a known threatening impact to the species*.	The combination of inadequate buffers and inappropriate stormwater treatment measures could lead to changes in hydrology and water quality. This suggests that important foraging areas for this threatened bird species may become polluted and/or damaged and is a known threatening impact to the survival of this species.
Compensation for loss of Saltmarsh. EA p. 122	*Revegetation/restoration of 1.94ha of current Community 3…shall occur. Revegetation shall be focussed upon re-creating endangered ecological communities (i.e. Subtropical Coastal Floodplain Forest, Swamp Oak Floodplain Forest and Swamp Sclerophyll Forest on Coastal Floodplains).*	The area of saltmarsh that will be translocated as compensation for the loss of 1,341m^2 of Saltmarsh EEC is 640m^2. The proposed compensatory area of saltmarsh is less than half the area to be removed. DCP A5.4.7 states: *Subdivision layouts and works are to be designed to avoid adverse impacts on fish and aquatic habitat and are to comply with the NSW Fisheries (1999) Policy and Guidelines Aquatic Habitat Management and Fish Conservation and the Fisheries Management Act 1994 and*

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		Fisheries Management (General) Regulation 1995. NSW Fisheries (1999) promotes a policy of 'No Net Habitat Loss' with the aim of ensuring ecologically sustainable fisheries for future generations. Their *Policy and Guidelines Aquatic Habitat Management and Fish Conservation* states that *environmental compensation should be provided…* and *would normally require the creation of new habitat (of the type lost) and on a 2:1 basis to account for the indirect as well as the direct impacts of development.* This is not specified in the report. The Policy states *Environmental monitoring is needed to determine if the assessment of the environmental impacts of a development were accurate….. a 20% change in a biological indicator (e.g. abundance, richness, biomass) one year after the impact should be regarded as a major impact and require environmental compensation.* Furthermore, in creating a compensatory area of habitat there are many considerations described in this Policy e.g. *the site must be suitable (of suitable substrate, depth and is not exposed to excessive pollution), agreed performance indicators must be specific, measurable and time referenced (e.g. 50% biodiversity over one year).* Methods and monitoring needs to be detailed in accordance with these policies. For example, is the area to receive the transplanted saltmarsh of correct topography? There are very specific habitat needs required by saltmarsh communities

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		(Green, 2009). Saltmarsh requires correct topography, hydrologic regime and salinity (i.e. tidal inundation and elevation). The applicant has not considered if these requirements are met at the receiving site. The methods of translocation are not outlined in sufficient detail to ensure success. The location of the area is in close proximity to public open space and the proposed house lots. The applicant should consider providing an adequate buffer to the receiving site to avoid risks such as saltmarsh being trampled/ not adequately protected from disturbance. The proposed translocation/rehabilitation is at odds with the NSW Wetland Management Policy, 1996. The purpose of this policy is to: *Halt and where possible, reverse:* - *The loss of wetland vegetation;* - *Declining water quality;* - *Declining natural productivity;* - *Loss of biological diversity; and* - *Declining natural flood mitigation.*

3 Conclusion / Summary

The principles of Ecologically Sustainable Development have not been adequately considered as the requirements to limit cumulative impacts, the precautionary principle, social and intergenerational equity and the conservation of biological diversity and ecological integrity have not been adequately addressed. A summary of the key points relating to inconsistency with ESD are provided below:

- Inadequate WSUD measures that will not treat stormwater to a level suitable for discharge, and may actually concentrate and increase the quantity and quality of pollutants entering the estuary and wetlands.
- Inadequate consideration of the effects, some cumulative, that changed hydrology and decreases/changes in water quality may have, on local ecology including impacts to Cudgen Nature Reserve, Saltmarsh and Swamp Oak Floodplain Forest (EECs), seagrass (Key Fish Habitat), acid frogs (threatened species) and associated ecological flow-on impacts.
- Failure to ensure a riparian buffer of at least 50m along Christies Creek.
- The inclusion of park, road or housing areas within a buffer zone is considered inconsistent with the definition of a buffer.
- Failure to ensure a minimum buffer of 50m to EEC's and proper consideration of the importance of buffers with respect to ecology and mitigating the impacts of climate change.
- Failure to consider the impacts on seagrass, key fish habitat and aquatic fauna species.
- Failure to consider the cumulative impacts on EECs, and the ecology of this tidal environment, in association with predicted impacts from climate change, specifically on Saltmarsh.
- Failure to adequately compensate for loss of Saltmarsh and to detail the methods of translocation and its suitability and likelihood of success.

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