

CONSOLIDATED RESPONSE TO AGENCY AND PUBLIC SUBMISSIONS (PARTS A, B and C)

PROJECT APPLICATION SANDON POINT



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On behalf of

Stockland Development Pty Ltd
(Project Ref: 5565H)

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Document Structure

This response to Agency Submissions includes two parts:

- Part A Responses to the exhibition of the Project application during May and June 2008. The responses in Part A are numbered 1 to 77.
- Part B Responses to the exhibition of the Project application during October 2007. The responses are numbered 1 to 32.
- Part C Responses to Public Submissions from both the May/June 2008 and October 2007 exhibition.

Appendices have been incorporated and relate to both to Part A and Part B responding to the additional submissions, as follows:

- Cardno Forbes Rigby (CFR) response to all flooding and climate change issues raised by Wollongong City Council, Department of Environment and Climate Change and the State Emergency Services are attached at **Appendix A**.
- CFR responses to all infrastructure, servicing and bridge related issues raised by Wollongong City Council are attached at **Appendix B**.
- Wilkinson Murray letter in relation to acoustic reverberation impacts from the proposed acoustic wall is attached at **Appendix C**.

Background

A chronology of events that relate to the Project application is set out below to assist in understand the context in which this Agency Submission response has been prepared.

On 21 December 2006 The Minister for Planning approved a Concept Plan MP06_0094.

On 18 September 2007 Stockland submitted a final Project application for public exhibition for the residential subdivision. This application was prepared on the basis of the Concept Plan approval.

During November 2007 the Project application and was publicly exhibited.

On 27 November 2007, Justice J Biscoe of the Land and Environment Court found that:

“the Minster’s approval of the concept plan is void and the Court is justified in setting aside the impugned decision and ordering that the discretion be re-exercised according to law” (paragraph 167).

Following the Land and Environment Court’s decision, the Department of Planning was unable to progress the assessment of Stockland’s Project application lodged a few months prior, until such time that an approved Concept Plan was again in place.

On 21 April 2008, Stockland and ARV submitted additional information relating to climate change in the form of a Revised Concept Plan in order for the Minister of Planning to re-
3 November 2008

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exercise his discretion according to law. At that time, the Project application submitted in September 2007 was also amended to include the Climate Change Assessment as part of the application documentation. During May and June 2008 the Revised Concept Plan and Project application (including the Climate Change Assessment) was publicly exhibited.

The Minister for Planning appealed the Land and Environment Court's decision. On 24 September 2008 the Court of Appeal ordered that the Minister's Concept Plan approval of 21 December 2006 still stands.

As noted above, the Project application has been publicly exhibited on two occasions:

- The first occasion was when the Project application was originally submitted; and
- The second occasion was a concurrent exhibition of the Revised Concept Plan application and the Project application both incorporating the additional climate change information.

Therefore, there are two sets of agency and public submissions. This response to submissions addresses the submissions received to both exhibitions. It should be noted that the submissions from the second exhibition also contain references to the Revised Concept Plan application. All comments have been reviewed and noted where necessary if they relate to the Revised Concept Plan application.

Further the submissions from the second exhibition also contain comments relating to the ARV component of the Revised Concept Plan. Agency comments regarding flooding as they relate to ARV's site are addressed in this Response to Agency Submissions to enable a holistic assessment of the issue as relevant. Other issues are not addressed and will be matters for a future Project application for the ARV component.

PART A

**RESPONSES TO
AGENCY SUBMISSIONS
JUNE 2008 EXHIBITION**

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APPENDICES

- A. CFR Letters 001, 002 and 003 responding to flooding and climate change issues raised in WCC, SES and DECC letters.
- B. CFR Letter 004 responding to servicing and bridges issues raised in WCC letter.
- C. Wilkinson Murray letter dated 29 November 2007

PART A - RESPONSES TO JUNE 2008 EXHIBITION

Issue 1 Adverse flooding impacts to existing development

ISSUE 1 **Adverse Flood Impacts to existing development** — *It is a major concern that there is no assessment of the impact of the proposed development on flood behaviour. As the development proposal involves significant modifications to the floodplain, this may lead to increased flooding to existing development. The local hydrologic behaviour of the site will change as a consequence of the development. There may be potential to offset adverse impacts through appropriate measures, however the adverse impacts have not yet been assessed either under existing conditions or following any future augmentation of the railway culverts (ie a recommended measure in Council's Hewitts Creek Floodplain Management Plan). It is noted that the Department, Council and Patterson Britton (January 2007) have previously advised the DoP of the need to assess adverse impacts and this was also a requirement of the approval authority. It is therefore recommended that the approval authority ensures a flood impact assessment be undertaken that compares existing conditions with developed conditions for both existing and augmented railway conditions. Off-site impacts of the development on flooding and erosion requires assessment for the full range of potential floods.*

Agency **DECC Letter dated 7 July 2008**

The potential off-site flood-related impacts from the Sandon Point project are limited to those locations where flood inundation limits extend beyond the site boundary or where creek upgrade works interface with existing creeks. Locations where such situations could possibly apply are as follows:

- (i) Post-development flood levels affecting the properties off Sea Breeze Place, to the east of the existing gabion wall along Hewitts Creek (constructed in the early 1990's).
- (ii) Post-development flood levels affecting properties on the southern side of Sandon Drive.
- (iii) Potential erosion where the upgraded reaches of Hewitts, Woodlands and Tramway creeks join the existing creek channels downstream.

In regard to (i), CFR has undertaken further modelling to assess flood impacts on the properties off Sea Breeze Place, to the north of the existing gabion wall along Hewitts Creek. This has confirmed that the Sea Breeze lots are not affected by any flooding, including the PMF, under post-project conditions. Flood levels are documented in the Table 6.2A in CFR's letter at **Appendix A**. The extents of flooding for both the 1% AEP and PMF events (for the upper bound climate change scenario with conservative Manning's n values) are shown on Drawing No SK-07 attached to CFR's letter at **Appendix A**. Modelling files are available for presentation to the independent reviewer on appointment.

In regard to (ii), modelling conducted as part of CFR's 2008 report indicated that the 1% AEP flood covers Sandon Drive to a depth of about 0.2 m in the existing climate scenario and that this increases to slightly more than 0.3 m in the 'upper bound' climate change scenario, which is the point at which vehicles become unstable due to buoyancy. The extent of inundation of the 1% AEP flood does not extend to the existing lots on the southern side of Sandon Drive for either the existing or changed climate scenarios. CFR's 2008 report also show that the Sandon Drive low point is inundated during the PMF event to a depth of 1.2 m in the climate change scenario, compared to 1.0 m under the existing climatic regime. This potentially restricts emergency evacuation. Such depths of PMF flooding cut off to emergency vehicle access via Sandon Drive to existing properties to the east, but this is not significant as any such isolation would be short-lived (i.e., the road would be cut off for a few hours only) and in any case access for emergency vehicles could still be achieved via Point Street and the cycle way along the beachfront reserve frontage, thus satisfying the requirement for emergency access to be available even under the (climate-changed) PMF event.

In regard to (iii), potential erosion where the upgraded reaches of Hewitts, Woodlands and Tramway creeks join the existing creek channels downstream) is minimally changed as a result of climate change and has been addressed in the previous application and accepted by DoP. CFR confirms that the designs presented satisfactorily address the potential for erosion at these locations.

Issue 2 Flood Planning Levels

ISSUE 2 Flood Planning Levels — the CFR08 rationale to support design flood planning levels for new development is unclear and this may lead to an exposure of new development on the floodplain to flooding. DECC notes that CFR08 challenges the hydraulic modelling parameters recommended by Council, DECC and the Commission of Inquiry findings. As the results in Chapter 6 of CRF08 indicate, climate change and natural vegetation growth in the channel has the potential to increase design flood levels in the order of 1 m (1% AEP) and 2-3metres (PMF) above those currently proposed.

Comments in section 6.2 also indicate that the recommended flood planning levels assumes that culvert upgrade works will be undertaken and this cannot be guaranteed given the complexities and funding constraints associated with Council upgrading high cost Railcorp assets. It also remains unclear as to why estimated increases of flood levels due to climate change in the order of 300-500mm have not resulted in any recommended increase in flood planning levels.

Agency DECC Letter dated 7 July 2008

In regard to DECC's first point which challenges the hydraulic modelling parameters adopted by CFR, please refer to Issue 43 in Part A.

DECC's second point was that CFR should not base recommended flood levels on culvert upgrade proposals as funding cannot be guaranteed. However CFR has ignored culvert upgrade proposals for Hewitts Creek for the existing climate scenario, and has only assumed that the upgrade works will be completed for the climate change scenario, which is based on upper-bound climate change predictions in 100-year's time. It had been CFR's assessment that, delays notwithstanding, Council would have completed the works within 100 years given that they have already committed to the community that the works are high priority ('within 5 years'). Indeed, Council's website (as at 30 October 2008) says:

"...Woodlands Creek, Bulli - upgrade of railway culvert

Significant flooding is also known to occur in the area immediately upstream of the Illawarra Railway line embankment (including the Princes Highway) due to the inadequate capacity of the existing culvert beneath the railway line and its potential to block with debris. This project aims to reduce the incidence of flooding along the section of Woodlands Creek immediately upstream of the railway embankment by upgrading the existing culvert system. As a result, the capacity of the upgraded system will be significantly increased, therefore reducing its potential to block, and resulting in lower flood levels upstream of the railway line.

The project is currently in the preliminary design phase." [i.e. Council's Project].

DECC's third point was that CFR's flood planning levels are inappropriate as CFR assumed that currently unfunded culvert upgrade works will be undertaken. We acknowledge that the high priority flood mitigation works (to be completed 'within 5 years') involving amplification of the Woodlands and Tramway Creek culverts will depend on the availability of funding. Council has not been able to meet this component of its Plan to date, as 5 years have already passed and the works have not been undertaken. Nevertheless, the Plan still stands and no other alternative cost-effective flood mitigation measures have been proposed. It is not unreasonable therefore to expect that funding for works that local and state government considers 'high-priority' (within a nominal 5-year planning period) will be completed by the year 2030 when the flood risk effects of climate change are expected to start to become apparent (but well before the full impacts expected over a 100-year planning horizon as modelled by CFR). This is discussed further at the response to WCC comment at Issue 52 in Part A..

DECC's fourth point was that additional freeboard should be provided above calculated flood levels. CFR do not agree as the application has been entirely consistent with the freeboard measures specified in DCP54, as discussed further in Issue 41 in Part A. CFR contends that DCP54 is the appropriate document to use and note that it has been formally adopted by Council and is used to assess the flood risks of every other development in the Wollongong LGA. DCP54 was formulated through the Floodplain Risk Management Plan preparation process stipulated by the NSW Government's Floodplain Development Manual, with the involvement of DECC.

CFR also note that the 'estimated increases of flood levels due to climate change in the order of 300-500mm' represents the upper bound case of a 30% increase in rainfall nominated in DECC's 2007 climate change guideline. DECC's guideline indicates that increases of 10%, 20% and 30% should be considered, but does not advocate that the

upper end of this predicted range must be adopted - only considered. It is contended that this has been done and hence CFR stand by the assessment.

Issue 3 Freeboard

ISSUE 3 *The adoption of a 0.5 metre freeboard provision is unlikely to account for the range of uncertainties in the design flood levels at this site of which climate change is only one.*

Agency *DECC Letter dated 7 July 2008*

Refer to Issue 2 in Part A, above.

Issue 4 Channel Stability

ISSUE 4 *[channel stability]As identified in section 6.3 and Appendix I, the design channel velocities and shear stresses exceed stability thresholds for natural stream treatments. It is noted that a simplistic approach has been taken in CFR08 for stability threshold analysis and quoted velocities are averaged and localised velocities are not estimated.*

It is also noted that shear stresses will exceed stability thresholds for natural treatments for much of the channel length even in frequent design floods (i.e. 5 year ARI).

Agency *DECC Letter dated 7 July 2008*

CFR do not agree with DECC's comment that a 'simplistic' stability threshold analysis has been undertaken with regard to the Climate Change assessment and that quoted velocities are averaged. The velocities referred to in Figures 6.4, 6.5 and 6.6 are channel velocities, and are not velocities averaged across the floodplain. It is thus not correct to say that CFR's analysis is simplistic through averaging of calculated velocities. As noted in CFR's Letter 003 responding to the WCC comments (refer to Issue 41 in Part A in response to WCC comments), the Project Application drawings dated March 2007 do show use of cobbles in various locations but it is noted that these drawings (CFR drawings 1702-1709) were prepared with respect to existing climatic conditions, and need some minor revisions to show the additional armouring required for the climate change scenario. This could be ensured as a condition of approval.

Issue 5 Woodlands Creek Stream Design

ISSUE 5 *Given that the stream design is largely unchanged, the prior advice to DoP from State Government agencies, Council, the Col findings and the Patterson Britton report (January 2007) remains relevant and concerns regarding future erosion of the watercourses have not been addressed. It also remains of concern that solutions that meet both stability and ecological function requirements via wider riparian zones (with increased stream meander to reduce energy and velocities to acceptable levels) have not been considered or proposed.*

Agency *DECC Letter dated 7 July 2008*

The stream design for Woodlands Creek (the main issue raised by Patterson Britton) has been substantially changed from that indicated in the original concept application. The riparian corridor has been considerably enlarged, particularly for Woodlands Creek. In addition stream meanders have been incorporated, as evident on CFR Drawings 1705 to 1707.

The width of the Woodlands Creek corridor has been substantially increased, with the lower (eastern) section of the riparian corridor widened to around 100m. This resulted in a complete revision of the proposed lot layout and in turn affected flood levels, flood behaviour and the extent of flooding, as can be seen by comparing CFR2008 to the 2006 Stormwater Masterplan prepared by Brown Consulting. Together with the widening of the riparian corridor a low flow channel has also been included in the design of Woodlands Creek.

Issue 6 Hard Engineered Structures

ISSUE 6 *It is therefore clear that the current proposal will lead to hard engineered channel treatments and this substantially departs from the NSW Government's position for natural stream treatments and rehabilitation of ecological function as set out in policy, best practice guidelines, the Illawarra Regional Strategy and the NSW State Plan. Given the regional significance of Woodlands Creek in particular, and the ability to implement natural stream treatments that provide both stability and appropriate ecological function (as per. the Col findings, prior advice of the Department and the Patterson Britton report) these are considered liabilities that could otherwise be avoided. In addition to the ability to implement an appropriate channel design, opportunity also exists for the approval authority to require a bond from the proponent (to cover the cost of channel reconstruction following a major flood) to protect the Government and local community from associated cost liability.*

Agency *DECC Letter dated 7 July 2008*

The designs proposed do not rely on hard engineering structures (i.e., concrete and gabion mattresses), but only use native grasses, cobbles and (in some limited locations)

boulders. Indeed, parts of the gabion lining of Hewitts Creek are to be removed as part of the project and replaced with native grasses and cobbles. Refer also to Issues 41 and 42 in Part A of this document responding to similar issues raised by WCC.

Issue 7 Regional significance of creek systems

ISSUE 7 *It appears that the current proposal still does not adequately recognise the regional significance of the creek systems as evidenced by reduced buffer widths and treatments that compromise the rehabilitation of the natural stream functions. It remains unclear, and a serious concern why the adverse flood impacts of the proposed development still have not been estimated and the impacts of flooding on the proposed development and creek stability (both on and off the development site), including those associated with climate change, have not led to any change in the proposal.*

Agency *DECC Letter dated 7 July 2008*

CFR has confirmed that the current proposal incorporates amendments to drawings as required by the Concept Plan approval, including a widened corridor for Woodlands Creek. CFR therefore contends that the current proposal does recognise the regional significance of the creek systems and is consistent with the Minister's conditions of approval.

The issue of climate change has been addressed in CFR's 2008 report, which demonstrates that associated changes to the impacts of flooding on the proposed development and creek stability are not significant. The potential adverse flood impacts of the proposed development are addressed in CFR's 2008 report (refer sections 6.2, 6.3, 7.3, 7.4 and 8.2) and within this letter.

Issue 8 Location of Bio-retention ponds in riparian corridors

ISSUE 8 *DECC previously commented (correspondence dated 20 November 2007) on the location of bio-retention ponds that were located outside the Stockland's site and within the riparian corridors. It was recommended that they be relocated outside the corridors due to the presence of endangered ecological communities and potential Aboriginal cultural heritage values. DECC understands that the location of the bio-retention ponds is outside the 30m wide riparian corridor (Figure 02 Brown Consulting). However, DECC remains concerned about the siting and construction of these ponds, particularly as they directly abut the "core" riparian zone and may involve areas of endangered ecological communities that would be lost as a result of the construction. The above matters could be partially addressed in any conditions of consent that are prepared should the proposal receive approval.*

Agency *DECC Letter dated 7 July 2008*

Modification A1 to Schedule 2 of the Concept Plan approval states:

- “(2) the following development may occur on land outside the development footprint shaded grey (including land hatched pink) on the map at (4)
(a) On Stockland Lands, Associated works.”*

Associated works are defined in A2 to Schedule 1 of the Concept Plan approval to include *(ii) the construction of water quality ponds and structures and (iv) flood mitigation works*. The location of bio-retention ponds within the riparian corridors is therefore consistent with the Concept Plan approval.

Issue 9 Vegetation structure of riparian corridors

ISSUE 9 Vegetation structure of riparian corridors is more like parkland than a well vegetated corridor with a healthy interconnected tree canopy, mid canopy and shrub layers. Concern that landscaping may compromise the ability to restore and maintain as a natural area.

Agency DECC Letter dated 7 July 2008

As noted in the Vegetation Management Plans (VMPs) prepared by Cumberland Ecology (Appendix K to the EAR), planting structure and densities will correspond with the existing VMP for Tramway Creek, prepared by Sainty and Associates, 2001 and densities as described by the NSW Scientific Committee for the EECs. In establishing planting densities and future vegetated structure of the riparian corridors, Cumberland Ecology reference the DNR Riparian Corridor Study, 2004 which suggests an overarching objective of riparian plantings in the Illawarra is to create a sub-tropical rainforest vegetation type with associated enclosed canopy. Cumberland Ecology note that the VMP (Appendix K) accords with this objective. They also note that the density will become progressively thinner towards the outer edge to facilitate view shafts into the corridor which is also consistent with DNR's 2004 study (Refer Section 6.7.5 of Appendix K).

Issue 10 No changes to proposed layout

ISSUE 10 DPI notes that the EA and Concept Plan for the Stockland site have been revised and amended to make it consistent with the Project application. However DPI notes that there have been no changes to the proposed layout of the subdivision development following the recent LEC judgement and subsequent climate change assessment by Cardno Forbes Rigby.

Agency DPI Letter dated 20 June 2008

The DPI's comments relate to the Revised Concept Plan application. The Concept Plan approval is valid following the decision of the Court of Appeal. The subdivision layout proposed in the Project application is consistent with the layout assessed in Cardno Forbes Rigby's climate change assessment.

Issue 11 Location of water quality ponds in managed riparian buffer is not best practice

ISSUE 11 *Water quality control measures (e.g. pocket wetlands) are still proposed to be located within the managed riparian buffer zones. Their location within the riparian buffer zones is not considered best practice environmental management as it potentially compromises the future ecological values of the rehabilitated waterways and riparian corridors. Recommend ponds located outside riparian buffer zones.*

Agency **DPI Letter dated 20 June 2008**

This issue is addressed at Issue 8 in Part A (above) and the location of the water quality control measures within the riparian corridors is consistent with the Concept Plan approval.

Issue 12 Agreement with Statements of Commitment

ISSUE 12 *DPI agrees with*

- *proposed water quality monitoring*
- *carrying out of further testing for potential acid sulphate soils prior to construction*
- *road and pedestrian bridge designs in context of DPI's fish friendly policy*
- *establishment and maintenance of aquatic and riparian vegetation in VMP*

Agency **DPI Letter dated 20 June 2008**

We note the DPI's agreement to certain aspects of the Project and Statements of Commitment as itemised above.

Issue 13 Best practice erosion and sediment control

ISSUE 13 *DPI expects any approval to require implementation of Best Management Practice with respect to erosion and sediment control during construction. Implementation of these measures is essential to mitigate impact on water quality and safeguard the aquatic environment downstream.*

Agency **DPI Letter dated 20 June 2008**

CFR has prepared a Supplementary Flood Study report which is contained at Appendix L of the EAR. Section 5 of the Study contains the soil and water management measures proposed for the site which has been prepared following the Blue Book prepared by the Department of Housing.

Issue 14 Insufficient information on size and extent of riparian buffer zones

ISSUE 14 *Insufficient information on size and extent of riparian buffer zones. Details should be provided at Project application stage.*

Agency **DPI Letter dated 20 June 2008**

This comment appears to be related to the Concept Plan. The Project application details the width of the riparian zones. Each riparian zone is comprised of a core riparian zone (CRZ) and each side of the riparian zone is a managed buffer zone (MBZ) which contains defensible space for bushfire protection and WSUD measures. This approach is clearly illustrated in Figure 17 of the EAR and Section 4 – Riparian Corridors of the Landscape Report prepared by EDAW and attached at Appendix 4 to the EAR.

Issue 15 Insufficient information on design and location of stormwater control measures and flood management

ISSUE 15 *Concurs with proposed WSUD, but insufficient information on the design and location of the proposed stormwater control measures and flood management. Details should be provided at Project application stage.*

Agency **DPI Letter dated 20 June 2008**

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application. As noted by DPI, detailed designs can accompany future Project application(s).

Issue 16 Requirement for downstream water quality monitoring

ISSUE 16 *Approval should include a requirement for monitoring of water quality downstream in Cookson and Tramway Creeks.*

Agency **DPI Letter dated 20 June 2008**

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application.

Issue 17 Requirement for ASS Management Plan

ISSUE 17 *Approval should include a requirement for the development and implementation of an Acid Sulphate Soils Management Plan*

Agency **DPI Letter dated 20 June 2008**

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application.

Issue 18 Environmental safeguards

ISSUE 18 *Approval should include a requirement that safeguards and measures in Statements of Commitment are fully implemented.*

Agency *DPI Letter dated 20 June 2008*

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application.

Issue 19 Erosion and sediment erosion control

ISSUE 19 *Implementation of best management practice with respect to erosion and sediment control during construction and appropriate and effective measures to be incorporated into a comprehensive soil and water management plan.*

Agency *DPI Letter dated 20 June 2008*

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application.

Issue 20 RFS raises no issues in relation to bush fire

ISSUE 20 *No issues raised*

Agency *RFS Letter dated 18 June 2008*

It is noted that the RFS does not raise any issues in relation to the proposed development the revised EAR.

Issue 21 PMF and evacuation

ISSUE 21 *The SES's assessment of the Sandon Point proposal is based on a core flood emergency management requirement i.e. in the event of a flood it must be possible for people to be evacuated to a site where they are no longer at risk from rising floodwater. This means that people must be able to reach an area that is above the highest possible flood level, the Probable Maximum Flood (PMF). The 1% Annual Exceedance Probability (AEP) flood level is not a suitable standard for risk to life.*

Agency *SES Letter dated 20 June 2008*

CFR agree with the SES that the 1% Annual Exceedance Probability (AEP) flood level is not a suitable standard for risk to life, and confirm that they have used a higher standard, being the Probable maximum Flood (PMF).

The proposed development has been designed in accord with the SES's comments. None of the lots adjoining Hewitts or Woodlands Creek are affected by PMF flooding, nor is the ARV site. The only part of the site affected by PMF flooding is residential Stage 5 on the southern side of Tramway Creek, where 2 lots only are marginally affected by the PMF event. Residents of these lots are readily able to 'evacuate' to land above the PMF by walking to the other side of their lots and onto the (flood-free) street. As further discussed in section 8.2 of CFR's 2008 report, this is in accordance with DCP54 'Managing our Flood Risks' and Council's adopted Hewitts Creek Floodplain Risk Management Plan (which was formulated through the process stipulated by the NSW Government's Floodplain Development Manual, with the involvement of the SES).

Issue 22 Flood evacuation contradictory

ISSUE 22 *This development appears to be based on the intention of having all residential land (as opposed to just flood levels) located above 1% AEP plus 500mm freeboard and trafficable access in the event of flooding up to the 1% AEP flood event. The net result of this approach is that most of the residential land will be above the level of the PMF. This leads to a general conclusion in the reports that flood evacuation capability is not a necessary consideration.*

However, there is an apparent contradictory statement in both Part 2 of the Environmental Assessment as well as in the Surface Water Management Report by GHD, which refers to measures which mitigate the impacts of flooding on the proposed development including "Flood risk management using flood planning levels and flood evacuation."

Agency **SES Letter dated 20 June 2008**

CFR has confirmed that the both the Stockland and ARV components of the Concept Plan area is served by a road network that can provide access in all floods including the PMF flood event.

Issue 23 Flood evacuation

ISSUE 23 *It is unclear how it is intended to address the issue of flood evacuation other than providing a 'muster area' within the complex which appears to be located on a 'flood island'.*

Agency **SES Letter dated 20 June 2008**

This comment refers to the ARV component of the Revised Concept Plan application and is not relevant to the Stockland's Project application.

Issue 24 Frequency shift of flood events

ISSUE 24 *In the assessment of climate change impacts it is forecast that over time, the frequency of flood events of a particular magnitude may change. The sites which are above the level of flooding attributed to the Probable Maximum Flood (PMF) of today, are forecast to progressively lose this safety factor. There is however no explanation of the consequences of this frequency shift which will in fact progressively change the risk profile for this site.*

Agency **SES Letter dated 20 June 2008**

As indicated above, it is reconfirmed (CFR 2008, s.8.2) that none of the lots adjoining Hewitts or Woodlands Creeks nor the ARV site are flood prone (with respect to the PMF event) when calculating flood levels using conservative roughness parameters under an 'upper bound' climate change scenario.

The proposed Stage 5 residential lots adjoining Tramway Creek are marginally affected by PMF flooding but not the 1% AEP event. This is allowable under Wollongong Council's DCP54 provided that various prescriptive controls are followed, including minimum floor levels and an evacuation strategy in the PMF event where required. In the case of residential development habitable floor levels need to be raised 500 mm above 1% AEP flood levels, which is readily achievable for the proposed Stage 5 lots. Evacuation can also be readily undertaken via the proposed subdivision road which quickly rises (over a distance of less than 100 m) to land above the PMF. This situation does not vary for the climate change scenario.

Issue 25 Access roads may progressively become susceptible

ISSUE 25 *It is our understanding that the development as it is proposed today will be based on 1% AEP flood level plus 500mm of freeboard, placing most sites above the level of the current PMF. However, the implication of what is forecast under climate change is that at some time in the future, these same sites may be closer to the 1% AEP flood level and with little or no freeboard. These sites will no longer be 'flood free' in the true sense of above PMF. This means that if it is assumed that people are not at risk of drowning if they do not evacuate under current flood levels, then in the future that risk will become a factor making evacuation essential. In a similar way, the access roads which may only be affected by less frequent floods under present circumstances (i.e. only floods >1% AEP), may progressively become susceptible to more frequent floods, thereby increasing the isolation risk.*

Agency **SES Letter dated 20 June 2008**

The SES's understanding is not correct. Refer to Issue 24 above.

Issue 26 Risk to people

ISSUE 26 *The risk to the people is caused by the fact they will be totally isolated from the rest of the community during large flood events. The risk from isolation is one that must not be down-played or assumed to be irrelevant. Land and Environment Court cases in which the SES has been involved over recent years have identified three specific risks that must be considered. These are the risk of a resident experiencing a serious and life threatening injury or medical emergency such as a cardiac arrest or stroke, the risk of a fire breaking out in a building, and risk of requiring intensive external support to maintain reasonable living conditions - what the SES terms resupply.*

Agency **SES Letter dated 20 June 2008**

CFR contend that this is a matter that was previously addressed and does not arise as a consequence of the climate change assessment. As with the Concept Plan application, the only isolation that will occur is the same 'isolation' which affects all residents between Thirroul and Coalcliff, who were cut off in the flood of August 1998. Lawrence Hargrave Drive was impassable south of the Bulli Pass intersection or north of Coalcliff in the August 2008 flood (which was approximately a once in 50-year event).

If this issue is held to be a concern in regard to the proposed development, then this would imply that no further development should be permitted in the northern suburbs of Wollongong between Thirroul and Coalcliff. We do not agree that this is an issue that would render the proposal unacceptable.

Issue 27 Vulnerability of community

ISSUE 27 *In the case of an aged care or retirement facility proposed as part of this development it stands to reason that these issues must be addressed in a more detailed manner given the vulnerability of the community at risk.*

Agency **SES Letter dated 20 June 2008**

This comment refers to the ARV project and is not relevant to the Stockland's Project application. Nevertheless, it is confirmed that the ARV site is above the PMF and a flood-free evacuation route is available between the site and existing services in Thirroul.

Issue 28 Risk creep

ISSUE 28 *It is recommended that prior to any approval being given, the issues of consequential risk creep due to climate change and the risk associated with isolation (both now and into the future) are considered in more detail than is currently the case in the assessment reports*

Agency **SES Letter dated 20 June 2008**

This has been done in section 8.2 of CFR's 2008 report, is further discussed at the response to WCC comment at Issue 44.

Issue 29 New application

ISSUE 29 WCC understand that DoP is considering the current Concept Plan MP006-0094 as a new application

Agency WCC Letter dated 7 July 2008

This comment relates to the additional information submitted to the Department of Planning in April 2008 which became known as the 'Revised Concept Plan Application'. After the submission of the 'Revised Concept Plan, and its public exhibition, the NSW Court of Appeal has ordered that the Minister's Concept Plan Approval of 21 December 2006 still stands. Therefore, there is no need to re-determine the Concept Plan application with its additional information.

Issue 30 Amendments to Concept may require amendments to Project application

ISSUE 30 Amendments to Concept may require amendments to current Project application

Agency WCC Letter dated 7 July 2008

A Flood Study Climate Change Assessment has been submitted as additional information for the Project application. The climate change assessment supports the layout as proposed in the Project application (MP07_0032). Therefore there is no need to amend the Project application as submitted.

Issue 31 Overall concept

ISSUE 31 The overall concept contains a mix of old and new reports containing conflicting details.

Wrexham Road not included

WCC owners consent not obtained

Agency WCC Letter dated 7 July 2008

This comment relates to the 'Revised Concept Plan' which following the NSW Court of Appeal's decision does not need to be re-determined.

Owners consent from Wollongong City Council has been obtained for the Project application (MP07_0032).

The comments regarding Wrexham Road access relate to the Revised Concept Plan application which is valid. The Wrexham Road access has been included in the Project application.

Issue 32 Urban Design

ISSUE 32 WCC notes that revised location of medium density location could improve public permeability

Agency WCC Letter dated 7 July 2008

It is noted that Council supports the revised location of the multi-unit housing super lots.

Issue 33 Integrated landuse & transport

ISSUE 33 Permeability for pedestrians and vehicles through retirement village site is limited.

Development relies on extension of Wrexham Road, staging should ensure Wrexham Road extension is completed in first stage.

Agency WCC Letter dated 7 July 2008

The comment regarding permeability relates to the ARV component of the approval and does not relate to Stockland's Project application.

Stockland's residential subdivision provides an appropriate balance between pedestrian and vehicular access through the site, and safety and security for residents. Pedestrian access is provided through the site and in particular through the environmental protection corridors and roads. Road access is provided primarily through the proposed new north-south link road to improve road links through the locality.

The Subdivision Layout Plan, February 2007 included in Appendix C to the EAR confirms that the Wrexham Road extension forms part of the first stage.

Issue 34 Statutory considerations

ISSUE 34 Restriction as to user on allotments affected by rail noise and vibration

Consideration for community title subdivision to ensure infrastructure is maintained under the community title scheme

APZ to Turpentine forest must comply with Planning for Bushfire Protection without significant impacts on the Turpentine forest

RFS concurrence to proposal

Agency WCC Letter dated 7 July 2008

The draft Statements of Commitment to the Project application contain a commitment that restrictions as to user will be placed on the title of allotments affected by rail noise.

Rail related noise impacts on the ARV land is not relevant to Stockland's Project application.

Community Title subdivision relates to ARV's site and is not relevant to Stockland's Project application.

The RFS raises no issues with bushfire protection in its submission to Stockland's Project application (refer Issue 20).

Issue 35 Heritage Considerations

ISSUE 35 Aboriginal heritage- recommendations of Preliminary Aboriginal Assessment report dated February 2005 by Mary Dallas to be adopted as conditions of approval.

Turpentine Forest – VMP to be prepared and implemented. Options should be explored to ensure a legal responsibility to implement VMP.

Historical Archaeology – excavation permits to be obtained and further investigations undertaken prior to development. Heritage Branch of DOP should be consulted to advise on legal requirements relating to potential relics.

Interpretation – heritage interpretation plan should be prepared for interpretation of Aboriginal heritage values (in consultation with the Aboriginal community), the brickworks, Woodlands Cottage and natural and cultural values associated with the Turpentine Forest and Woodlands Creek.

Agency WCC Letter dated 7 July 2008

Comments regarding Aboriginal Heritage and the Turpentine Forest relate to ARV's component of Concept Plan and are not relevant to Stockland's Project application.

Section 75U of the EPA Act provides that the requirement to obtain a permit under Section 139 of the Heritage Act does not apply to an "approved project". The Heritage Office's response dated 3 August 2006 in relation to the Concept Plan application recognised this fact. The Heritage Office's comments in relation to the Project application are addressed in Issue 10 of Part B of this document.

A Heritage Interpretation Plan (HIP) has been prepared and is contained in Appendix T to the EAR which includes interpretation of Aboriginal heritage values, the Thirroul Brickworks and Woodlands Cottage. The comment in relation to the natural and cultural values of the Turpentine Forest relates to the ARV component of the now approved Concept Plan. The HIP relates solely to Stockland's site and does therefore not address the Turpentine Forest which is located on ARV's land.

Issue 36 Infrastructure and Servicing

ISSUE 36 *Design and impact on ongoing maintenance burden of assets (roads, bridges, footpaths, drainage works and open space) needs to be considered.*

Bridges over railway line to be ownership of relevant rail authority

Water, sewer and energy providers to confirm ability to service the development.

Consideration of maintenance and damage to existing assets

Proponent should dedicate land to facilitate connectivity between the proposed extension of the pedestrian cycleway and existing cycleway to an agreed Council standard.

5 year maintenance plan for Regional park, riparian corridors and road works.

Agency **WCC Letter dated 7 July 2008**

Volume 4: Sandon Point Submission to the Minister for Planning Agreement for Infrastructure forming part of the Concept Plan package sets out the proposal for future ownership and management of roads, bridges, footpaths, drainage works and open space. Council at its meeting on 1 June 2007 considered the draft VPA contained in Volume 4 and resolved in part as follows:

- “1. *Council endorse, in principle, the entering into a Voluntary Planning Agreement with Stockland Development Pty Ltd generally in accordance with the terms of the Voluntary Planning Agreement attached to the report.*

The Planning Agreement submissions set out that the Wrexham Road connection, rail bridge and intersection works would be managed and owned by Council. CFR's response at **Appendix B [reference CFR Response 002]** notes that Council took ownership of a similar railway bridge in Haywards Bay.

During the COI, Sydney Water stated that water and sewerage facilities can be made available to the site, and that there is adequate capacity in the existing trunk water and sewerage systems to service development at Sandon Point. CFR has liaised with utility providers as documented in the Concept Plan application and Section 3.5.13 of the Project application EAR. CFR has established that there is sufficient capacity within existing networks for the development.

Damage to existing Council assets is a consideration for all new developments and it is normal practice for the Developer to be responsible for making good any damage

caused to Council's assets as a result of construction, which can form a condition of approval (refer Issue 9 in Part B).

We assume that the reference to the dedication of land to facilitate the connection of the cycleway is a reference to the extension of Wilkies Walk to the regional foreshore cycleway. The potential connection to the foreshore is proposed over land owned by Stockland. The transfer of Stockland's land to Council is set out in the Voluntary Planning Agreement attached at Appendix F to the EAR. The VPA identifies land which is either "*Open Space Lands*" to be dedicated or transferred to Council free of charge or "*Section 94A Lands*" to be transferred to Council. The cycleway connection is located over both "*Open Space Lands*" and "*Section 94A Lands*" enabling the cycleway to be located on land that will ultimately be within Council's ownership. Cycleways within the subdivision are within road reserves which will also be dedicated to Council.

Volume 4 relating to the future Planning Agreement, has been endorsed by Council in principle and addresses maintenance of infrastructure including the sections of the regional park and road works subject of the application. The VPA sets out when land will be dedicated and Stockland's maintenance obligations in relation to the infrastructure facilities as follows:

- All riparian corridors will be maintained for 2 years after date of registration of the plan of subdivision which identifies the open space lands as separate lots of land;
- All riparian corridors will be dedicated or transferred to Council free of charge 2 years after date of registration of the plan of subdivision which identifies the open space lands as separate lots of land;
- Road works (6 months).

After the expiration of the maintenance periods, these facilities will be managed by Council.

Issue 37 Bridges

ISSUE 37 Detailed comments made in relation to the design and construction standard of all bridge structures

Agency WCC Letter dated 7 July 2008

With respect to the bridge structures proposed within the Sandon Point Development, the following comments have been provided by CFR.

Wrexham Road Bridge

The Wrexham Road Bridge is higher in elevation than the previous bridge due to changes to RailCorp design standards relating to clearances to trains. The detail design for the approach roads to the bridge is in the preliminary stage and CFR recognises that provision of acceptable vehicular access to the existing properties in Wrexham Road will need to be achieved.

The Hewitts Creek and Woodlands Creek bridges are preliminary designs to enable CFR to effectively model stormwater flows. The M-Lock bridge systems were developed by Cardno Bridge Unit in conjunction with Rocla Monier and will incorporate lateral post tensioning and asphaltic concrete decking as required.

Details with respect to vehicular and pedestrian barriers will be provided upon completion of detailed designs and provided when applying for construction certificate.

Design of kerb returns

Details of kerb returns will be provided at the detail design stage and will be consistent with Wollongong Council's Subdivision Code.

Details of the proposed road crossing of Tramway Creek will be provided at the detailed design stage, however CFR expect the type of bridge or culvert to be dependent on the outcomes of the stormwater modelling. This level of detail can be documented at construction certificate stage.

Draft conditions

The bridges throughout the subdivision including Wrexham Road Bridge will be designed in accordance with the relevant bridge design codes applicable at the time of preparing the construction certificate plans. The codes mentioned above are consistent with current design guidelines.

Issue 38 Pedestrian and cycle paths

ISSUE 38 Detailed comments made in relation to the design and construction standard of pedestrian and cyclepaths

Agency WCC Letter dated 7 July 2008

CFR has reviewed the conditions suggested by Council and they agree with the comments and will prepare final design plans in accordance with Council's suggestions when applying for construction certificate. This can be imposed as a condition of approval if necessary.

Issue 39 Traffic comments

ISSUE 39 Council disagrees with statements that indicate a very minimal traffic impact on the eastern section of Point Street and the adjacent coastal roads to the south. Traffic impact will now be greater than Stages 2 to 5.

Council has concern with potential adverse impacts on some local streets if that traffic uses the underpass and the Sturdee Street bridge. Council would like to see north-south link road constructed up front with traffic signals at the Lawrence Hargrave Drive/Wrexham Road intersection.

Agency WCC Letter dated 7 July 2008

The impacts to Point Street (east) have been considered in the Traffic Impact Report dated June 2007 prepared by Christopher Stapleton Consulting (CSC) attached at Appendix N to the EAR. This report considered a number of previous traffic studies prepared by CSC, Wollongong City Council and Gabites Porter (NZ) Pty Ltd (GPNZ)

(engaged by Council). CSC's report notes that traffic modelling was provided in the Sandon Point Traffic Impact Study prepared by GPNZ for Wollongong City Council. CSC's report summarises the findings of the GPNZ report. One of those conclusions was that *"the link road did not increase regional traffic flows along Point Street (east) or along the Coastal Route – i.e. the link road did not generate any significant regional re-routing (from the Lawrence Hargrave Drive-Princes Highway route)"* (page 5, CSC, June 2007).

Council's comment appears to be contradictory to the findings of their own study, and the findings reviewed by the COI and in the Charles Hill report. Notwithstanding, the proposed network is consistent with that approved as part of the Concept Plan approval.

In relation to the traffic signals at the intersection of Lawrence Hargrave Drive and Wrexham Road, Stockland commits to funding and installing the provision of the signalised intersection in its draft statement of commitments. Stockland will install the traffic lights prior to the occupation of Stage 1 unless the RTA has an alternate timetable that might delay their installation.

The underpass under the railway line will be used as the access point for Stages 1 and 2 of the development. This has been selected as it has the least number of residential adjoining residential properties and good sight lines to Lawrence Hargrave Drive (refer Appendix Q of EAR). The underpass however is a low point and susceptible to flooding. If the underpass is flooded the Wrexham Road access will be used (provided the bridge is constructed) or the Sturdee Avenue Bridge. The Sturdee Avenue Bridge is therefore not intended as a primary construction access point.

Issue 40 Discharge for 20 year ARI and channel capacity

ISSUE 40 The flood study by Cardno Forbes Rigby (CFR) dated March 2008 does not quantify the amount of discharge (flow) for the 20 year Average Recurrence Interval (ARI), nor does it confirm the capacity of the channels for the volume of flow for this recurrence period as required by the Director General.

Agency WCC Letter dated 7 July 2008

Flows for the 20 year ARI event were not included in the main body of text, but are fully detailed in Appendix F. The 20 year line was not shown on Figures 6.4, 6.5 and 6.6 as it clearly lies between the lines for the 5 year and 100 year ARI events. Irrespective of wherever the 20 year line plots between these two limits, the conclusions of the report are unchanged. Attachment A to CFR's letter (**Appendix A** of this report) contains figures with the 20 year lines added.

Issue 41 Channel design and stability

ISSUE 41 *The channel designs are inadequate to maintain channel stability up to the 20-year ARI as per the Director General's requirements for the climate change scenario. The scour protection proposed within the channels is only capable of protecting the channels up to a 5-year ARI based on the flow velocities and shear stress results found within the flood study.*

Agency **WCC Letter dated 7 July 2008**

It is agreed (as is stated in the CFR 2008 report) that native grass planting alone in the channel will ensure stability in events up to the 5 year ARI. For larger events, up to and including the climate change 'upper bound' 100-year event, the use of cobbles in localised areas, (and possibly boulders in some limited locations) will produce a stable channel design using natural materials.

The Project Application drawings dated March 2007 do show use of cobbles in various locations but it is noted that these drawings (CFR drawings 1702-1709) were prepared with respect to existing climatic conditions, and need some minor revisions to show the additional armouring required for the climate change scenario. This can be managed as a condition of approval.

Issue 42 Channel design for Tramway & Cookson Creeks

ISSUE 42 *No channel designs have been submitted for either Tramway or Cookson Creeks to allow a detailed assessment to be carried out with respect to channel stability.*

Agency **WCC Letter dated 7 July 2008**

This comment relates to the ARV's site however CFR has confirmed that there are no significant changes proposed to Tramway Creek. Essentially, it is to be retained in its existing form as proposed in the original application, which was accepted by DoP. The changes to velocities and shear stresses for Tramway Creek under the climate change scenario are minimal, as can be seen in the figures included as Attachment A to CFR's letter at **Appendix D** to this report.

Again, as with the original application, which was accepted by DoP, separate modelling by GHD confirmed that flows to be carried by Cookson Creek are still relatively small under the climate change scenario and can be readily engineered into final designs for the post-development landform.

Issue 43 Mannings 'n' value

ISSUE 43 *CFR have neglected to use the flood levels based on the extreme upper bound of roughness coefficient $n=0.2$ for the riparian corridors to determine flood planning levels for the proposed Sandon Point development. This may result in building platforms becoming inundated in the future due to the significant establishment and lack of maintenance of these riparian corridors.*

Agency **WCC Letter dated 7 July 2008**

It is not correct to say that CFR has 'neglected' to use the flood levels based on the extreme upper bound of roughness coefficient $n=0.2$ to determine flood levels. CFR used the same approach as in the original Concept Plan application, in that CFR considered flood levels based on the extreme upper bound of roughness coefficient $n=0.2$, but did not adopt them in settling flood planning levels. We contend therefore that this is a matter that was previously addressed and does not arise as a consequence of the climate change assessment.

We further note that CFR's 2008 report adopted Manning's 'n' values of $n = 0.10$ for the main channel and $n = 0.15$ for the overbank areas, to reflect the degree of planting/re-vegetation envisaged within the proposed riparian corridors for Hewitts, Woodlands and Tramway Creeks. These Manning's n values are significantly higher than those used in the calibrated model adopted by Council (i.e., the 2002 Hewitts Creek Flood Study), which used an n value of 0.05 for the channel and $n = 0.10$ for overbank flow reflecting the 'existing' creek vegetation at the time the study was conducted.

CFR also undertook sensitivity assessment using even higher Manning's 'n' values of $n = 0.20$ for both the channel and overbank areas (as requested by DECC). This is consistent with the approach adopted by Brown Consulting for the original Concept Plan application, which included a sensitivity analysis (in Appendix C of the May 2006 'Stormwater Concept Plan' report) of the effects on flooding behaviour of the high Manning's 'n' value of 0.2. Browns however did not adopt flood levels associated with these extreme 'n' values when setting flood planning levels.

In reviewing the results of flood modelling using the extreme upper bound of Manning's roughness of 0.20, CFR and GHD (the peer reviewer of CFR's 2008 climate change flood risk assessment) considered the use of such values of Manning's 'n' was inappropriate for large events as the very high flows in the 1% AEP and PMF events would tend to bend down or strip away protruding limbs of vegetation and thus reduce hydraulic roughness, particularly in the base of the channel where only low planting is proposed. The same approach as Browns used in the original application, which was accepted by DoP, is adopted.

It is observed that the Brisbane City Council Natural Channel Design Guidelines describe the vegetation community associated with a Manning's 'n' of 0.15 (as adopted by Browns) as "*Trees and shrubs at 1m spacings, some vines, low branches, fallen trees, difficult and slow to walk through*". This vegetation description does not correspond to typical densities associated with sub-tropical rainforest in the Illawarra

area where competition for light precludes the establishment of such plant densities – thus implies a significant degree of conservativeness.

It is further noted that the DWE has recently advised Kiama Municipal Council (letter dated 9 July 2008, in regard to a Land & Environment Court matter) that appropriate Manning's Roughness Values for vegetation/plant densities within Illawarra riparian corridors should be 0.10 to 0.12 (left and right overbank) for the core riparian zone. These values are much less conservative than those adopted by CFR.

Issue 44 DECC Climate Change Management Strategy

ISSUE 44 The flood study has failed to consider the optimum climate change management strategy as recommended by the Department of Environment and Climate Change (DECC) for new developments. In particular, a higher flood planning level is recommended for such development, which provides a factor of safety in addition to the general freeboard. The view adopted by CFR reflects the climate change impacts being absorbed within the general freeboard and no additional factor of safety for inaccuracies within the flood modelling.

Agency WCC Letter dated 7 July 2008

CFR does not agree that they have failed to consider the 'optimum' climate change management strategy as recommended by DECC for new developments. The suggestion by Council to adopt a higher flood planning level in this case is inconsistent with Council's current adopted Policy as currently contained in DCP54 'Managing our Flood Risks'.

DCP54 provides schedules of prescriptive controls relating to the floodplains for which local Floodplain Risk Management Studies and Plans have been prepared and adopted by Council. Schedule 4 contains prescriptive controls specifically relating to the Hewitts Creek catchment (which also includes the floodplains of Slacky, Woodlands, Tramway and Thomas Gibson Creeks). One of the prescriptive controls in DCP54 (relating to 'Flood Planning Levels') is the provision of freeboard in setting floor levels above calculated 1% AEP flood levels for residential development (and above PMF levels in the case of aged care developments).

The provisions of *Wollongong DCP54 Managing Our Flood Risks* are complied with. The objectives of DCP54 are primarily directed to minimising risk to property and human life. The current prescriptive standards in DCP54 include a requirement that the habitable floor level of dwellings be no lower than the current 100 year flood plus 0.5m freeboard (which as presently defined includes an allowance for climate change). The proposed subdivision would allow for all future dwellings to be at a level above the current PMF and therefore more than complies (given that the PMF is typically 0.65 to 1.2 m higher than the 100 year flood in each of Hewitts, Woodlands and Tramway Creeks). This also provides for the ability for all future residents to shelter in place if necessary during floods up to a PMF (consistent with the requirements of DCP54) but as an additional measure the carriageways of all proposed internal roads are also to be constructed at a level above the current PMF.

Assuming Council is questioning the veracity of its own planning controls that deal with flood risk (inclusive of climate change) a further assessment has been undertaken to assess compliance with DCP54 in 100 years time applying the upper bound change scenario suggested by the DECC Guideline. The DECC Guideline suggests a procedure to assess additional flood risks that may arise due to climate change. There are some uncertainties associated with the degree of change, particularly with respect to rainfall intensities. Consequently the DECC Guideline suggests a sensitivity analysis applying different scenarios for change. After applying the upper bound scenario to the suggested planning horizon (100 years in the future) the proposed subdivision would still allow for all future dwellings to be constructed with habitable floors at a level above the PMF. Therefore the proposal more than complies with the DCP in the future after consideration of climate change flood risk as suggested by the DECC Guideline. In the upper bound climate change flood risk scenario only proposed lots 225 and 226 have any material affection by the PMF (albeit minor and unaffected in a 100 year flood) but remain capable of more than minimum compliance with DCP54. Additionally, the compliance of the proposal with the emergency management requirements of DCP54 remains unchanged.

Issue 45 Overtopping of railway embankment

ISSUE 45 The flood study fails to clarify the impact of flooding on the development due to overtopping of the railway embankment in the PMF event. This was identified within the Hewitt's Creek Floodplain Risk Management Study and Plan (2002), but was not explored within the recent CFR Climate Change Study.

Agency WCC Letter dated 7 July 2008

Flows overtopping the railway in the PMF event are directed back to the creeks within railway land between the track formation and the subdivision fill. The railway track levels at the creek crossings are at approx. RL 15.0 m AHD for Hewitts Creek and approx. RL 16.5 m AHD for Woodlands Creek. The rail embankment crest slopes down generally at a constant grade between these two points.

The railway land corridor between the track formation and subdivision boundary is approximately 10-15m wide sloping from west to east generally at a gradient of 1(V):5(H). The proposed subdivision fill will batter back toward this corridor at a slope of 1(V):2(H), effectively creating a channel between the rail embankment and subdivision. A concrete acoustic barrier approximately 2m high is proposed to be placed at the top of the subdivision batter, which will act as a flood levee on the upstream edge of the subdivision, until Woodlands Creek railway culvert is updated.

CFR has undertaken hydraulic modelling of flows in the rail corridor channel and modelling indicates that the channel will have sufficient capacity to relay any flows overtopping the railway in the PMF event back to Hewitts and Woodlands creeks in both the existing climate and post climate change scenarios, without any adverse impacts to the west of the railway line or to the proposed development. Under these conditions, PMF floodwaters are generally contained within the channel, although at some points

along the channel the flood level reaches marginally above the base of the concrete barrier. The acoustic barrier will be subjected to hydrostatic pressures in these areas and will be designed accordingly.

Modelled flood levels in the railway corridor channel are well below the railway embankment crest at all locations along the channel and floodwaters are excluded from the subdivision by a filling and/or the concrete acoustic barriers. This confirms that overtopping of the railway embankment during the PMF event will not cause inundation of the proposed subdivision lots, and there will be no impact on flood levels upstream of the railway embankment as a result of the proposed acoustic barriers. Refer Attachment B to CFR's letter at **Appendix A** of this report for outline of modelling, including location of cross-sections and calculated flood levels at typical sections.

Upgrading of the Woodlands Creek railway culvert is recommended as high priority in the Hewitts Creek Floodplain Risk Management Plan adopted by Council ('within 5 years') and a reduction in flows overtopping the railway embankment during high flow events will be achieved once this upgrade has taken place.

Even so, CFR confirm that the development has been designed to cater for 'maximised' peak flows in Hewitts Creek immediately downstream of the railway line for existing climate conditions (ie, without any culvert upgrade), reflecting the following blockage culvert status:

- The Lachlan St culvert is clear (which diverts less flow out of Hewitts Creek)
- The existing (non-upgraded) railway culvert at Woodlands Creek is 100%-blocked (which diverts more flow into Hewitts Creek)

The Railway bridge at Hewitts is 25%-blocked (which reduces dynamic attenuation by the informal basin above the railway), with flow passing to Hewitts Creek downstream of the railway by way of 'weir' flow over the railway formation.

The impacts of any railway overtopping flows on the proposed development will be further managed by appropriate configuration of the acoustic barriers which will be designed to wrap around the 'corners' of the subdivision and not to encroach into the riparian corridors of Woodlands and Hewitts Creeks.

Flows overtopping the railway in the PMF event at Tramway Creek are similarly directed back to the creeks within railway land between the track formation and the subdivision access road, as proposed in the Brown Consulting for the original Concept Plan application (May 2006 'Stormwater Concept Plan' report).

Issue 46 Flood modeling upslope of railway line

ISSUE 46 *The study does not reflect any flood modelling/analysis upslope of the railway line embankment for any of the watercourses (Hewitts/Woodlands/Tramway/Cookson), to determine whether any flooding impacts occur west of the railway line as a result of the proposed development. In particular, the impacts due to any afflux at the proposed bridges within the development and also the impacts due to the acoustic barriers proposed along the railway embankment and adjacent to the watercourses.*

Agency **WCC Letter dated 7 July 2008**

CFR has now modelled the proposed bridges over Hewitts and Woodlands Creeks for both unblocked and blocked conditions (i.e., 25% bottom-up blockage, and 100% blockage of handrails), for the 1% AEP and PMF events. It is confirmed that the blocked scenarios do not cause afflux at the railway. CFR have not specifically modelled the impact of acoustic barriers with a separate new model for PMF overtopping of the railway, but confirm that the acoustic barriers do not cause a problem. The modelled flood levels are tabulated in their letter attached at **Appendix A**.

In regard to Tramway Creek, we note that the new road bridge is a short distance downstream of the existing railway bridge and it is assumed that if the Tramway Creek road bridge could only be 25%-blocked if the railway bridge is 25% blocked. Further modelling has confirmed that under such conditions there are no flooding impacts west of the railway line as a result of the proposed development.

The modelling confirms that none of the bridges are overtopped in the climate changed PMF event under 'blocked' conditions. Modelling files are available to present to the independent reviewer on appointment.

It is not considered conceivable that any sensible design for Cookson Creek could result in afflux resulting in increased flooding impacts west of the railway line. Nevertheless, if desired, safeguarding against such an (implausible) adverse impact during subsequent detailed design of the site internal stormwater management (which would include Cookson Creek) could imposed as a condition of approval.

Issue 47 Council's Conduit Blockage Policy

ISSUE 47 *The flood study does not reflect compliance with Council's Conduit Blockage Policy, which states a 25% bottom up blockage for structures with a major diagonal opening width of greater than 6 metres. In particular, no obstructions were found within the Hec-Ras hydraulic model cross sections that represent a 25% bottom up blockage for any of the bridge structures. The flooding impacts due to this requirement needs to be clearly identified and fully investigated for all structures, including handrails on all bridge structures and the proposed footbridge.*

Agency **WCC Letter dated 7 July 2008**

The modelling referred to in the response to Issue 46 above also addresses this comment.

Issue 48 PMF & overtopping of creeks

ISSUE 48 The results of the flood study indicate flood levels for the Probable Maximum Flood (PMF) reaching/overtopping the structures over Hewitt's, Woodlands and Tramway Creek. This is likely to have an impact on the future lots although has not been clarified within the study.

Agency **WCC Letter dated 7 July 2008**

The modelling referred to in the response to Issue 46 above also addresses this comment.

Issue 49 Flooding impacts of footbridge

ISSUE 49 *The flooding impacts of the proposed footbridge, which spans across Woodlands Creek, and the proposed road crossing, which spans across Tramway Creek have not been referred to or modelled within the recent flood study by CFR.*

Agency **WCC Letter dated 7 July 2008**

CFR has confirmed that the modelling referred to in Issue 46 addresses this concern.

Issue 50 Inconsistency with respect to road bridge

ISSUE 50 *There is an inconsistency within the flood study with respect to the road bridge over Woodlands Creek. In particular, the Hec-Ras hydraulic cross section shows 3 rows of piers — the general arrangement bridge drawing by CFR only indicates 2 rows of piers.*

Agency **WCC Letter dated 7 July 2008**

Detailed designs have not yet been prepared for these bridges, but it is observed that 3 piers is the more critical case from the perspective of flood hydraulics. So if the flood hydraulics are acceptable for a 3-pier bridge, they would also be acceptable for a 2-pier bridge.

Issue 51 Flood modeling of Cooksons Creek

ISSUE 51 *No flood modelling has been undertaken on Cookson Creek to determine the impacts on the Retirement Village development due to climate change. This creek also needs to be analysed with detailed modelling by CFR, considering the recent Land and Environment Court ruling.*

Agency **WCC Letter dated 7 July 2008**

A separate simulation of Cookson Creek was not conducted in CFR's 2008 report as it is much smaller than the other creeks and hence consider readily manageable. The catchment of Cookson Creek upstream of the railway only amounts to some 1.7 ha, with the major part of the catchment of Cookson Creek (which total 6 ha at the confluence with Woodlands Creek) being the development site itself, so the management of Cookson Creek in effect falls under the internal stormwater management plan for the site. Separate modelling by GHD confirmed that flows to be carried by Cookson Creek are still relatively small under the climate change scenario and can be readily engineered into final designs for the post-development landform.

Issue 52 Assumption of culvert upgrades

ISSUE 52 *The flood modelling by CFR under the climate change scenario is only based on the amplification of all railway culverts west of the subject Sandon Point Development Site. The flood modelling should also examine the impacts of climate change on the subject and surrounding developments in the event of no culvert amplifications or only partial/staged amplification, since the recommendations with respect to culvert amplification were based on engineering judgement made at the time and may be subject to change in the future, and also highly dependent on funding being available for the given time for any proposed works.*

Agency **WCC Letter dated 7 July 2008**

The Hewitts Creek Floodplain Risk Management Plan adopted by Council states that the 'high-priority' upgrade of the Woodlands Ck Railway culvert is to take place 'within 5 years'

Council is correct in stating that CFR has assessed the climate change scenario based on the assumption that the 'high-priority' upgrade works proposed for the railway culverts at Woodlands and Tramway Creeks. This is considered a valid assumption as Council's adopted Plan for Hewitts Creek catchment indicates that these upgrade works are to take place 'within 5 years'. In comparison the climate change scenario will take 100 years to manifest to the extent assessed in the high-range scenario adopted by CFR.

CFR differ however in relation to the implications of Council's comment that the railway culvert amplifications were based on '*engineering judgment made at the time which may*

be subject to change in the future'. The August 1998 floods demonstrated the vulnerability to flooding of existing houses in the area between Hewitts and Woodlands Creeks upstream of the Illawarra railway line. The Hewitts Creek Floodplain Risk Management Study established that amplification of the Woodlands Creek railway culvert is the most effective way to mitigate flooding in these areas. It is both a practical and feasible solution. CFR do not see how it can be argued, 5 years on, that the upgrade of Woodlands Creek railway culvert is any less pressing than it was in 2003. Council's Plan in this respect was a sound one, and still is. CFR reaffirm that Council's 'engineering judgment' in identifying the works as high priority (to be completed 'within 5 years') remains in the best interests of the community. The effects of climate change will only put the residents upstream of the railway line at further risk should Council not implement the high-priority upgrade of the Woodlands Creek railway culvert.

CFR acknowledge Council's comment that the amplification of the Woodlands and Tramway Creek culverts will also depend on the availability of funding. Council has not been able to meet this component of its Plan to date, as 5 years have already passed and the works have not been undertaken. Nevertheless, the Plan still stands and no other alternative cost-effective flood mitigation measures have been proposed. It is not unreasonable therefore to expect that funding for works that local and state government considers 'high-priority' (within a nominal 5-year planning period) will be completed by the year 2030 when the flood risk effects of climate change are expected to start to become apparent (but well before the full impacts expected over a 100-year planning horizon as modelled by CFR).

It should also be recognised (as promoted by DECC's counterpart agencies in other states of Australia) that when assembling design assumptions for flood modelling that may be *'reasonable when considered in isolation, it is essential that the build-up of conservatism is not forgotten'*. We would contend that there is considerable build-up of conservatism in CFR's approach to date.

CFR's modelling has assumed that all of the following assumptions occur simultaneously:

- Assuming that where blockages occur, they involve 100% blockage of structures less than 6-m wide (despite only tenuous evidence that this actually happens in real floods. - it is rare that vegetation would create full and total blockage of a waterway structure) – this goes well beyond the requirements of the State Government Floodplain Development Manual, which does not require that culverts be considered fully blocked in the setting of flood levels.
- Assuming that culverts are 100% blocked at the peak of the flood, at which time the effects on calculated flood levels are the greatest - this is again a conservative assumption not fully supported by the data-set of historical flood blockages for the Wollongong Local Government Area.
- Further assuming the most adverse combination possible of culvert blockages (i.e., 'blocking' only those culverts that make flooding worse at a particular location, but leaving 'unblocked' those culverts which would serve also to make flooding worse) - this is a combination of low probabilities in that it implies blockage and flooding always happen at the same time, which is not correct. This assumption in effect makes calculated flood levels for the 1% AEP event of a probability much rarer than 1% per annum.

- Adoption of both the high range sea level increase and the upper-bound case of rainfall intensity increases described in DECC's climate change flood risk guideline (i.e., rather than adopting the mid-range scenarios)
- The inclusion of freeboard (of minimum floor levels over calculated flood levels) as a further factor of safety.

We contend that adding a further assumption that Council will not be able to find the funds within 100 years for works they say should be done within 5 years, in combination with the above conservative assumptions, is inappropriate.

Our modelling incorporates an allowance for increased flow in Woodlands Creek once the Woodlands-to-Hewitts diversion is reduced, for both the existing climate and the upper-bound climate change scenarios. Equally this design assumption has been applied to Hewitts Creek for the upper bound climate change scenario.

In regard to Tramway and Woodlands Creeks, flooding is actually made worse by Council's proposed culvert upgrade works. This worst-case arrangement has been taken into account in our modelling for the climate change scenario - even though the effectiveness of the Tramway Creek railway culvert upgrade proposal is questionable (as noted in the recommendations of CFR's 2008 report). Development proposals in these creeks are therefore not affected by Council failing to implement its Plan.

Issue 53 Tail-out works

ISSUE 53 The proposed tail-out works as stated in the CFR study for Hewitt's and Woodlands Creek are not consistent with the Hewitt's Creek Floodplain Risk Management Plan (FRMP). The FRMP recommends filling and closure of the existing diversion of Woodlands Creek into Hewitt's Creek and reinstatement of the original route of Woodlands Creek towards Tramway Creek. The reinstatement of Woodlands Creek involves excavation of an enlarged channel and rock armour bank protection through the downslope property. The CFR study proposes works primarily on the Stockland site, which is unsatisfactory since these 'incomplete works' have the potential to impose a greater risk to property downstream. This would also be contrary to the requirements imposed by the Department of Planning.

Agency WCC Letter dated 7 July 2008

It is not accepted that the proposed interim works on the Stockland site have the potential to impose a greater risk to property downstream.

Under existing conditions, the natural flood flows in Woodlands Creek are unable to pass through the undersized railway culvert and are diverted to Hewitts Creek. It is only when the Woodlands Creek railway culvert is upgraded will there be significant flood flows carried in Woodlands Creek downstream of the railway.

Tail-out works are proposed on the adjoining downstream land as an interim step in order for the works as designed to be constructed, in a manner commonly undertaken in

association with subdivision development. No cutting of the floodplain or adjacent areas is proposed. The re-diversion of Woodlands Creek into Tramway Creek, indicated as being a high priority in the Hewitts Creek Floodplain Risk Management Plan, is not a matter directly attributable to the proposed development. The tail-out drain can be readily upgraded in due course once Council negotiates permission with the affected landowner, and implements the adopted recommendations of the Floodplain Risk Management Plan.

Issue 54 Flood free access

ISSUE 54 *The flood study has not demonstrated how 'flood free' access will be available in the PMF event for the future occupants from both the proposed residential subdivision and retirement village, considering that overtopping of the railway embankment will occur in the PMF, as identified within the Hewitt's Creek Floodplain Risk Management Study and Plan (2002).*

Agency **WCC Letter dated 7 July 2008**

Flood-free access will be available in accordance with modelling adopting CFR's recommended Manning's n values (refer also to Issue 43 above in response to Council's comment and the response to SES comments).

Issue 55 Flood storage areas

ISSUE 55 *The flood study has not accurately or clearly documented the impact of the development on surrounding properties as a result of filling of flood storage areas, channelisation works on the watercourses and proposed bridge structures.*

Agency **WCC Letter dated 7 July 2008**

CFR contend that this is a matter previously addressed in the approved Concept Plan Application (which was assessed by the DoP and the DoP's independent reviewer Patterson Britton & Partners and found to be satisfactory), and does not arise as a consequence of the climate change assessment. Nevertheless, further detailed discussion of impacts of the development on surrounding properties is presented in Issue 40 of Part A. Filling of storage areas was envisaged in the original application, and is consistent with Council's OSD Policy which indicates that flood storage is not critical in the lower reaches of a catchment, and shows the Sandon Point Development Site being located within the 'concession' zone where OSD is not required.

Council has already made separate specific comments above on 'channelisation' works on the watercourses and proposed bridge structures which have been addressed above.

Issue 56 Water Quality

ISSUE 56 *Proponent to commit to monitoring 5 years after construction of the subdivision and associated dwelling, as well as annual water quality monitoring reports that include a yearly summary of results, trends and interpretation.*

Use of alum or polyaluminium chloride to flocculate sediment laden water in sediment basins raises pH. Water from basins not to be released unless pH is in range of 7.0 to 8.5.

Removal of invasive species entering ponds and wetlands every 10 years is insufficient. Monitoring for invasive weeds should take place throughout the year.

pH should be added to parameters to be measured in construction phase water quality monitoring.

Agency **WCC Letter dated 7 July 2008**

The Council's suggestion for a water quality monitoring to take place 5 years after subdivision and associated dwelling is unreasonable. Such a requirement is too open ended with no time limit as construction of the last dwelling could be many years after completion of the last stage of the subdivision.

Council in their submission dated 16 November 2007 proposes the following condition

"27 Water Quality Monitoring

Details on water quality monitoring must be submitted for approval of the Certifying Authority as part of the detailed design all water quality controls on the site. As a minimum, quarterly reports must be provided to Council until such time as the construction (including dwellings) in 80% of the catchment area of the creeks within the proposed subdivision are complete. Also, a yearly summary of results, trend analysis and interpretation must be submitted to Council the end of the calendar year. pH must be included a parameter to be measured."

This is standard condition imposed on residential subdivision development in the Wollongong Local Government Area and is a more reasonable approach. The conditions suggested by Council have been reviewed (as discussed in Issue 9, Part B) and Condition 27 is acceptable.

Issue 57 Riparian corridors

ISSUE 57 *Inadequate riparian zones for Tramway and Cooksons Creeks*

***CRZ should be measured from centre line of creek not top of bank.
Concept Plan should be amended to ensure recommended 20m CRZ
and an additional 10m vegetated buffer.***

***No clear plans provided on the width of the CRZ and vegetated buffer
for Woodlands and Hewitts Creeks.***

Agency WCC Letter dated 7 July 2008

The riparian zone to Cooksons Creek relates to ARV's site and is not relevant to Stockland's Project application.

The width of the riparian zones, including Tramway Creek was considered in detail as part of the Concept Plan application, and ultimately established in the Concept Plan approval dated 21 December 2006. The approval identified the developable footprint. The proposal does not encroach on the developable footprint including that area in the vicinity of Tramway Creek.

Details of the CRZ and buffers is illustrated in the Project application EAR prepared by DFP (Figure 17, SK41 at Appendix C and Appendix D).

Issue 58 VMP Monitoring Reports

ISSUE 58 *Monitoring reports recommended in VMPs to be submitted to Council as well as Stockland before handover of riparian lands.*

Agency WCC Letter dated 7 July 2008

WCC references the reporting procedure documented in the Vegetation Management Plans (VMP) for Hewitts, Woodlands and Tramway Creeks, prepared by Cumberland Ecology and contained in Appendix K of the EAR. Section 11.1.2 – Reporting of the VMP states that annual reports will be forwarded to Stockland. WCC is suggesting that such reports are also forwarded to Council given that the land will be transferred to Council. Stockland agrees to this being imposed as a condition of approval.

Issue 59 Geotechnical Comments

ISSUE 59 *Council notes that geotechnical reports appropriate for subdivision concept plan, however follow up reports required at CC stage and during construction.*

Agency WCC Letter dated 7 July 2008

Noted.

3 November 2008

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Issue 60 Modification of superlots

ISSUE 60 Reduction in size of superlots from 13,769m² to 4,968m² would reduce the availability of affordable housing in the northern suburbs. Council recommends housing to be adaptable.

Agency WCC Letter dated 7 July 2008

The approved Concept Plan application and proposed Project application both propose up to 80 apartments and 25 town houses or terrace style housing. Therefore there is no change in density, despite the reduction in site area. The site proportions of the townhouse super lots have been amended to enable a more efficient housing layout. The use of terrace style housing in the Project application also allows more efficient use of land. These factors allow the density to be maintained, thereby not reducing opportunities for housing that is diverse and more affordable. Adaptable housing is a detailed matter for future applications for the development of the individual super lots.

Issue 61 Display Village

ISSUE 61 Parking spaces must be designated for disabled parking

Agency WCC Letter dated 7 July 2008

The plans at Appendix C of the EAR and the draft statements of commitment confirm that Stockland will provide 2 car parking spaces for persons with a disability within the display village.

Issue 62 Roads and Bridges

ISSUE 62 Council encourages the incorporation of safe pedestrian and cyclist crossing areas, particularly near bridges. Disabled access also needs to be considered.

Agency WCC Letter dated 7 July 2008

The design of pedestrian and cyclist crossing areas can be documented as part of the construction certificates for each stage.

Issue 63 Landscaping

ISSUE 63 Integration of public art into landscaping along with other street furniture.

Agency WCC Letter dated 7 July 2008

The Landscape Report prepared by EDAW and attached at Appendix D to the EAR contains an Interpretation Strategy and identifies suitable locations for the placement of interpretative material include Aboriginal and European Interpretation, entry signage, a major sculptural art piece and guideline signage along certain streets and along the eco-trail. These are scattered throughout the site and are a form of public art. It is not considered appropriate to add further public art within the streets, as this could compete with the themes intended to be established through the Interpretation Plan.

Issue 64 Access

ISSUE 64 *Further details regarding possible topography constraints to providing new public access foreshore or access being suitable for people with a disability.*

Agency **WCC Letter dated 7 July 2008**

Section 7.12.1 of the EAR states that the topography of the site does not allow for footpath gradient to be designed to meet Australian Standard AS1428.1. This is not an uncommon circumstance. There would numerous residential subdivisions, including those in Wollongong LGA that would not be constructed on land with gradients that would not enable compliance with AS1428.1. This circumstance is reflected in Council's standard conditions of development consent. Council's submission dated 16 November 2007 (submissions to the October exhibition) contains a suggested condition number 19 which reads " *equitable access must be incorporated into all pathways, walkways and trails in the development except where topography does not allow*".

Stockland does not have any objection to this condition as detailed in Issue 9 of Part B of this Response to Agency Submissions.

Issue 65 Transportation

ISSUE 65 *Council supports consultation with local public bus transport providers for input into Project application. Council supports design to accommodate a bus route.*

Agency **WCC Letter dated 7 July 2008**

The north-south link road has already been designed to allow for a bus service. The provision of a bus service is dependent upon the local bus provider(s).

Issue 66 Safer By Design Principles

ISSUE 66 *Limited use or no use of battleaxe blocks, cul-de-sacs. Recommend in stage 1 that cul-de-sac on Road 2 be linked to Road 1 to increase connectivity and street activity.*

No colourbond fencing

Wilkes walk appears to be a shared roadway which is preferable to a walk/cycleway path alone, especially as shared roadway includes house frontages enabling natural surveillance.

Eco-trail needs further CPTED analysis given that laneways or walking tracks are often configured next to side fences.

Agency WCC Letter dated 7 July 2008

WCC recommend that Road 2 be linked to Road 1 to remove the cul-de-sac on Road 2. This road would serve only 1 allotment and is considered an excessive requirement and of little benefit. Cul-de-sacs are utilised in two locations on the southern side of Hewitts Creek and in Stage 5. In the instance of the two cul-de-sacs adjoining Hewitts Creek, whilst there is no vehicular connectivity, the distances between roads is relatively short. There is also a visual link and a clearly defined pedestrian connection between the roads in the form of the eco-trail along the edge of the riparian corridor. The eco-trail is located within the 6m wide defendable space which is a managed zone with low plantings providing sight lines clear of vegetation.

Where allotments adjoin the riparian corridor, they are designed to encourage dwellings to address the corridor. The Design Guidelines are proposed to control the extent of fencing in these circumstances as illustrated in Figure 10 of the EAR. The Design Guidelines also require lapped timber fencing. However the need for fencing would be limited to only two lots adjoining Woodlands Creek corridor (lots 149 and 201). The fencing controls promote casual surveillance and the location of defendable space with low plantings provides good sight lines. The combination of these two design features combined with the relatively short length of the eco-trail where it adjoins allotments is considered to be an acceptable design outcome in terms of CPTED principles.

Issue 67 Social Impact

ISSUE 67 *Consider undertaking social impact statement*

Agency WCC Letter dated 7 July 2008

The Director General Requirements, dated 1 May 2007 do not contain a requirement to carry out a social impact assessment.

As noted in Volume 2: Environmental Assessment Report, prepared by DFP dated 1 June 2006, WCC engaged consultants Gutteridge Haskins & Davey Pty Ltd (GHD) to prepare a Local Environmental Study (LES) to rationalise zonings and planning controls

for the Sandon Point locality. The brief for the LES was to provide a detailed study of all economic, environmental and social issues to determine the appropriate land uses for the broader study area, and provide for consultation with relevant state government departments and the community, through a working party. The LES process also incorporated community consultation involving a public meeting, the establishment of a community hotline, and consultation with a total of 14 government agencies and utility providers. The LES was reviewed by Mitchell McCotter. The LES ultimately led to the rezoning of the land. On the basis of past studies and subsequent rezoning, further social impact assessment would not be necessary.

Issue 68 Road safety and traffic efficiency

ISSUE 68 RTA has significant road safety and traffic efficiency concerns with additional development accessing the Princes Highway via either Sturdee Avenue or Beattie Avenue. Given this the RTA recommends all development accesses the main road network via Point Street or Wrexham Road.

Agency RTA letter dated 28 August 2008

Christopher Stapleton Consulting (CSC) noted in their May 2006 Traffic Review that the COI recommended a secondary vehicle access be provided from Sturdee Avenue and Beattie Avenue subject to further assessment). CSC strongly disagrees with this recommendation, based on the poor access options between both these roads and the Princes Highway, including below standard sight distance (exacerbated by gradient) and reduced access paths (i.e. left in and left out only), requiring legal or illegal turning movements in the vicinity.

The ARV component of the Concept Plan contains the following statement of commitment in relation to this issue.

“Signage is to be put in place to enforce access restrictions across Sturdee Avenue rail bridge on completion of the north-south link. This is to be designed and included as part of any future Project Application.”

The north-south link is therefore proposed to provide access at the northern and southern ends of the site.

Issue 69 SIDRA modelling

ISSUE 69 The junction of Lawrence Hargrave Drive and Wrexham Road should be analysed using SIDRA considering the impact with and without development for the following scenarios:

- ***AM and PM peak flows***
- ***10 year projected volumes (2018)***

Agency RTA letter dated 28 August 2008

CSC has advised that modelling has previously been carried out using SCATES and INTANAL which are modelling techniques accepted by the RTA. We are of the opinion that further modelling using SIDRA is not required given the previous modelling and Stockland is currently seeking the RTA's agreement that further modelling is not required in this instance.

We will DoP with the RTA's advice when received.

Issue 70 Electronic copies of traffic modelling

ISSUE 70 Electronic Copies of all the modelling should be provided to the RTA together with electronic copies of the TRACKS modelling referred to in the Concept Plan 2006 Traffic Review (May 2006) prepared by Christopher Stapleton Consulting.

Agency RTA letter dated 28 August 2008

Electronic copies of the modelling can be provided to the RTA. We proposed to provide electronic copies of the modelling once the outcome of our enquiries with the RTA regarding Issue 69 is known.

Issue 71 Treatment of Lawrence Hargrave Drive and Wrexham Road

ISSUE 71 A concept plan should be provided for the proposed treatment at the junction of Lawrence Hargrave Drive and Wrexham Road.

Agency RTA letter dated 28 August 2008

CSC has advised that the electronic copies of the modelling contain a concept plan which will be made available to the RTA as noted in Issue 70 above.

Issue 72 Pedestrian and cycleway treatments

ISSUE 72 Details of pedestrian and cycleway treatments proposed at the northern end of the site considering the proximity to Thirroul Railway Station.

Agency RTA letter dated 28 August 2008

The Landscape Report at Appendix D of the EAR nominates the 2.4m wide pedestrian/ cyclepath to Thirroul railway station will be smooth finish insitu concrete.

Issue 73 Subdivision layout

ISSUE 73 *Battle axe lots and easements for access across multiple lots are not encouraged. All houses should have direct access to the street to improve access, safety and surveillance and layout. Consideration should be given in these situations to the creation of a separate laneway or road.*

Agency **DoP letter dated 24 October 2008**

The subdivision layout maximises the number of lots with direct access to a street. There are some exceptions where lots are accessed via an access handle along the edge of the Hewitts Creek and Woodlands Creek corridors. We understand that DoP's concern relates to those lots west of the bridges over each creek.

The subject lots are approximately 35m in depth. The creation of a road of 13m in width (consistent with the other creek edge roads) would reduce the allotment width to only 22m. The available building envelope would be reduced further once a front setback is applied. This would unreasonably constrain these allotments. A laneway could be of a width of between 6-7m. The current access handle/right of way is designed at 6m in width. The right of way would need to be free of obstructions and paved for its length effectively taking the form of a lane. The benefit of the current design and use of rights of way means that the laneway remains in private ownership and is therefore not a maintenance cost for Council. However, if Council are prepared to accept the laneways as public roads, then Stockland is amenable to this outcome.

The legibility of the subdivision layout or accessibility to the lots would be not greater with either a right of way or lane way. The objectives of the Coastal Design Guidelines are considered to be achieved in relation to clear way-finding and legibility.

If the lots were orientated to face the street (which is feasible where there are only 2 lots facing the creek corridor) the outcome would be a side boundary presentation to the creek corridor. This would result in the built form being closer to the creek corridor (900mm) and potentially reduced passive surveillance. The layout as proposed allows houses to front the creek corridors providing surveillance to these open space areas. Figure 10 in the EA (page 25) illustrates the design outcome for the battle-axe lots with houses addressing the corridor providing good presentation and passive surveillance to the public domain. On balance this is a preferable outcome to side boundaries facing the corridors.

Issue 74 Defendable space

ISSUE 74 *Confirmation that all defendable space is accessible to fire fighting vehicles and all defendable space is located within the residential zone, is required.*

Agency **DoP letter dated 24 October 2008**

The EA notes that Modification A3 of the Concept Plan approval requires APZs to be located within the residential zone. However, this is inconsistent with Part A of the Approval - Approval in detail. Clause A2 of Part A defines Associated Works to include, amongst other things, asset protection zones (APZ). The Development Footprint defined in Schedule 2, Part A – Department of Planning's Modifications, states in A1(2) that Associated Works may occur on land outside the Development Footprint, on Stockland land. Therefore APZs may therefore be provided within the riparian corridors.

The use of APZs has been replaced with defensible space which serves a similar function. Stockland met with the Rural Fire Service (RFS) in February 2007 to discuss the requirement for APZs. Consultation with the RFS has established that APZs are not required, subject to a managed defensible space which is accessible to vehicles with adequate water supply being provided along the edges of the riparian zones. Confirmation of the discussions with the RFS is documented in Appendix I of the EA. We also note that the RFS in their letter dated 18 June 2008 did not raise any issues in relation to the Project application.

As noted in the report prepared by Bushfire Environmental Services (BES) attached at Appendix I to the EA, the defensible space is a minimum of 6m in width comprising a 4m wide trafficable surface and 1m cleared space either side. This enables vehicles to access the space, which is possible from the adjoining roads. Alternatively, the space can be used as pedestrian access by fire fighters if appropriate.

Issue 75 Townhouse sites

ISSUE 75 To ensure appropriate townhouse development in keeping with the original concept approval, further details are required regarding how development on the townhouse sites will be managed now they are not longer part of a superlot.

Further details are required as to how the rear laneway access to the townhouse lots in Precinct 2 will be managed.

Agency DoP letter dated 24 October 2008

Stockland proposes that the townhouse/terrace style housing is developed in an integrated approach, not individually. This will housing design to be coordinated and allow for vehicular access to be appropriately managed for each house.

In relation "Precinct 2", the rear lane can be dedicated as a public road if Council agrees. If this is not possible, then the laneway can be managed as a right of way with reciprocal rights to enable access to each lot.

Issue 76 Aerial photo overlay

ISSUE 76 *A recent aerial photo overlaid with transparent subdivision layout is requested to show extent of existing vegetation likely to be removed/retained by the development*

Agency **DoP letter dated 24 October 2008**

The Vegetation Management Plan prepared by Cumberland Ecology attached at Appendix K to the EAR, notes that due to past disturbances and the need to carry out substantial earthworks to reconstruct riparian corridors, the opportunities for tree retention are limited. The small number of trees capable of retention is best identified during construction. The VMP includes measures regarding their protection. The preparation of a plan is therefore not considered to be of any assistance in this instance.

Issue 77 Electronic versions of plans

ISSUE 77 *To facilitate confirmation that the proposed development is within the appropriate zoning under the proposed SEPP (Major Projects) 2005 (Amendment 25), plans are to be provided as a polygon dataset in either Shapefile or other agreed format.*

Agency **DoP letter dated 24 October 2008**

An electronic copy of the subdivision layout in the requested format has been provided by separate email.

PART B

**RESPONSES TO
AGENCY SUBMISSIONS
OCTOBER 2007 EXHIBITION**

PART B - RESPONSES TO OCTOBER 2007 EXHIBITION

The Agency comments discussed below were made prior to the submission of additional information in the form of the Climate Change Assessment.

Issue 1 Riparian Corridor Widths

ISSUE 1 *The DECC notes that further studies have been provided by CFR – Appendix L (July 2007) however the proposed widths of the riparian corridors do not appear to have significantly changed. The analysis by CFR (2007) appears to confirm that there are high shear stresses in the proposed creek corridor/floodway areas. Also, CFR does not appear to clearly compare pre and post development flood impacts (eg a 1% AEP change in flood levels & velocities map). As such it remains a concern as to the likely adverse flood related impacts of the proposal on existing development, riparian lands and requirements for erosion control works in the aftermath of a flood.*

Agency *DECC Letter dated 20 November 2007*

The widths of the riparian corridors are consistent with the Concept Plan approval dated 21 December 2006.

CFR has prepared a comprehensive response to these issues, in particular Issues 1, 4, 5, 6 and 7 in Part A of this document

Shear stresses in the creek corridors have been discussed in Issue 41 in Part A of this document.

CFR has confirmed that post development impacts have been considered as discussed in Issues 1 and 45 in Part A of this document.

Issue 2 Technical Adequacy of Flood Modeling

ISSUE 2 *DECC has not undertaken any detailed assessment of the reporting of flood studies as this agency does not have a consent/approval role for this development. From a preliminary review DECC does however advise DoP that the CFR flood study does not appear to address a range of previously identified matters including but not limited to sensitivity analysis, hydraulic roughness parameters, review design floor flows, implications of climate change, the PMF and impacts of the development on existing development and the environment. The DoP, as the consent authority, will need to ensure that it undertakes a review of the technical adequacy of the flood modelling and reporting in addressing the above advice.*

Agency *DECC Letter dated 20 November 2007*

These issues are addressed in Issue 43 Part A of this report. We note that a Climate Change Assessment has been submitted and DECC has reviewed this report as indicated in their letter dated 7 July 2008. DECC advises the Department of Planning to undertake a review of the technical adequacy of the flood modelling and reporting. We understand that the Department of Planning has engaged Sinclair Knight Merz to assist in this assessment.

Issue 3 Regional Riparian Corridor Planning Objectives

ISSUE 3 *The current proposal also does not appear to deliver on regional riparian corridor planning objectives. Claims by Forbes Rigby in section 1.4.2 that the riparian corridor widths are wholly in accordance with the objectives of the Riparian Corridor Management Study are considered to be inaccurate. The documentation contained in the Commission of Inquiry and prior Departmental advice on integrated riparian and floodplain management outcomes establishes that adequacy of riparian widths and treatments of the streams, in particular the regionally significant Woodlands creek, as such outcomes are critical to ecologically sustainable catchment function. The DoP should seek to clarify this claim by Cardno Forbes Rigby.*

Agency *DECC Letter dated 20 November 2007*

The Supplementary Flood Study for the Project Plan Application, prepared by CFR and attached at Appendix L to the EAR considers a number of regional strategy documents, as requested by DNR in a letter dated 23 March 2007.

The width of the riparian corridors is consistent with the Concept Plan approval dated 21 December 2006. The treatment of the streams has been further reviewed in the Climate Change Assessment prepared by CFR and dated March 2008.

Issue 4 Flora and Fauna Assessments

ISSUE 4 *It appears that the current proposal does not adequately recognise the regional significance of the creek systems as evidenced by reduced buffer widths, inclusion of constructed stormwater control measures in the riparian zone and treatments that compromise the rehabilitation of the natural stream functions. The impacts of the proposed landform modifications on flood behaviour and creek stability also remain unclear in the current documentation.*

Agency **DECC Letter dated 20 November 2008**

These comments have been discussed in Issue 7 of Part A of this Response to Agency Submissions.

Issue 5 Stormwater Management Measures

ISSUE 5 *It has not been possible to make a proper assessment of the Stormwater management measures due to lack of information included with the assessment. For example there is no indication of where bioswales will be located.*

In response to the concept plan for Stockland's site it was stated that while the current water quality targets appeared to be met the information was somewhat confusing.

The DECC recommended that stormwater plans be revisited as a result of the apparent confusion. However, the current project application does not provide detail to ascertain whether the issues raised above have been addressed in the supplementary CFR assessment.

Agency **DECC Letter dated 20 November 2008**

The Supplementary Flood Study, Project Plan Application, Sandon Point prepared by CFR dated July 2007 contains very detailed concept design plans of the development, showing clearly the location of all bio-swales, pocket wetlands, and creek/floodplain components. These drawings are in Appendix A and titled 100 – 1709 and show detailed plans and sections through bio-swales and pocket wetlands.

CFR does not understand how at the Project Application phase of a development how these WSUD measures could be any better described.

Issue 6 Riparian Corridor

ISSUE 6 *DWE (formally DLWC/DIPNR/DNR) has previously provided consistent and detailed advice on the riparian corridors at the Sandon Point site which was supported by the Commission of Inquiry.*

In a letter dated 4/12/2006, the former DNR outlined the basis by which it could support the proposal (a copy of DNR's letter of 4/12/2006 is attached for your information). DWE considered that the previous advice is still relevant, however the proposal as presented in the EA does not appear to align with the advice. DWE recommends that the EA is reviewed and amended to be consistent with this advice.

Agency *Department of Water and Energy letter dated 19 November 2007*

Department of Water and Energy has raised the same issues that were addressed in detail by Stockland and ARV in its Submission to Agency Responses dated October 2006, in relation to the Concept Plan. The Department of Planning engaged Patterson Britton to assess the flooding and riparian corridor issues. The Director General's Assessment Report ultimately recommended approval of the Concept Plan subject to modifications and the Concept Plan was approved by the Minister on 21 December 2006. The Project application is consistent with the Concept Plan approval as set out in the EAR.

Issue 7 DPI Letter dated 16 November 2007

ISSUE 7 *Comments identical to DPI letter dated 10 June 2008*

Agency *Department of Primary Industries letter dated 16 November 2007*

The issues raised by DPI have been repeated in their letter dated 20 June 2008 in relation to the June exhibition of the Project application. DPI's comments are addressed at Issues 10 to 19 in Part A of this document.

Issue 8 Wollongong City Council letter dated 16 November 2007

ISSUE 8 *Comments are those contained in Wollongong City Council letter dated 7 July 2008*

Agency *Wollongong City Council letter dated 16 November 2007*

The issues raised by Wollongong City Council have been repeated in their letter dated 7 July 2008 in relation to the June exhibition of the Project application. Wollongong City Council's comments are addressed in Issues 29 to 67 in Part A of this document.

Issue 9 Suggested Conditions of Approval

ISSUE 9 112 The Council has suggested 112 conditions are approval.

Agency Wollongong City Council letter dated 16 November 2007

The suggested conditions have been reviewed. The conditions which should be deleted or amended are discussed below.

As an over-riding comment of all the conditions recommended by Council should be reworded to replace:

- the term 'development consent' with the term 'Project approval'; and
- the term 'development application' with the term 'Project application'.

Condition	Comment
5. Staging	<p>The development of the site will occur in a north-south direction. However, the area nominated as Stage 5 is a discrete component and can occur independent to the remainder of the subdivision (as noted in Section 3.5.7 of the EAR). The condition should therefore be amended to read:</p> <p><i>Applications for Construction Certificates and Subdivision Certificates must reflect the approved staging plan, with the timing of Stage 5 being independent to the remainder of the Staging.</i></p>
8 North/South Link Road	<p>The condition as currently worded requires the construction of the north-south link road and traffic signals prior to the issue of a subdivision certificate without reference to a stage of the development. The link road will not be fully completed all the way to Sandon Drive in Stage 1, but will be constructed stage by stage which has been the approach proposed in the Concept Plan application and subject Project application. The approved staging plan and Council's Condition No. 5 – Staging will cover the sequential construction of the road.</p> <p>The traffic signals at Wrexham Road and Lawrence Hargrave Drive are covered by the draft Statement of Commitment. The traffic signals will be constructed prior to the occupation of Stage 1 unless the RTA has an alternate timetable that might delay their installation.</p> <p>The Project application proposes a 2.m wide shared cycle and pedestrian pathway along the north-south link road, widening to 2.5m where it connects to Thirroul Station. The width of 2.4m is only 100mm narrower than the shared pathway width specified in Wollongong Council's Subdivision Code and is considered acceptable.</p> <p>The condition should therefore be deleted.</p>
9 Archaeological Investigations	Delete – covered by Statement of Commitments
13 Final Landscaping Plan	Delete – landscape plan forms part of the Project Application documentation.

15. Existing Vegetation Plan	The VMP prepared by Cumberland Ecology notes that due to past disturbances and the need to carry out substantial earthworks to reconstruct riparian corridors, the opportunities for tree retention are limited. The small number of trees capable of retention is best identified during construction. The VMP includes measures regarding their protection. The preparation of a plan is therefore not considered to be of any value in this instance, and the condition should be deleted.
16 Tree Protection and Management	Generally acceptable but the wording should be amended to read as follows: <i>"The existing trees that are capable of being retained on the subject property..."</i>
17 Compensatory Planting	Delete – compensatory planting is more than addressed through the vegetation of the riparian corridors. The VMP and Landscape Plans document the species selection for these corridors.
18 Public Art	Delete – public art which reflect local Aboriginal Heritage forms part of the Heritage Interpretation Plan.
23 Riparian Corridors	Delete – the riparian corridors and their alignment has been extensively analysed during the Concept Plan process and reflected in the creek designs forming the Project application.
24 Woodlands Creek	Delete – the width of the riparian corridors has been established under the Concept Plan approval dated 21 December 2006.
25 Hewitts Creek	
26 Turpentine Forest	Delete – this does not form part of Stockland's site
29 Flood Study	The requirements set out in (a) to (k) of the condition are addressed in the 2007 Flood Study and the Climate Change Assessment. Stockland is prepared to provide Council with these two reports plus any updates that arise from the response to Agency submissions and outcomes of the Department of Planning's assessment. The following condition is suggested as a replacement condition to Council's condition: <i>The Proponent is to provide Council with a copy of the following documentation:</i> <i>(a) Supplementary Flood Study Project Plan Application, Proposed Development Sandon Point, July 2007 prepared by Cardno Forbes Rigby</i> <i>(b) Sandon Point Flood Study, Concept Plan Application, Climate Change Assessment, March 2008 prepared by Cardno Forbes Rigby</i> <i>(c) an addendum to the above reports that arises out of:</i> <i>(i) responses to Agency Submissions; and</i> <i>(ii) the assessment of the above reports by the Department of Planning.</i>
42 Footpaths	Council's Subdivision Code requires a 1.2m minimum footpath width which has been designed into each road reserve. The suggested condition requires a minimum of 1.5m. The condition should be amended to be consistent with the Council's Subdivision Code.

	<i>A 1.2m wide footpath must be constructed in accordance with Wollongong City Council standards along the frontage of Lots on one side of every road.</i>
46 Construction Environmental Management Plan (CEMP)	Delete. The suggested condition requires management plans which duplicate the actions and recommendations of the various management plans and studies forming part of the Project application. The condition is considered to be unnecessary duplication and should therefore be deleted.
47 Soil and Water Management Plan	Delete. A soil and water management plan (SWMP) has been prepared by CFR and included as Appendix D to the Supplementary Flood Study for the Project Plan Application (Appendix L of the EAR). The SWMP has been prepared in accordance with the NSW Department of Housing "Blue Book" being the relevant guideline in NSW for all construction sites.
49 Dust Suppression	Delete. Appendix Q of the EAR contains a Construction and Traffic Management Plan which includes dust control measures. A Statement of commitment is proposed to require Stockland to implement the measures in the Construction and Traffic Management Plan. The condition is therefore duplication and should be deleted.
50 Asset Management	Agree – however, the documentation should be worded to <i>be prior to issue of a Subdivision Certificate for each stage of the development</i> as the costs of the various items are not necessarily known at the time of applying for a Construction Certificate.
56 Traffic Calming	Traffic calming measures are indicated in the Local Area Traffic Management Review prepared by Christopher Stapleton Consulting and attached at Appendix N to the EAR. The implementation of the LATM Review forms one of the statements of commitment. The condition is therefore duplication and should be deleted.
57 Bus Shelters	<p>The condition should be reworded as follows:</p> <p><i>A bus shelter (3 in total) designed, constructed and located in the North/South Link Road in accordance with Wollongong City Council's standards must be provided for stages 1, 3 and 5, unless the local bus provider requires otherwise.</i></p> <p>This ensures that the condition can still be complied with and certified if the bus operator requires fewer bus stops than suggested by Council.</p>
58 Noise Walls	Delete – The condition requires noise walls to be constructed to RTA specifications. The Project does not propose noise walls to be constructed to ameliorate the impacts of road noise. Acoustic barriers are proposed to the railway line as indicated on the Project application documentation. The RTA specification relates to road noise impacts, not railway noise. The condition should be deleted to avoid confusion during certification and unnecessary amendment of an irrelevant condition.
68 Environmental Management Plan	Delete – As stated in relation to Condition 46, the Project application contains a number of management plans which are reflected in the statement of commitments. Condition 68 should be deleted to be consistent with the deletion of Condition 46.

88 Traffic Control Plan	<p>A Traffic and Construction Management Plan prepared by CFR has been submitted with the Project application (Appendix Q). A further plan and further approval should not be required. The first sentence of the condition can be retained, but the remainder deleted. The condition will therefore read:</p> <p><i>“Approval must be obtained from Wollongong City Council Traffic Section for any interruption to pedestrian and vehicular traffic within the road reserve caused by the construction of the development.”</i></p>
94 All Works to be Completed	<p>In Stockland’s experience with residential subdivisions, there is a risk that some works (e.g. kerbing and landscaping) can be damaged if installed prior to the construction of houses. Flexibility should therefore be provided to allow bonds to be paid to Council for any works that are deferred until the risk of damage is reduced.</p> <p>The condition should be reworded as follows:</p> <p><i>“All works as specified in the Project approval and Constriction Certificate must be completed prior to the issue of a Subdivision Certificate for each stage, unless bonds are paid by the proponent for any works that are deferred or unable to be completed in part of a stage. All works shall be fully borne by the proponent and any damage to Council’s assets shall be made good, prior to the issue of a Subdivision Certificate for each stage. Bonds are to be returned to the proponent upon satisfactory completion of the bonded works.”</i></p>
110 Section 88B Instrument	<p>Agree with the condition, however, item (p) relating to fencing adjacent to a public reserve should be deleted.</p> <p>The mesh fencing proposed in the Condition is not considered to be an acceptable design outcome and fencing to the riparian corridors is managed through the Design Guidelines attached at Appendix E to the EAR.</p>

Issue 10 Non-indigenous Heritage

ISSUE 10 *Review of the Environmental Assessment and supporting Appendices as described above [in the Heritage Office letter] indicates that the measures proposed are generally appropriate for the identified significance and nature of the non-Indigenous heritage resource remaining within the project area.*

The Statement of Commitments provided by Stockland in Section 8.0 of the Environmental Assessment has also been reviewed by the Heritage Office, Department of Planning. The 'Cultural Heritage' Commitments establish the need for: archaeological testing of the Woodlands Cottage site with artefact cataloguing and a report to be lodged with Wollongong City Library; and for Stockland to implement the Heritage Interpretation Plan. Whilst these commitments are supported by the Heritage Office it is considered that they could be strengthened through consideration of the following Condition of Approval:

- *After archaeological works are undertaken, a copy of the final excavation report(s) shall be prepared and lodged with the Heritage Council of NSW, the Local Studies Library and the Local Historical Society in the relevant Local Government area, The proponent shall also be required to nominate a repository for the relics salvaged from any historical archaeological excavations.*

Agency ***Heritage Office, Department of Planning letter dated 15 November 2007***

Stockland supports the comments made by the Heritage Office and has no objection to the additional conditions of approval suggested by the Heritage Office.

Issue 11 Flora Impacts

ISSUE 11 *Recommend that the area south of Tramway Creek is managed for conservation with no residential development permitted.*

Agency ***Nature Conservation Council of NSW letter dated 1 November 2007***

Part of the area south of Tramway Creek (Lot 235) has been approved as 'developable footprint' as part of the Concept Plan approval dated 21 December 2006. The Project application is consistent with the Concept Plan approval.

Issue 12 Wetlands

ISSUE 12 *Wetlands in the area contain extensive grasslands and wet swales which are crucial habitats for migratory birds listed under the NSW Threatened Species Act. Further, a wide range of fauna, including approximately 119 native bird species such as the Australasian Bittern (*Botaurus poiciloptilus*), which is listed as a Threatened Species under the NSW Threatened Species Act (1995) use the land and foreshore area as foraging areas. International Agreements such as the Japanese and Australian Migratory Bird Agreement protects a number of bird species in the area, such as Latham's Snipe (*Gallinago hardwickii*). We contend that if subdivide and developed, these areas may be deemed unsuitable for habitation by these species.*

Conversion of these highly diverse vegetative communities into residential areas could be highly damaging. The function that these flora communities play in the regional biological health of the area is clearly significant, with the vegetation providing critical habitat for fauna species. We contend that any changes to the native biological health could have enormous impacts.

Agency *Nature Conservation Council of NSW letter dated 1 November 2007*

Assessment of impacts on flora and fauna has been carried out by:

- Connell Wagner in June 2001,
- Connell Wagner and Sainty and Associates in June 2001 and;
- Connell Wagner in February 2003.

As part of the Concept Plan application the Cumberland Ecology reviewed and updated these flora and fauna assessments with further surveys to investigate the presence / absence of the Green and Golden Bell Frog.

The EAR for the approved Concept Plan noted (page 87) that Cumberland Ecology concluded that *"the proposal will not have a significant impact on these communities and no Species Impact Statement is warranted. No parts of the communities will be removed, modified or isolated. Fragmentation by the crossing over Tramway Creek will not impact the Swamp Sclerophyll Forest as both sections will remain proximate. The proposal will enhance and improve habitat for these communities within the subject land."*

The Concept Plan application has been approved and the residential development is contained within the approved development footprint.

Issue 13 Fauna Impacts

ISSUE 13 *The proposed residential subdivision, named 'Stage 6', not be approved as it will compromise the ecological importance of the area, disrupting that habitat of know threatened species.*

Agency *Nature Conservation Council of NSW letter dated 1*

November 2007

Flora and fauna impacts were assessed and considered as part of the Concept Plan application process. Stage 6 is located within the 'developable footprint' identified as part of the Concept Plan approval dated 21 December 2006. The Project application is consistent with the Concept Plan approval.

Issue 14 Open Space

ISSUE 14 *Sandon Point is currently characterised by approximately 61ha of valuable open space, which have a number of particularly important roles. Open spaces provide a crucial buffer between riparian areas and already existing development in the region. Further, open space is utilised and enjoyed by the wider indigenous and non-indigenous community for a number of purposes including recreation. Public access to McCauley's Beach and other areas of Sandon Point via open space is particularly important for community ownership and a sense of community.*

Agency **Nature Conservation Council of NSW letter dated 1 November 2007**

The Stockland land included in the Project application is not public open space available for any member for the community for recreation or other purposes. The Project application does provide for significant areas of open space in the form of the riparian corridors along Hewitts Creek, Woodland Creek and Tramway Creek. These riparian corridors are proposed to be zoned 7(a) Environmental Protection and dedicated to Council, when they will become public open space areas.

Issue 15 Commission of Inquiry

ISSUE 15 *The concept proposal be amended to remove stage 6 and the eastern segments of stages 2 and 4 so that the plan at least adheres to the recommendations of the 2003 Commission of Inquiry.*

Agency **Nature Conservation Council of NSW letter dated 1 November 2007**

These comments relate to the Revised Concept Plan. The Concept Plan was approved on 21 December 2006. The Project Application is consistent with the Concept Plan approval.

Issue 16 Cultural Heritage

ISSUE 16 *Aboriginal burial sites and relics have been previously uncovered by high seas and excavations. The proposed subdivision will require bulk earthworks including infrastructure works within the riparian corridors. NCC believes these significant excavation works are likely to disturb a number of sites and will therefore further diminish the immense indigenous heritage of the area. The development of this site is highly inappropriate because of the cultural values of the site.*

Agency **Nature Conservation Council of NSW letter dated 1 November 2007**

The COI did not find any restraint to future development, having regard to non indigenous heritage, but recommends that such historical items be incorporated into interpretative measures within the ultimate development of the site. Interpretive Plans have been prepared to address European Heritage and Aboriginal Heritage and submitted with the Project application.

The Project application also contains a Desktop Assessment of Archaeological Potential which was conducted by Susan McIntyre-Tamwoy Heritage Consultant. This Assessment reviewed past studies and the Sandon Point Aboriginal Cultural Heritage Assessment, AASC 2006 (Stuart Huy's report). The area is highly disturbed from past activities, particularly quarrying, imported fill and modification of creek lines. The findings of past studies and assumption of areas of potential archaeology have been validated against geotechnical assessment to establish the extent of remaining topsoil. This has enabled Susan McIntyre-Tamwoy to formulate six recommendations as set on page 77 of the EAR. One recommendation includes test excavation in areas of potential archaeology which can assist in Heritage Interpretation. Any aboriginal objects recovered can be held in the Aboriginal Keeping Place which is currently the subject of a Development Application (DA) submitted to Wollongong City Council.

Issue 17 Keeping Place

ISSUE 17 *As Stockland has yet to honour its obligation under Stages 2-6 to enter into a Voluntary Conservation Agreement (VCA) and to establish a Keeping Place it is imperative that in relation to this project that Stockland be required to enter into a VCA prior to any development work being undertaken.*

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007**

A DA for an Aboriginal Keeping Place was lodged with Wollongong City Council on 23 July 2008 to interpret the Aboriginal heritage of the site as required by the VCA.

Issue 18 Further Archaeological Studies

ISSUE 18 *Further archaeological studies should be undertaken prior to any works, with the participation of the Traditional Owners, who are the relevant members of the Aboriginal Community.*

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007**

The Desktop Assessment of Archaeological Potential which was conducted by Susan McIntyre-Tamwoy Heritage Consultant recommends that archaeological investigations should be undertaken with the participation of the Aboriginal community which is reflected in the draft statements of commitment.

Issue 19 Interpretation Signage

ISSUE 19 *The Traditional Owners should be the relevant Aboriginal people consulted about the interpretation signage, and I particularly wish to be consulted about this. In particular I want the cultural and spiritual significance of the area recognised and the fact that this area (despite the appalling development and destruction to which it has been subjected) remains very culturally significant for present and future generations, not just past generations, to be clear.*

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007**

Consultation has been undertaken in the development of the Keeping Place, however there are considerable differences of opinion between the various Aboriginal community groups represented in this area. The Keeping Place DA has been submitted with Council and further consultation will be carried out with the public exhibition of the DA providing further opportunity to comment on the content of the Keeping Place and interpretive material.

Issue 20 Tramway Creek Riparian Corridor

ISSUE 20 *Tramway Creek and a broad riparian corridor (i.e. Lot 235 South and East of the proposed Anglican Retirement Village) be left as Regional Open Space.*

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007**

The majority of Tramway Creek south and east of ARV's site will be retained as a riparian corridor, except for part of Lot 235 south of the creek which has been approved for residential subdivision in accordance with the Concept Plan approval.

Issue 21 Environmental Protection 7(a) Zone

ISSUE 21 *COI recommended that the entire eastern portion of the site, riparian corridors, endangered ecological communities, and areas of Aboriginal heritage significance should be zoned 7(a) Special Environmental Protection. This proposed development appears to be in breach of this recommendation in a number of important ways, notably in relation to Tramway Creek, Woodlands Creek and Hewitt's Creek riparian corridors and possible endangerment of the Turpentine Forest and women's area close to Willkie's Track, between it and Tramway Creek. It has coolamon marked trees there which are very important to us and it is a women's birthing area, which is why it is significant.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007*

The footprint of the residential development is consistent with the Concept Plan approval. The riparian corridors of Hewitts, Woodlands and Tramway Creeks traversing the site are proposed to be rezoned Environmental Protection 7(a).

The Turpentine Forest and women's area is not part of Stockland's site, but forms part of the ARV site.

Issue 22 Stuart Huy's Report and Protection of Riparian Corridors

ISSUE 22 *The Stuart Huys Report also identified the riparian corridors of all the above-mentioned named creeks be protected from future development; he noted that there may be potential for archaeological sites along these creeks. The protection of all the creeks is imperative.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007*

The Stuart Huy's report states at page 72 that:

"On the basis of the strong views and concerns unanimously expressed by the Aboriginal stakeholder representatives, it is recommended that the riparian corridors along Tramway Creek, Woodlands Creek and Hewitts Creek, are protected from future development and are actively managed and re-habilitated. The minimum width of the riparian corridors should be in accordance with the recommendations in the COI report."

The footprint of the residential development has been approved in the Concept Plan approval dated 21 December 2006. The width of the approved riparian corridors differs from that recommended in the COI report, however, the riparian corridors will be re-habilitated which is consistent with the Stuart Huy's report. For Woodlands Creek this will include reconstruction of the section of the creek which is currently piped and the removal of the diversion of Woodlands Creek into Hewitts Creek. For Hewitts Creek restoration of recent destruction of sections of the original creek banks will be carried

out. Works are therefore necessary along these creek lines and to enable their revegetation and reconstruction in the case of Woodlands Creek. These works are consistent Wollongong City Council's Hewitts Creek Flood Risk Management Plan.

Issue 23 Thomas Gibson Park

ISSUE 23 *Wrexham Road access through Thomas Gibson Park (P1) is an area of Community Park, compulsory rezoned "operational" in order to allow Stockland to place a road through the park to their landlocked subdivision. Thomas Gibson Park is public land without a plan of management, because to make one would require an Aboriginal Heritage Study. There are identified Aboriginal sites in TG park: "...Guboo Ted Thomas [related] that Gibson Park, located just to the north-west of the Col area, was an important Aboriginal place." (Sandon Point Aboriginal Cultural Heritage Assessment Final Report July 2006, AASC Stuart Huys, P41). But Wollongong City Council has ignored the evidence.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

The section of Thomas Gibson Park included in the Project application has been reclassified as Operational land under the Local Government Act 1993 to facilitate the Wrexham Road link. It is unclear from Stuart Huy's report which sections of Thomas Gibson Park have archaeology potential. The Desktop Assessment of Archaeological Potential conducted by Susan McIntyre-Tamwoy Heritage Consultant did not identify the section of Thomas Gibson Park which has been reclassified (i.e. south-western corner of the park where the link road will be constructed) as having archaeological potential.

Issue 24 Filling of AIR Site

ISSUE 24 *Stockland owned AIR (northern) site has been filled to several metres depth by illegal dumping of soil containing artifacts (from Stages 1 to 6) without development consent, and without an Aboriginal Cultural Heritage Study.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

We are not aware of illegal dumping on the AIR site from development of Stages 1 to 6.

Issue 25 Lot 235 – Aboriginal Women's Site

ISSUE 25 *Stockland eastern Lot 235 is identified by Huys as an Aboriginal Women's site.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

Figure 5 in Stuart Huy's report maps the Aboriginal Sites and Cultural Areas in the COI Area. This map does not indicate an Aboriginal Women's site within Tramway Creek.

Issue 26 Wilkies Walk

ISSUE 26 *“Throsby Track” was a traditional access and leading to the pathway through the site known as “Wilkies Walk”. This is a customary access for both Aboriginal and the wider community, and is also the site of the remnant “Woodlands” cottage.*

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)**

Wilkies Walk is to be formalised as a public thoroughfare along the boundary with the northern edge of the ARV site. Test excavations are proposed in the Desktop Assessment of Archaeological Potential along part of Wilkies Walk and the former site of Woodlands Cottage, as illustrated in Figure 6 of the Desktop Assessment contained at Appendix S to the EAR.

Issue 27 Aboriginal Place

ISSUE 27 *The DECC-declared “Aboriginal Place” extends from Hewitts Creek to Sandon Point headland, so any “tail-out” works would require a NPW Act S90 Consent to Destroy Aboriginal Place. The Minister seems to have forgotten the Aboriginal Place in his Approval to “reconfigure” Hewitts and “re-instate” Woodlands Creek.*

Aboriginal Place declaration includes eastern estuaries of Woolands, Cooksons and Tramway Creeks inside the area of the Aboriginal Place, so any tail-out works would be an act of destruction in an Aboriginal Place.

Agency **Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)**

The tail out works do not extend into the Aboriginal Place declared under the National Parks and Wildlife Act.

The Desktop Assessment of Archaeological Potential conducted by Susan McIntyre-Tamwoy Heritage Consultant has noted that land to the east of Stockland's site (i.e. Ray Hannah's land) has been identified by Stuart Huy's as having archaeological potential. Susan McIntyre-Tamwoy notes that archaeological testing should include any part of this area that is affected by creek rehabilitation works or other works that involve subsurface disturbance. The tail-out drainage works extend slightly into this area and test excavations will therefore be carried out.

Issue 28 Woodland Cottage Garden Beds

ISSUE 28 *Flowering bulbs and other plants indicate potential Woodlands garden beds. A horticulturist should be commissioned to investigate the footprint of these gardens. It is also possible foundations remain of Woodlands Cottage, and both Aboriginal and European cultural values must be considered during investigation.*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

The Desktop Assessment of Archaeological Potential conducted by Susan McIntyre-Tamwoy Heritage Consultant has identified the former Woodlands Cottage site as being an area for test excavation. The need for test excavation is reflected in the draft statements of commitment.

Issue 29 Stuart Huy's Report and Further Consultation

ISSUE 29 *Stuart Huys identified sites on land owned by Stockland, Ray Hannah, Cooksons-ARV and WCC. But the Aboriginal persons consulted by Huys do not appear to have been consulted. What does Stockland intend to do regarding Huys requirement for Anthropological consultation, which study Stockland has not commissioned?*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

The Project application only relates primarily to Stockland's land, part of Thomas Gibson Park, part of Ray Hannah's land and Wollongong City Council's for tail-out drainage works. The Stuart Huy's report made the following recommendation regarding consultation in relation to the riparian corridors within Project application site:

"Designated representatives from the appropriate Aboriginal stakeholders groups should be consulted regarding the wording that is used for the signage and regarding Aboriginal involvement in the implementation of recommendations regarding revegetation, interpretive signage and weed eradication."

Consultation has been undertaken prior to the preparation of the Keeping Place DA. The Vegetation Management Plans for each creek identify plant species and weed eradication programs. The VMPs have been exhibited with the Project application to allow for input including Aboriginal stakeholders, however no comments have been received in relation to the details of the VMPs.

Issue 30 Additional Anthropological Assessment

ISSUE 30 *Appendix S of the EAR considers the Department of Planning modifications requiring “additional anthropological assessment ...[for] ARV development area regarding a Women’s site “not relevant to this report.” That is untrue because Huys’ study identified the Aboriginal women’s are extending from the whole of the ARV site across Stockland Lot 235 to the sea*

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

Figure 5 of Stuart Huy’s report identifies the Aboriginal Women’s area as extending from the ARV site eastwards to the sea. Whilst this does pass over Lot 235, it is the section of Lot 235 east of the ARV site. This section of Lot 235 is not part of the residential subdivision which is located in the south-western corner of Lot 235 which is not identified as an Aboriginal Women’s area.

Issue 31 Site is of State or National Significance

ISSUE 31 *SMT references the original Aboriginal Place draft Report of June 2001 (Nightingale for NPWS) but does not mention that aboriginal community consensus was that the whole of the site was of State Significance, as declared 15 February 2001 by Illawarra Local Aboriginal Land Council (ILALC).*

It remains possible, even likely, that this site should be considered of national importance for questions of ancient technology and economy.

Agency *Wadi Wadi Coomaditchie Aboriginal Corporation letter dated 12 November 2007 (2nd letter)*

The Minister for Planning has issued a Concept Plan approval on 21 December 2001 which has approved a residential development on the site. The approval was made having regard to issues of Aboriginal and European Heritage. The approval imposed an additional commitment to require a Heritage Interpretation Plan (Part B5 of the Approval) which has been prepared and submitted with the Project application.

PART C

**RESPONSES TO
PUBLIC SUBMISSIONS
OCTOBER 2007 EXHIBITION AND
MAY/JUNE 2008 EXIHIBTION**

PART A - RESPONSES TO PUBLIC SUBMISSIONS TO JUNE 2008 EXHIBITION

No.	Nature	Comment/Issues Raised	Issue Summary	Response
1	Objection	<ul style="list-style-type: none"> Errors in submitted application documentation; Significant ecological and Aboriginal heritage values are directly threatened by the ocean view precinct There is little change in the proposal when compared with the original invalid approval, established by J Walker v Minister for Planning; Final land-use zonings and boundaries of the developable areas have not been established across the Sandon Point site; The importance of Turpentine Forest Area as an endangered ecological community and as a place of spiritual, cultural and social significance to Aboriginal people has planning legislation and policy implications at local, state and national levels; The Turpentine Forest Area is a declared Aboriginal Place and protected under Section 84 of National Parks and Wildlife Act 1974. The forest is also the core element of the identified endangered ecological community, listed under the Threatened Species Conservation Act. The forest should be off limits for development and designated as a State Significant Aboriginal Heritage and Flora and Fauna Conservation Zone; Statement by JBA stating that the site does not contain any matters of National Environmental Significance is incorrect as the land contains the EEC Swamp on Coastal floodplains & also is habitat for several listed species. The proposal would have detrimental impacts to existing flora and fauna; Cutting of new pathways through the forest, as suggested by CAB Consulting should not be allowed; The zoning for the Turpentine Forest does not afford the forest adequate protection; Ocean View Precinct will have major impacts on aboriginal heritage values and cultural importance. Removing the Ocean View precinct can reduce need for roads, pathways and bridges around the forest; The ARV Project will have difficulty meeting the requirements of SEPP 2004 with respect to Clause 38 for wheelchairs. The ARV and Stockland developments are both inconsistent with the specific objectives of the Illawarra REP No 1; The ARV Development is inconsistent with the Wollongong LEP 1990 in relation to Clause 12 for FSR; Little progress has been made on the Keeping Place and heritage interpretation facility; Community consultation to the EA exhibition does not constitute proper consultation; Inadequate Aboriginal heritage conservation outcomes; To avert the threat to the listed ECC and Aboriginal Cultural heritage, ARV's development footprint should be contracted and amended. 	<ul style="list-style-type: none"> Application documentation Aboriginal heritage Land use zoning Impact on Turpentine forest area Ecological community Cultural/social significance Aboriginal place Flora & fauna conservation Ocean view precinct Illawarra REP No1 Wollongong LEP 1990 Community consultation Development footprint 	<p>Application documentation</p> <p>We are not aware of any errors in documentation.</p> <p>Aboriginal heritage</p> <p>Comments regarding the Turpentine Forest area relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Land use zoning</p> <p>For the Stockland component, the footprint of the proposal fits within the current Residential 2(b) zone, with the exception of a narrow band of development footprint located in the 6(a) zone along the eastern boundary of the site. Under the current zoning that part of the development within the 6(a) would not be permissible under the Wollongong LEP 1990. The project is not wholly prohibited, and under Section 75J(3)(b) the Minister may approve the Project, which is substantially permissible. Overall, the Stockland component proposes residential development on 14.8ha, while the total area of land currently zoned Residential under Wollongong LEP 1990 is 18.13ha.</p> <p>The footprint of the proposal, including both ARV and Stockland components will fit wholly within the amended residential 2(b) zoning proposed in the State Significant Site Study which will form part of Schedule 3 to the Major Projects SEPP when implemented.</p> <p>Impact on Turpentine forest area</p> <p>Comments regarding the Turpentine Forest area relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Ecological community</p> <p>Comments regarding EECs relate JBA's report for the Revised Concept Plan and which pertain to ARV's site and are not relevant to Stockland's Project application.</p> <p>Cultural/social significance</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Aboriginal place</p> <p>DECC has previously considered the Aboriginal significance in the Sandon Point area. Specific parts of the Sandon Point area site have been declared an Aboriginal Place under the National Parks and Wildlife Act. These are located outside of the Project plan area.</p> <p>Flora & fauna conservation</p> <p>The impact on natural species has been addressed at the Concept Plan application stage. A Flora and Fauna Assessment was carried out by Connell Wagner dated 7 February 2003 which includes an 8 part test (now a 7 part test) under the Threatened Species Conservation Act, 1997 in a Flora and Fauna Assessment dated 12 June 2001 carried out by Connell Wagner and Sainty & Associates. Cumberland Ecology reviewed these assessments and provided a further assessment into the Green and Golden Bell Frog. Their report is attached at Appendix D of the Concept Plan EAR. Impacts were found to be acceptable. Stockland committed to preparing Vegetation Management Plans for the three creek corridors which have been incorporated into the Project application and are attached at Appendix K of the Project Application EAR.</p> <p>Ocean view precinct</p> <p>Comments regarding the Ocean View Precinct relate to ARV's site and are not relevant to Stockland's Project application.</p>

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				<p>Illawarra REP No1</p> <p>Consistency with objectives of REP No.1 have been addressed in Section 5.2.11 of the EAR.</p> <p>Wollongong LEP 1990</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Community consultation</p> <p>Extensive consultations regarding the planning of Sandon Point have occurred in the past to provide an understanding of the issues considered relevant by the community, council and government agencies. These consultations have been substantially part of various processes including the preparation of the LES, LEP and DCP, Stages 1 to 6 DAs, the COI and COI review by Charles Hill. Further opportunity for comment has been provided with two public-exhibitions of the Project application undertaken in accordance with the requirements of the EPA Act.</p> <p>Development footprint</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p>
2	Objection	<ul style="list-style-type: none"> ▪ Drainage impacts on ocean and locality ▪ Traffic flow problems and will be worse ▪ Flooding impacts on development and locality, safety of residents 	<ul style="list-style-type: none"> ▪ Drainage ▪ Traffic ▪ Flood 	<p>Drainage</p> <p>The drainage system and its performance under climate change including consideration of predicted ocean level rises over the next 100 years have been undertaken by Cardno Forbes Rigby (CFR) (March 2008). CFR's assessment has been peer reviewed by GHD.</p> <p>Traffic</p> <p>Traffic generation and impacts have been assessed as part of the Concept Plan which was approved on 21 December 2006.</p> <p>Flood</p> <p>Consideration of the impact of flooding on the development and the effects of the development on flooding behaviour have been undertaken via detailed modelling (CFR, March 2008). The proposed development has been designed to address evacuation and safety criteria as established by the Hewitts Creek Floodplain Risk Management Plan and DCP54. None of the proposed lots adjoining Hewitts or Woodlands Creek are affected by flooding in the existing climate regime. The only part of the site affected by flooding is the edge of proposed residential lots in Stage 5 on the southern side of Tramway Creek. Future residences and the majority of the external area of these lots would be above the probable maximum flood, as noted in section 8.2 of CFR's 2008 report.</p>
3	Objection	<ul style="list-style-type: none"> ▪ Object to proposal, given Sandon Point should not be subject to increased development ▪ Support appeal by Jill Walker. 	<ul style="list-style-type: none"> ▪ Appeal 	<p>Appeal</p> <p>Suitability of the site for proposed development has been established through previous planning process including the preparation of the LES, LEP and DCP, Stages 1 to 6 DAs, the COI and COI review by Charles Hill and finally the Concept Plan approval dated 21 December 2006.</p>

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4	Objection	<ul style="list-style-type: none"> There is no adequate infrastructure in the area to support further dwellings Traffic congestion is constant Intersection will be dangerous due to banked up traffic Impacts on environment such as global warming and pollution Sacred Aboriginal area 	<ul style="list-style-type: none"> Infrastructure Traffic Global warming Pollution Aboriginal Significance 	<p>Infrastructure</p> <p>Utility providers have been consulted at Concept Plan application stage and again as part of the Project application. Services are available and capacity is adequate discussed in Section 3.5.13 of the EAR.</p> <p>Traffic</p> <p>Addressed above in Issue 2 above.</p> <p>Global warming</p> <p>ESD considerations are addressed in Section 9 of the EAR and a climate change assessment has been prepared by CFR which supports the Project application.</p> <p>Pollution</p> <p>Water quality impacts are addressed in Section 7.2 and Appendix L (Supplementary Flood Study) of the EAR which sets out measures to mitigate impacts. Pollution in terms of air quality has been addressed at the Concept Plan stage in Section 7.4 of the Stockland EAR (Volume 2).</p> <p>Aboriginal Significance</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p>
5	Objection	<ul style="list-style-type: none"> Object to development due to ecological fragility and Aboriginal significance of the area Resources of site are beneficial to Aboriginal and non-Aboriginal people, and people of the future Site is an environmental corridor Site is unsuitable for development 	<ul style="list-style-type: none"> Aboriginal Significance Ecological area Site unsuitable 	<p>Aboriginal Significance</p> <p>Aboriginal heritage has been addressed appropriately during the concept plan stage as described in section 7.4 of the Concept Plan EA report and the statement of commitments forming part of the Concept Plan approval dated 21 December 2006.</p> <p>The Project application also contains a Desktop Assessment of Archaeological Potential which was conducted by Susan McIntyre-Tamwoy Heritage Consultant. This Assessment reviewed past studies and the Sandon Point Aboriginal Cultural Heritage Assessment, AASC 2006 (Stuart Huy's report). The area is highly disturbed from past activities, particularly quarrying, imported fill and modification of creek lines. The findings of past studies and assumption of areas of potential archaeology have been validated against geotechnical assessment to establish the extent of remaining topsoil. This has enabled Susan McIntyre-Tamwoy to formulate six recommendations as set out on page 77 of the EAR. One recommendation includes test excavation in areas of potential archaeology which can inform Heritage Interpretation. Any aboriginal objects recovered can be held in the Aboriginal Keeping Place which is currently the subject of a Development Application (DA) submitted to Wollongong City Council.</p> <p>Ecological area</p> <p>The proposal will remove an industrial use of the site, addresses degraded land issues and reconstruct environmental corridors with links to the regional open space and coast.</p> <p>Site unsuitable</p> <p>Suitability of the site has been established through the LES, LEP which rezoned the land to the current zoning and DCP, Stages 1 to 6 DAs, the COI and COI review by Charles Hill and the Concept Plan approval dated 21 December 2006.</p>
6	Objection	<ul style="list-style-type: none"> The area should be designated as a regional park administered by NSW National Parks Disagree with concept of buildings on the site 	<ul style="list-style-type: none"> Provision of Regional Park 	<p>Provision of Regional Park</p> <p>The SSS study proposes that the lands east of the site be zoned Environmental Protection 7A and form a regional park connecting with existing coastal open space. The proposed riparian corridors are also proposed to be zoned Environmental Protection 7A connecting to this future regional park. The current zoning, COI and Charles Hill review did not recommend that the entire site be a regional park.</p>

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7	Objection	<ul style="list-style-type: none"> Recommend that the site or portion recommended for Zone 7(a) be turned into a Regional Park Ecological values of the Forest are too great to sacrifice for development which does not consider ESD principles. Scale of development proposed by ARV is too great for such an ecologically sensitive site Concern regarding boundaries of the forest, as it will be completely surrounded by buildings and roads. Will affect the integrity and health of the forest as it will prevent the natural corridor effect of continuous vegetation. Documentation regarding vegetation management submitted with the application is vague. Concern regarding public access to forest. VMP does not address the specific history of the site. 	<ul style="list-style-type: none"> Provision of Regional Park Forest Ecological sensitive site Vegetation management History of site 	<p>Provision of Regional Park</p> <p>Addressed it Issue 6 above.</p> <p>Forest</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Ecological sensitive site</p> <p>Comments relate to ARV's site and are not relevant to Stockland's Project application.</p> <p>Vegetation management</p> <p>The comments are not clear, however it appears that the comment regarding the VMP relates to the ARVs site. For Stockland's land the VMP forms part of the Project Application (MP07_0032) documentation. The VMP clearly sets out the management requirements for Hewitts, Woodlands and Tramway Creeks.</p> <p>History of site</p> <p>A VMP does not address site history. In relation to Stockland's site, a Heritage Interpretation Plan (Godden Mackay Logan, 2001) has been developed for the Thirroul Brickworks and sets out principles of how to inform the community about its history and significance, which will be adapted to suit the final development proposal. A Heritage Interpretation Plan has also been prepared for Aboriginal Heritage and is attached as Appendix T to the EAR. Further a development application for an Aboriginal Keeping Place has been submitted to Wollongong City Council to interpret the Aboriginal heritage of the site.</p>
8	Objection	<ul style="list-style-type: none"> The site has been identified through studies and the Commission of Inquiry (COI) that it is a Traditional Site significant to Aboriginal people and is historical and must be protected. The site symbolises the struggles for Aboriginal people to sustain a connection back to the Dreaming. It is recommended that the site be declared an Aboriginal Area to guarantee its protection; Keeping Place area must be adhered to; 	<ul style="list-style-type: none"> Aboriginal Significance Declared Aboriginal site Keeping Place 	<p>Aboriginal Significance</p> <p>The COI did not identify Stockland's land being a Traditional Site. It is assumed that this comment relates to the Turpentine Forest which is not located on Stockland's site.</p> <p>Declared Aboriginal site</p> <p>DECC has recently declared parts of the site as An Aboriginal Place under the NPW Act to recognise the Aboriginal heritage value of those parts of the site. These include land at MaCauleys Beach and the Turpentine Forest, neither of which are located within Stockland's site.</p> <p>Keeping Place</p> <p>A development application for an Aboriginal Keeping Place has been submitted to Wollongong City Council to interpret the Aboriginal heritage of the site.</p>
9	Objection	<ul style="list-style-type: none"> The area is home to significant Aboriginal heritage. The proposal will destroy the important Aboriginal site and burial grounds. The proposal that Aboriginal artefacts will be stored in Keeping Place is meaningless. The entire site should be declared an Aboriginal Place of State and National significance. The impacts of climate change and building on a flood plain should be addressed. The current proposal does not address climate change. Thomas Gibson park should remain a public asset The area should be developed into a regional park 	<ul style="list-style-type: none"> Aboriginal Significance Aboriginal site Climate change Public park Regional park 	<p>Aboriginal Significance</p> <p>Aboriginal significance has been assessed during as part of the Concept Plan which has been approved and discussed in Issue 5 above. The requirement for a Keeping Place is a condition of previous Section 90 consents under the National Parks and Wildlife Act, 1974 in relation to Stages 2 to 6 located south of Sandon Drive (i.e. south of the Project application site).</p> <p>Aboriginal site</p> <p>DECC has previously considered the Aboriginal significance of the site. Specific parts of the Sandon Point site have been declared an Aboriginal Place under the National Parks and Wildlife Act.</p> <p>Climate change</p> <p>Flooding impacts, including an assessment of climate change flood risk has been extensively considered in the EA reports.</p> <p>Public park</p> <p>Part of Thomas Gibson Park has been reclassified Operational under the Local Government Act 1993 to facilitate the Wrexham Road link. This will not affect</p>

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				<p>the playing fields within Thomas Gibson Park.</p> <p>Regional park</p> <p>Addressed in Issue 6 above.</p>
10	Objection	<ul style="list-style-type: none"> Disagree with findings of report on climate change and sea level rise. Documentary information advises that sea level will rise to over 6 metres due to world glacial meltdown. The information in the report is based on outdated figures and is not accurate; Flood plains of Sandon Point will eventually be under the sea level due to sea level rise Tsunami impacts on development not considered in detail Peer review by GHD appears to have not been read Overall reject the climate change report and object to the information provided in it 	<ul style="list-style-type: none"> Climate change Sea level rise Tsunami impacts 	<p>Climate change</p> <p>CFR has based its assessment on the maximum expected sea level rise over the next 100 years as specified in the most recent DECC climate change guideline (Oct 2007)</p> <p>Sea level rise</p> <p>The reconstructed floodplains within the subject site will accommodate the effects of sea level rise for at least the next 100 years.</p> <p>Tsunami impacts</p> <p>There is no regulatory requirement to assess tsunami risk and no currently accepted methodology for assessment of the size and/or frequency of tsunamis that may affect the NSW coast-line.</p>
11	Objection	<ul style="list-style-type: none"> The development is occurring on significant Aboriginal land The site is of important local biodiversity, including the Turpentine Forest, the Tramway Creeks and wetlands. These natural areas will be destroyed by this development; Important factors such as flooding, climate change have not been considered The area needs to preserve the open green areas. 	<ul style="list-style-type: none"> Aboriginal Significance Biodiversity Flooding Climate change Provision of Public park 	<p>Aboriginal Significance</p> <p>Addressed in Issue 5 above.</p> <p>Biodiversity</p> <p>The Turpentine Forest does not form part of Stockland's site.</p> <p>The issue of biodiversity has been addressed under the heading of Flora and Fauna conservation in Issue 1 above.</p> <p>Flooding</p> <p>Flooding impacts, including an assessment of climate change flood risk has been extensively considered in the EA reports.</p> <p>Climate change</p> <p>Flooding impacts, including an assessment of climate change flood risk has been extensively considered in the EA reports and the climate change assessment prepared by CFR.</p> <p>Provision of Public park</p> <p>The Stockland proposal provides for extensive open space to be dedicated to Council including extensive rehabilitation works to the creeks and vegetation that are currently degraded. The proposal provides for greater levels of public open space than would result under the current zonings of the site.</p>
12	Objection	<ul style="list-style-type: none"> The proposal will threaten biodiversity, threatened species and endangered ecological communities. The site floods at an extremely quick level, and the flooding would have to be absorbed to the detriment of the surrounding community The site is of high Aboriginal significance and should therefore be protected. Existing significant items will be affected by the development. The Turpentine Forest and creek corridors should be listed as an Aboriginal place of significance and added to the land at the Karadji site. 	<ul style="list-style-type: none"> Biodiversity Flooding Aboriginal Significance Preservation of the Forest 	<p>Biodiversity</p> <p>The issue of biodiversity has been addressed under the heading of Flora and Fauna conservation in Issue 1 above.</p> <p>Flooding</p> <p>It is agreed that the rate of rise of floodwaters at the site is rapid, which is a common flooding characteristic for all creeks in the northern suburbs of Wollongong. Appropriate management measures reflecting such a characteristic are documented in the NSW Government's Floodplain Development Manual and Council's DCP54 '<i>Managing our Flood Risks</i>', and have been applied to the project. These measures comprise various prescriptive controls (including minimum floor levels) and an evacuation strategy in the PMF event where required. It has also been demonstrated (by modelling) that the development will not increase flood affectation of adjoining properties.</p> <p>Aboriginal Significance</p>

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				<p>Refer to Issue 5 above.</p> <p>Preservation of the Forest</p> <p>The Turpentine Forest does not form part of Stockland's site. DECC has recently declared parts of the site as An Aboriginal Place under the NPW Act to recognise the Aboriginal heritage value of those parts of the site. These include land at MaCauleys Beach and the Turpentine Forest, neither of which are located within Stockland's site. The recent Aboriginal Place declarations did not incorporate the riparian corridors.</p>
13	Objection	<ul style="list-style-type: none"> ▪ The riparian corridors for the creeks are not sufficiently wide to ensure ecological health ▪ Development will impact on the health of the flora and fauna of the creek ▪ The setback to the Turpentine Forest should be increased, not reduced; ▪ There should be more thorough studies for Aboriginal significance in the area; ▪ No action appears to be happening regarding the Keeping Place; ▪ Effect of development on the visual impact of the site is very much underplayed. ▪ Inadequate information has been provided regarding infrastructure for water and sewerage. ▪ Object to the reclassification of public land at Thomas Gibson Park. ▪ The proposal documents do not adequately address the issues raised by Government Department's, such as issues raised from DECC, the RTA and Heritage Council, ▪ Technical assumptions in the Climate Change report are simple and incorrect. ▪ The study does not quantify the amount of discharge for the 20 year ARI. Report promotes an undersized channel which is unsatisfactory from a hydraulic perspective ▪ Woodlands Creek would require a high level of scour protection to ensure channel stability – this is not reflected on the detail plans for the Woodlands Creek rehabilitation ▪ Study does not include results that quantify the flow velocities for Woodlands Creek in any flood event ▪ Study des not indicate any flood modelling of the railway line embankment for any of the watercourses ▪ Study does not include modelling of Tramway Creek. Proposed tailout works are not consistent with the Hewitts Creek Floodplain Risk Management Plan (FRMP). ▪ The Duty of Crown is to return land to the original owners when the land is no longer required. ▪ Land should be returned to the crown to restore balance to Australian life with the intention of greater public good ▪ The return of lands should take into account the wide range of land needs of Australia's surviving first people. ▪ The NSW Government should return the indigenous lands to the indigenous people of the area. ▪ Right to revitalise culture and reconciliation with indigenous people ▪ Keeping Place details to be forwarded to indigenous cultural partners ▪ Illawarra Regional Strategy needs to be reviewed to include provisions for the cultural specific land needs of Indigenous people in the Illawarra, due to there being a high population of indigenous people; ▪ Sandon Point provides a key area for Indigenous people and it should not be developed until proper provisions are made for the future of indigenous significance in the area. 	<ul style="list-style-type: none"> ▪ Riparian corridors ▪ Ecological health ▪ Flora and fauna ▪ Aboriginal Significance ▪ Keeping Place ▪ Visual impact on site ▪ Infrastructure ▪ Loss of Public park ▪ Documentation inadequate ▪ Climate change ▪Crown land ▪Indigenous needs ▪Illawarra Regional Strategy 	<p>Riparian corridors</p> <p>Riparian corridors have been widened consistent with the Concept Plan approval dated 21 December 2006. The Climate Change risk assessment did not require the corridors to be widened any further to manage potential climate change impacts.</p> <p>Ecological health</p> <p>Addressed in Issue 1 under the heading of Flora and Fauna impacts. Riparian corridors have been widened improving opportunities for the ecological function of the corridors.</p> <p>Flora and fauna</p> <p>Addressed in Issue 1 above.</p> <p>Aboriginal Significance</p> <p>There have been a significant number of studies in into the Aboriginal significance of the area allowing for this issue to be comprehensively assessed.</p> <p>Refer also to Issue 5 above.</p> <p>Keeping Place</p> <p>Refer to Issue 8 above.</p> <p>Visual impact on site</p> <p>The Concept Plan approval required the widening of the Woodland Creek riparian corridor and a reduced development footprint for the residential subdivision. The Project application is consistent with the Concept Plan approval. The widened Woodlands Creek corridor was not driven by visual impact concerns. The requirements of the Concept Plan approval is such that the visual impacts of the development are unchanged from the Concept Plan or reduced from certain view points.</p> <p>Infrastructure</p> <p>Refer to Issue 4 above.</p> <p>Loss of Public park</p> <p>Refer to Issue 9 above. The land has been reclassified.</p> <p>Documentation inadequate</p> <p>The writer's comments must be related to issues raised by DECC, RTA and Heritage Council etc during the public exhibition of the Concept Plan application, as the comments from these agencies would not have been available or received in relation to the Project application. Issues raised by the agencies were addressed in the October 2006 Response to Agency Submissions and subsequent meetings with DoP. Further issues raised by Agencies have been addressed in this Response to Agency Submissions.</p> <p>Climate change</p> <p>The basis for objection is not known. The Climate Change Report has been prepared by experts in this field including Cardno Forbes Rigby and Cardno</p>

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				<p>Lawson Treloar and reviewed by GHD.</p> <p>Crown land</p> <p>The land the subject of the Project application is not Crown land and therefore cannot be “returned”.</p> <p>Indigenous needs</p> <p>As stated above, the land is not Crown land to be returned. The potential for Aboriginal archaeology has been assessed as outlined in Issue 5 above. The Project includes a Heritage Interpretation Plan to synthesise previous research and present this in a manner that informs the wider community about the Aboriginal history and associations with Sandon Point. Similarly the Keeping Place will perform a similar role, and a DA has been submitted with Wollongong Council for the Keeping Place.</p> <p>Illawarra Regional Strategy</p> <p>The Illawarra Regional Strategy 2006-1031 has been reviewed in Section 5.2.12 of the EAR. The inclusion of additional provision in the Strategy in relation to the cultural specific land needs of Indigenous people in the Illawarra is a matter for the Department of Planning and beyond the scope of the Major Project process and this Project application.</p>
14	Objection	<ul style="list-style-type: none"> ▪ The Duty of Crown is to return land to the original owners when the land is no longer required. ▪ Land should be returned to the crown to restore balance to Australian life with the intention of greater public good ▪ The return of lands should take into account the wide range of land needs of Australia’s surviving first people. ▪ The NSW Government should return the indigenous lands to the indigenous people of the area. ▪ Right to revitalise culture and reconciliation with indigenous people ▪ Keeping Place details to be forwarded to indigenous cultural partners ▪ Illawarra Regional Strategy needs to be reviewed to include provisions for the cultural specific land needs of Indigenous people in the Illawarra, due to there being a high population of indigenous people; ▪ Sandon Point provides a key area for Indigenous people and it should not be developed until proper provisions are made for the future of indigenous significance in the area. 	<ul style="list-style-type: none"> ▪ Crown land ▪ Indigenous needs ▪ Keeping Place ▪ Illawarra Regional Strategy ▪ Aboriginal Significance 	<p>Crown land</p> <p>The land the subject of the Concept Plan application is not Crown Land</p> <p>Indigenous needs</p> <p>Addressed in Issue 13 above.</p> <p>Keeping Place</p> <p>Refer to Issue 8 above. The concept developed by EDAW for the Aboriginal Keeping Place was circulated to each of the Aboriginal groups and representatives, Council and DECC in April 2008, with a request for ideas and identification of any areas in which groups or individuals might want to have design input.</p> <p>Illawarra Regional Strategy</p> <p>Addressed in Issue 13 above.</p> <p>Aboriginal Significance</p> <p>Addressed in Issue 5 above.</p>
15	Objection	<ul style="list-style-type: none"> ▪ Community concerns and recommendation is that the application be rejected and that the whole site be instated as a Regional park and Aboriginal Heritage Conservation area. ▪ Public consultation period was inadequate and documentation was not made available at libraries ▪ Land should be utilised as a regional park. ▪ The proposal is almost twice the size of the development recommended by Commission of Inquiry ▪ The site accommodates significant Aboriginal heritage, including artefacts and burial sites ▪ There is no agreement on details for Keeping Place. Keeping Place should be included as a condition ▪ Issues raised by DECC have not been addressed by proposal ▪ The floor space appears to be high density rather than medium density as per the 2b zoning ▪ The width for the riparian corridor along the creek must be increased ▪ Flora and fauna studies have errors. They ignore the State listing of endangered ecological communities and do not provide sufficient conservation buffer zones ▪ The flood plain and creek are at serious risk of flooding ▪ Do not accept the findings of the Climate Change report ▪ Traffic congestion will increase in the area and will cause major impacts on local roads. Traffic studies provided are deficient in information 	<ul style="list-style-type: none"> ▪ Regional park ▪ Heritage conservation area ▪ Public consultation ▪ Over development ▪ Aboriginal Significance ▪ Keeping Place ▪ Density ▪ Creek ▪ Flora and fauna ▪ Floor plain ▪ Climate change ▪ Traffic ▪ Park land ▪ Railway bridge ▪ Asset protection zone 	<p>Regional park</p> <p>Addressed it Issue 6 above.</p> <p>Heritage conservation area</p> <p>DECC has recently declared parts of the site as An Aboriginal Place under the NPW Act to recognise the Aboriginal heritage value of those parts of the site.</p> <p>Public consultation</p> <p>Multiple copies of all documents were provided to the Department of Planning for the purposes of the public exhibition.</p> <p>Over development</p> <p>The footprint of developable land in the Project application is not twice the size of that recommended by the COI as illustrated in Figure 12 of the Concept Plan EAR Volume 2, prepared by DFP.</p> <p>Aboriginal Significance</p> <p>Addressed in Issue 5 above. Refer also to Response to Agency Submissions.</p> <p>Keeping Place</p> <p>Refer to Issue 8 and 14 above.</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
		<ul style="list-style-type: none"> Object to loss of parkland for use in development. Thomas Gibson Park will be impacted by the access road Stockland have demolished the heritage railway bridge at Wrexham Rd entrance, which once provided access to the park and beach. There are no benefits from this, but rather negative public impacts; The asset protection zone around the forest is too small. 		<p>Density</p> <p>The density (dwellings/ha) of the Stockland component is less than the target set in DCP 94/17. The Concept Plan approved a residential subdivision for up to 285 dwellings comprising:</p> <ul style="list-style-type: none"> 180 lots, super lots for 25 townhouses and a superlot for up to 80 dwellings. <p>The Project application proposes a residential subdivision for up to 261 dwellings comprising:</p> <ul style="list-style-type: none"> 167 lots, super lots for 14 townhouse/terrace style dwellings and a superlot for up to 80 dwellings. <p>The density of the site development is therefore slightly less than approved in the Concept Plan application.</p> <p>Riparian corridors</p> <p>The width of the riparian corridors has been addressed in Issue 13 above.</p> <p>Flora and fauna</p> <p>The Project application does contain further flora and fauna impacts as these were addressed in the Concept Plan approval. The writer's comments could relate to the Revised Concept Plan which was exhibited with the Project application. Cumberland Ecology has reviewed EEC listings in the preparation of the VMPs for the creek corridors and these are documented in Section 4.1.4 of the VMP (Appendix K to the EAR).</p> <p>Flood plain</p> <p>Flood risk is addressed in Appendices contained in the EAR and the Climate Change Assessment, Volume 5).</p> <p>Climate change</p> <p>Addressed in Issue 13 above.</p> <p>Traffic</p> <p>Addressed in Issue 2 above and Issue 2 in Part B.</p> <p>Park land</p> <p>Addressed in Issue 9 above.</p> <p>Railway bridge</p> <p>The Wrexham Road railway bridge was demolished with the development consent of Wollongong City Council. Approval for reconstruction is sought as part of the Project application.</p> <p>Asset protection zone</p> <p>These comments relate to ARV's site and are not specifically relevant to Stockland's Project application.</p>
16	Objection	<ul style="list-style-type: none"> Original proposal was declared null and void by Land & Environment Court, yet the same proposal with a new climate change report is being exhibited, that includes no flood study Economic and social costing for public funds for maintenance of infrastructure ARV intends to avoid any S94 funds Wollongong Council stated in its submission that the submitted Flood study is incomplete, regarding the channel sizes, flood modelling, flooding impacts not reflected in modelling, Huys AASC Sandon Point Aboriginal Heritage Study not exhibited; Concept Plan documentation must undergo a test of adequacy; Commission of Inquiry recommended rezoning all the Turpentine Forest surrounds for environmental protection to include a Regional Park; 	<ul style="list-style-type: none"> Climate change Economic/social costing Lack of S94 contribution Inadequacy of Flood study Flooding issues Lack of Aboriginal heritage study Preservation of the Forest Impact of Thomas Gibson Park Native Title 	<p>Climate change</p> <p>The Court of Appeal has found that the Minister's approval was not void. A flood study and climate change assessment has been carried out and submitted with the Project application.</p> <p>Economic/social costing</p> <p>The project application contains a draft VPA which sets out the function and provision of certain infrastructure, land dedications and Section 94 contributions proposed to be provided by Stockland, consistent with the Sandon Point Submission to the Minister for Planning Agreement for Infrastructure forming part of the Concept Plan. Council at its meeting on 1 June 2007 considered the draft VPA and agreed in principle to its terms.</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
		<ul style="list-style-type: none"> Rezoning of Thomas Gibson Park was approved by the now sacked Wollongong Councillors. The decision to demolish the heritage Wrexham Rd Bridge was approved by Wollongong General Manager, who was named at the ICAC investigations Any bridges over sensitive floodplains, would require EPBC approval under relevant Commonwealth legislation The Federal Aboriginal Heritage Acts and the Native Title Act 93 must be considered as part of proposal Flood risk issues were not addressed as part of the original approval Tramway Creek is being deliberately destroyed Stockland agreed to extend the size of the water ponds, but still have not. In 2003 Stockland were given subdivision certificates by Wollongong Council to comply this. The site is of high significance for Aboriginal heritage and culture, especially Women. The Aboriginal people are the original owners prior to it was stolen by the Crown; It is apparent there is a failure of transparency and due process and human and environmental rights are not protected in NSW. The proposal should be referred to ICAC. 	<ul style="list-style-type: none"> Flooding issues Aboriginal heritage 	<p>Lack of S94 contribution</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Inadequacy of Flood study</p> <p>Responses to the Wollongong City Council submissions dated 16 November 2007 and 7 July 2008 have been addressed in this Response to Agency Submissions.</p> <p>Flooding issues</p> <p>See above comment.</p> <p>Lack of Aboriginal heritage study</p> <p>The AASC (Stuart Huy's) report was commissioned by DoP, not the proponents. It does not form part of the Project application documentation.</p> <p>Preservation of the Forest</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Impact of Thomas Gibson Park</p> <p>Part of Thomas Gibson Park has been reclassified as operational land under the Local Government Act, and the reclassification remains valid despite the sacking of Wollongong City Council. The reclassification facilitates a road connection which was identified as desirable during the LES planning process leading up to the current zoning of Sandon Point and reflected in the current site DCP.</p> <p>Wrexham Road bridge demolition was carried out with the development consent of Wollongong City Council.</p> <p>Federal Aboriginal Acts and Native Title Act</p> <p>The Aboriginal and Torres Strait Island Heritage Protection Act 1984 seeks to ensure the preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition. Part 1 s7 of the Act points out that <i>This Act is not intended to exclude or limit the operation of a law of a State or Territory that is capable of operating concurrently with this Act.</i> Aboriginal heritage issues at Sandon Point have been considered under existing State laws protecting cultural heritage. The heritage values of the area have been a matter of extensive assessment and the management methods proposed are consistent with those assessments.</p> <p>Applications to the Federal Minister to make declarations under this Act must be made by Aboriginal persons. The Minister will only make a declaration where they believe that the area is both significant and threatened (and it is implied – not being protected under state provisions). The State provisions have functioned to provide adequate scrutiny to heritage assessments in the Sandon Point area and that no declaration would be made under this particular Act in this particular case.</p> <p>In relation to the Native Title Act, 1993, Section 23B defines <i>previous exclusive possession act</i> as the Grant of freehold estates or certain leases etc. on or before 23.December 1996. The land was freehold prior to December 1996, and therefore the previous exclusive possession of this area means that Native Title has been extinguished.</p> <p>Flooding issues</p> <p>Refer to Issue 2 above.</p> <p>Aboriginal heritage</p> <p>Comments appear to relate to ARV's site. Aboriginal heritage has been addressed in Issue 5.</p>

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16A	Objection	<ul style="list-style-type: none"> ▪ Proposal needs to take full account of other relevant state and federal legislation, status of lands in L & E Court, alternative studies, community issues and other factors ▪ Legal changes have affected the status of the site, so that some lands within the concept site remain locked in court cases. ▪ Minister has not explained why Commission of Inquiry findings have not been adhered to. 	<p>DoP did not provide an issue summary.</p> <ul style="list-style-type: none"> ▪ Relevant legislation ▪ Status of site ▪ COI findings 	<p>Relevant legislation</p> <p>Relevant legislation has been taken into account as documented in the EAR. Climate Change Assessment has been undertaken and provided in Volume 5.</p> <p>Status of site</p> <p>Status of the site has not changed as a consequence of recent court cases.</p> <p>COI findings</p> <p>Consistency with Col findings are documented in the Concept Plan EAR and the Project application is consistent with the Concept Plan approval.</p>
17	Objection	<ul style="list-style-type: none"> ▪ The modelling in the Cardno Forbes Rigby Climate Change report is flawed. The site will be affected by weather events which result in rainfall intensity and raise in sea level ▪ The old jetty was destroyed by a severe storm. A second stronger jetty was built, which was also destroyed by a storm. Does the Climate Change report consider the predictability in their modelling for a storm? ▪ Homes are already at risk by land slip ▪ Erosion is a real threat to coastal communities. The whole site should be a buffer zone between the sea and development ▪ Urge the Minister to reject the proposal on the above grounds and adopt to the Commission of inquiry recommendations for a Regional Park 	<ul style="list-style-type: none"> ▪ Weather events ▪ Jetty ▪ Erosion ▪ Provision of Regional Park 	<p>Weather events</p> <p>The Climate Change Assessment addresses possible increased rainfall events and rising sea levels consistent with the parameters set out in the DECC Floodplain Risk Management Guideline title Practical Consideration of Climate Change dated 25 October 2007.</p> <p>Jetty</p> <p>The CFR climate change report appraises the vulnerability of the development to wave attack in extreme events for the existing climate, and in a climate change scenario under high ocean-level inundation. It also considers climate-change enhanced storm erosion and beach recession during a 100-years planning period.</p> <p>Erosion</p> <p>Geotechnical investigation by Network Geotechnics, February 2003 found that the northern portion of the Cookson site and the southern portion of the Brickworks site and the slopes north from Hewitts Creek as have a Medium Risk of overall slope instability. The steep batters of uncontrolled fill either side of Hewitts Creek have a High Risk of local instability, with the remainder of the site assessed as having a Low Risk. Network Geotechnics concluded that following site earthworks outlined in their report and remedial work along Hewitts Creek that the risk of local instability would be reduced to Medium Risk, which is normally acceptable to Council.</p> <p>Provision of Regional Park</p> <p>The Col did not recommend that the entire site form a Regional Park.</p>
18	Support	<ul style="list-style-type: none"> ▪ The proposed Concept Plan looks excellent. There is lots of green space which retains original vegetation and amenities for aged citizens in need of safe accommodation. ▪ There is a need for a facility like this in the area with many aged people requiring such a facility; ▪ The proposal seems to be an excellent compromise between need for conservation and the needs of an ageing population. 	<ul style="list-style-type: none"> ▪ Green areas ▪ Safe accommodation ▪ Facility for aged ▪ Ageing population 	<p>Green areas</p> <p>We agree with the comments made.</p> <p>Safe accommodation</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Facility for aged</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Ageing population</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p>
19	Objection	<ul style="list-style-type: none"> ▪ Extensive Aboriginal cultural heritage exists on the site, including burial grounds. The works to date on the site have resulted in the destruction of irreplaceable ancient human heritage ▪ The entire site should be declared an Aboriginal Place of State and National Significance ▪ The proposal will threaten local biodiversity including flora and fauna ▪ There are a number of endangered ecological communities which exist on the site and have not yet been mapped as requested by DECC. ▪ The four creeks merge at Sandon Point to create a floodplain, absorbing the water into ground water 	<ul style="list-style-type: none"> ▪ Aboriginal culture ▪ Aboriginal site ▪ EEC mapping ▪ Floodplain ▪ Stormwater Management ▪ Climate Change 	<p>Aboriginal culture</p> <p>Subdivision development works in Stages 2 to 6 have taken place with the appropriate consents.</p> <p>Aboriginal site</p> <p>Refer to Issue 9 above.</p> <p>Flora and fauna – refer to Issue 1 above.</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
		<p>systems</p> <ul style="list-style-type: none"> Stormwater management system built by Stockland on the southern part of the site were found to have severe shortcomings. The current proposal is for a much larger residential development, with even greater changes of failure in proper stormwater management. The new revised proposal does not adequately address the impacts of climate change nor ESD principles as defined under the Protection of the Environment Administration Act 91. The proposal does not address the precautionary principles; inter-generational equity; conservation of biological diversity and ecological integrity; and improved valuation, pricing and incentive mechanisms. Public open space should be retained for playing fields and open space for sport/recreation The proposal does not include allowance for public facilities such as schools, community centres, public transport, sports fields and so forth. 	<ul style="list-style-type: none"> Public land Public facilities 	<p>EEC mapping</p> <p>EEC mapping was addressed in the Response to Agency Submissions in relation to the Concept Plan application (Appendix G) and the Concept Plan was approved.</p> <p>Floodplain</p> <p>All four creeks have been considered in the flood modelling and the climate change assessment.</p> <p>Stormwater Management</p> <p>Stormwater management systems and creek corridors have been modelled and designed for a wide range of conditions, including those under climate change scenarios.</p> <p>Climate Change and ESD</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application. The matters of ESD are addressed in Section 9 of the EAR.</p> <p>Public land</p> <p>The playing fields of Thomas Gibson Park are not affected by the proposal.</p> <p>Public facilities</p> <p>The site has been zoned for residential development since 1997, and the capacity of local schools, community facilities and recreations facilities is a matter relevant to the Local Environment Study and LEP preparation process the preceded the zoning of the land. Provision is made within the residential subdivision for a bus route, and the site is within close proximity of Thirroul railway station providing public transport options for future residents.</p>
20	Objection	<ul style="list-style-type: none"> Previous application failed to consider ESD principles and climate change impacts Current proposal lacks credibility in relation to these issues Endangered Ecological Communities and Threatened birds will be impacted by the proposal. Natural areas will be affected by these developments Land between Hewitts & Woodlands Creek is well known floodplain. Climate Change will increase flooding Sale of Thomas Gibson Park goes against community need for more open space, not less Traffic through back streets will only increase the influx of new residents Aboriginal Heritage which has not been properly acknowledged, exists throughout the site Land best managed as a major coastal park. Natural constraints on this site would then be respected. 	<ul style="list-style-type: none"> Climate change ESD Principles Proposal lacks credibility Flood plain Thomas Gibson Park Traffic Aboriginal heritage Coast park 	<p>ESD Principles</p> <p>The matters of ESD are addressed in Section 9 of the EAR.</p> <p>Climate change</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application.</p> <p>Proposal lacks credibility</p> <p>The EAR and accompanying reports have been prepared by qualified and consultants experienced in their respective fields.</p> <p>Flood plain</p> <p>Potential impacts of climate change upon the floodplain has been addressed in the Climate Change Assessment prepared by Cardno Forbes Rigby.</p> <p>Thomas Gibson Park</p> <p>Addressed in Issue 9.</p> <p>Traffic</p> <p>Traffic impacts have been examined in the Concept Plan application which has been approved. The Project application does not increase the density of development and traffic generation is therefore unchanged from the studies undertaken at Concept Plan stage.</p> <p>Aboriginal heritage</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application. Also refer to issues above as relevant.</p> <p>Coastal park</p> <p>Addressed at Issue 6.</p>
21	In principle	<ul style="list-style-type: none"> Pedestrian path be maintained and open to the public. Used for 20 yrs as an access point to the Beach 	<ul style="list-style-type: none"> Pedestrian path 	<p>Pedestrian path</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
	support	<ul style="list-style-type: none"> Existing worker and manufacture plant be maintained in appropriate industrial area Aged care facility provide much needed employment Aged care facility will have minor impact on surrounding residents Existing land is an eyesore. Recognition of Aboriginal heritage is acknowledged 	<ul style="list-style-type: none"> Industrial area Aged care facility Aboriginal heritage 	<p>Wilkie's walk will be retained in the form of a pedestrian path along the east-west road between Stockland and ARV's site. A connection to the regional pedestrian and cycleway is provided through Stockland's land providing access to the beach.</p> <p>Industrial area</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Aged care facility</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p> <p>Aboriginal heritage</p> <p>Comment relates to ARV's site and is not relevant to Stockland's Project application.</p>
22	Objection	<ul style="list-style-type: none"> Strongly suggest the Minister for Planning adopt the recommendations of the Commission of Inquiry into Sandon Point. The proposed level of development is absurd The approach in regard to climate change should be very rigorous. The site area can go from dry to flooded in half an hour. Wollongong rate payers may have to pay for the acquisition of flood affected properties on this site 	<ul style="list-style-type: none"> Climate change Flooding 	<p>Climate Change</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application.</p> <p>Flooding</p> <p>The proposed sale of section 94A land from Stockland to Wollongong City Council is a provision within the draft Voluntary Planning Agreement. Council at its meeting on 1 June 2007 considered the draft VPA and agreed in principle to its terms.</p>
23	Objection	<ul style="list-style-type: none"> Extensive Aboriginal cultural heritage exists on the site, including burial grounds, middens, toolmaking sites. The entire site must be declared an Aboriginal Place of State and National Significance Proposal will threaten local biodiversity, including threatened species, migratory species and endangered ecological communities This proposal does not adequately address the impacts of climate change nor ESD principles Oppose use of public land for private development Traffic issues in relation to Wrexham Rd remain unresolved. Predicted increase in traffic will cause major problems of safety and reduced traffic flow Urge Department to reject proposal and to protect whole area as a Regional Park under the management of DECC 	<ul style="list-style-type: none"> Aboriginal cultural heritage Biodiversity Climate change ESD Principles Public land Traffic issues Regional park 	<p>Aboriginal cultural heritage</p> <p>Refer to Issue 9.</p> <p>DECC has recently declared parts of the site as An Aboriginal Place under the NPW Act to recognise the Aboriginal heritage value of those parts of the site. These include land at Macauleys Beach and the Turpentine Forest, neither of which are located within Stockland's site.</p> <p>Biodiversity</p> <p>Issues of biodiversity, flora and fauna impacts and EECs were addressed in the Concept Plan application which has been approved. Refer also to Issue 1.</p> <p>Climate change</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application.</p> <p>ESD Principles</p> <p>The matters of ESD are addressed in Section 9 of the EAR.</p> <p>Public land</p> <p>The majority of the site is not public land. The only component of the Project which is public land is a portion of land located within Thomas Gibson Park which has been reclassified operational land under the Local Government Act, 1919 to facilitate the Wrexham Road extension and link road.</p> <p>Traffic issues</p> <p>Traffic issues associated with Wrexham Road have been addressed in the Concept Plan application which has been approved. Christopher Stapleton Consulting found that the traffic lights to be installed at the intersection Wrexham Road and Lawrence Hargrave Drive will operate at Level of Service C or better. In their 2007 Report, CSC found that traffic generation from the proposed subdivision including ARV's proposed development will be significantly lower than the past assessments. They conclude that <i>"if anything, the lower generation of the Sandon Point/Cookson site should provide even greater spare capacity at these intersections [including Wrexham Road and Lawrence Hargrave Drive], and therefore reduce delays from the worst case</i></p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
				<p><i>Level of Service “C” report by Gabites Porter for the year 2016 to a ‘good’ operation of Level of Service “A” or “B”.</i></p> <p>Regional park</p> <p>Addressed at Issue 6.</p>
24	Objection	<ul style="list-style-type: none"> ▪ Extensive Aboriginal cultural heritage exists on the site, including burial grounds, middens, toolmaking sites and food gathering. The site must be declared an Aboriginal place of State/National significance ▪ Proposal will threaten local biodiversity, including threatened species, migratory species and endangered ecological communities ▪ This proposal does not adequately address the impacts of climate change nor ESD principles ▪ Oppose use of public land for private development ▪ Predicted traffic increase through local roads will cause major problems of safety 	<ul style="list-style-type: none"> ▪ Aboriginal heritage ▪ Biodiversity ▪ Climate change ▪ ESD Principles ▪ Public land ▪ Traffic 	<p>Aboriginal heritage</p> <p>Addressed at Issue 9.</p> <p>DECC has recently declared parts of the site as An Aboriginal Place under the NPW Act to recognise the Aboriginal heritage value of those parts of the site. These include land at MaCauleys Beach and the Turpentine Forest, neither of which are located within Stockland's site.</p> <p>Biodiversity</p> <p>Issues of biodiversity, flora and fauna impacts and EECs were addressed in the Concept Plan application which has been approved.</p> <p>Climate change</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application.</p> <p>ESD Principles</p> <p>The matters of ESD are addressed in Section 9 of the EAR.</p> <p>Public land</p> <p>The majority of the site is not public land. One component of the Project which is public land is a portion of land located within Thomas Gibson Park which has been reclassified operational land under the Local Government Act, 1919 to facilitate the Wrexham Road extension and link road. Tail-out drainage works associated with Hewitts Creek are also proposed on part of Council's land east of the site. These works would be carried out, in part, in satisfaction of the Hewitts Creek Flood Risk Management Plan.</p> <p>Traffic</p> <p>Traffic safety has been addressed in the Local Area Traffic Managment Review prepared by Christopher Stapleton Consulting and attached at Appendix N to the EAR. This identified measures to calm traffic along the north-south link road. Other roads within the subdivision are local roads carrying local traffic to service only the immediate residents and would not present traffic safety issues.</p>
25	Objection	<ul style="list-style-type: none"> ▪ Object to allowing developers to re-submit proposals. ▪ Proposals means continued disrespect and contempt for Aboriginal people ▪ Loss of much needed coastal park 	<ul style="list-style-type: none"> ▪ Aboriginal people ▪ Coastal park 	<p>Aboriginal people</p> <p>Addressed in Issue 5 above.</p> <p>Coastal park</p> <p>The proposal does not result in the loss of a coastal park as the land is within private ownership, zoned for residential development and not identified as being regional or coastal park.</p>
26	Objection	<ul style="list-style-type: none"> ▪ The Aboriginal Keeping Place is a sneaky and patronising negotiation by Stockland without establishing the required Management committee. ▪ Request that Ms Susan McIntyre-Tamwoy be removed from the Sandon Point matter, under Section 10 of the Racial Discrimination Act 1976 ▪ Request the Federal Aboriginal Affairs & Environment Minister return Sandon Point to the Illawarra Aboriginal community and the wider community for a coastal regional park ▪ Proposed snake path would adversely impact the heritage values of Sandon Point headland requiring S90 consents to destroy Aboriginal place of State Significance ▪ Since 2002 there have been many court challenges at Sandon Point by two Aboriginal applicants ▪ Sandon Point headland is a gazetted Aboriginal Place and a surfing icon. It is a natural landmark and 	<ul style="list-style-type: none"> ▪ Aboriginal keeping place ▪ Return Sandon Point to people ▪ Heritage values ▪ Court challenges ▪ Aboriginal place of significance ▪ Stormwater ▪ Commission of Inquiry ▪ Management committee ▪ Cost of land 	<p>Aboriginal keeping place</p> <p>The requirement for a Keeping Place is a condition of previous Section 90 consents under the National Parks and Wildlife Act, 1974 in relation to Stages 2 to 6 located south of Sandon Drive. .</p> <p>Return Sandon Point to people</p> <p>The land the subject of the Project application is not Crown land and therefore cannot be “returned”.</p> <p>Heritage values</p> <p>Aboriginal heritage has been addressed in Issue 5</p> <p>Court challenges</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
		<p>therefore any built structure would be inappropriate and unwelcome.</p> <ul style="list-style-type: none"> ▪ Must be no construction in Tramway Creek wetland where Stockland previously excavated a stormwater outlet without development consent. ▪ Commission of Inquiry findings have been ignored, whilst amendments to Part 3A legislation occurred allowing for deletion of provisions for protection that applied to Sandon Point ▪ Aboriginal significant places have been ignored by Stocklands, and they have failed to conduct any studies of Aboriginal cultural heritage ▪ Proposal should not be attempted without prior establishment of a court ordered management committee ▪ Illawarra Local Aboriginal Land Council (ILALC) warned Sydney Water in 1998, to not sell the land. Stockland paid \$2.1 Million for the beachfront land including the burial ground and midden, gaining about \$8 Million dollars from public land ▪ Royal Commission is required. The Federal Government should seek means to acquire this Aboriginal Meeting Place for a coastal regional park. ▪ The land should be managed under Federal Provisions or DECC Schedule 14 with an inclusive Aboriginal Management Committee to provide and restore this traditional meeting place. 	<ul style="list-style-type: none"> ▪ Federal Government intervention 	<p>Previous court challenges have been heard and resolved and are not directly relevant to the assessment of the Project application.</p> <p>Aboriginal place of significance</p> <p>The Project application does not include land has been declared an Aboriginal Place under the National Parks and Wildlife Act.</p> <p>Stormwater</p> <p>The Concept Plan approval has approved a developable footprint south of Tramway Creek. Aside from the construction of the subdivision in the approved area, there are no other construction works including services proposed within Tramway Creek</p> <p>Commission of Inquiry</p> <p>The COI findings and Charles Hill review has been considered in the Concept Plan application which has been approved.</p> <p>Management committee</p> <p>There is no court ordered management committee and it is not within the scope of the Project application to initiate such a committee.</p> <p>Cost of land</p> <p>Past land transfers, nor the amount paid is a matter relevant to the Project application.</p> <p>Federal Government intervention</p> <p>This is not a matter that Stockland can address.</p>
27	Objection	<ul style="list-style-type: none"> ▪ Problem with new Climate Change analysis is that it is predicated on flood studies originally under taken by Forbes Rigby. ▪ Numerous errors made in Forbes Rigby study, including omission of watercourses ▪ No demonstration of Forbes Rigby being impartial in flood study – Minister must demand a complete and independent study of the site. ▪ Commission of Inquiry made sound and sensible recommendations relating to the riparian corridors necessary on Woodlands Creek ▪ No hard engineering solution were recommended by Government Departments for Woodlands Creek ▪ Cardno Forbes Rigby Report contradicts itself, with its previous findings for Wollongong Council and as part of the Concept Plan proposal – this aspect of the study requires independent analysis ▪ The current concept plan fails to address the threats to the community in either its flood or climate change sections ▪ The law currently states that any development which does not maintain the existing flood status quo cannot be approved. Minister must consider this ▪ The current application fails to address numerous outstanding issues. Specifically relate to use of Wrexham Rd access to the site when traffic studies are out off date. ▪ As originally planned in the 1990's, the owner needs to construct a new road overpass of the rail line to connect with Hobart Street Bulli. ▪ Should be not access to Lawrence Hargrave Drive via Wrexham Rd or construction of a one way traffic route to Station Street Thirroul. ▪ A major problem with Volume 5 is that they recommend no amendments to the floodplain maps for Hewitt's Creeks. ▪ Flood risk outlined in the Hewitt's Creek Flood study for the AIR site have been underestimated. Conclusion of this is that, the flood hydrology of Illawarra streams show that the region experiences discharges comparable to the largest recorded rainfall-runoff floods in the world. ▪ The Minister is duty bound to provide some written justification as to why the precautionary principle should not apply in this instance and that cognisance must be paid to the need for macro channels. ▪ A much wider riparian corridor is a required essential component of flood mitigation measures in this area 	<ul style="list-style-type: none"> ▪ Climate Change ▪ Commission of Inquiry ▪ Flooding Studies ▪ Traffic and Access 	<p>Climate Change</p> <p>A climate change assessment has been carried out in the flood study prepared by Cardno Forbes Rigby and peer reviewed by GHD.</p> <p>Commission of Inquiry</p> <p>The COI was considered in the Concept Plan application. The Concept Plan approval required the widening of the Woodlands Creek riparian corridor which has been complied with in the Project application.</p> <p>Flooding Studies</p> <p>Flood studies and climate change impacts have been assessed for the site and peer reviewed by GHD.</p> <p>Traffic and Access</p> <p>It is not known what outstanding issues the writer is referring to. Traffic issues were considered as part of the Concept Plan application. The Sandon Point Concept Plan 2006 Traffic Review prepared by Christopher Stapleton Consulting formed part of the Concept Plan application. This report reviewed a number of past studies. In this report they note that traffic modelling prepared for Wollongong City Council and traffic reports by Christopher Stapleton Consulting found that <i>impacts of the development (based on forecasts for 2005 and 2016, and yield of 655 dwellings) could be accommodated by the local and regional road network without significantly impacting existing traffic flows or local residential amenity (in Point Street east and along the Coastal Route).</i>" [page 5, CSS, 2006].</p> <p>In terms of the currency of the traffic studies were based on a higher yield and were forecast to 2016 and the findings are still valid.</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
		<ul style="list-style-type: none"> ▪ The Hewitt's/Woodland's/Tramway Creek flood studies need to be re-done by a new and independent consultant ▪ The precautionary principle needs to be invoked in this instance and that something more transparent be considered for the Hewitt's/Woodland/Tramway Creek floodplain. ▪ How can there be any independence in the assessment-reassessment undertaken by Forbes Rigby Cardno. ▪ The issue of the Illawarra rail line acting as a dam for floodwaters in this very fact acting fluvial-process catchment is fraught with complex considerations ▪ Question the independence in the flood study process 		
28	Objection	<ul style="list-style-type: none"> ▪ Known Aboriginal cultural heritage exists on site, entire site should be declared as Aboriginal Place of State and National Significance ▪ Natural area and biodiversity likely to negatively impacted and disturbed by development and increase in human activity. The freshwater wetland at the confluence of Hewitts and Woodlands Creeks will be totally destroyed. ▪ The area between Woodlands and Hewitts Creek is known as a floodplain and this part of the site is severely flood prone ▪ The previous submission rejected by Land and Environment Court for failure to consider ESD principles. The current proposal does not adequately address all the impacts of the development in relation to climate change. ▪ Object to the reclassification of public land at Thomas Gibson Park and oppose the sale of public land. Need more playing fields for sport and recreation. ▪ The community's heritage bridge at Wrexham Rd must be rebuilt ▪ Traffic issues in relation to Wrexham Road remain unresolved, concern over the likely increase in traffic via local roads. ▪ Area should be declared a national treasure and therefore a public park. Its time to act in the public interest. 	<ul style="list-style-type: none"> ▪ Aboriginal cultural heritage ▪ Flora and Fauna ▪ Flooding ▪ ESD principles ▪ Public Land ▪ Bridge rebuild ▪ Traffic increase 	<p>Aboriginal cultural heritage</p> <p>DECC has previously considered the Aboriginal significance of the site. Specific parts of the Sandon Point site have been declared an Aboriginal Place under the National Parks and Wildlife Act.</p> <p>Flora and Fauna</p> <p>Addressed in Issue 1.</p> <p>Flooding</p> <p>Flooding issues in the floodplain has been addressed by flood studies prepared by Cardno Forbes Rigby, re-assessed in the Climate Change Assessment prepared by Cardno Forbes Rigby and peer reviewed by GHD.</p> <p>ESD principles</p> <p>The Court of Appeal has found that the Minister's approval of the Concept Plan is not void.</p> <p>Public Land</p> <p>Part of Thomas Gibson Park has been reclassified Operational under the Local Government Act 1993 to facilitate the Wrexham Road link. This will not affect the playing fields and Thomas Gibson Park will remain a public asset.</p> <p>Demand for further recreation facilities is addressed in Issue 19.</p> <p>Bridge rebuild</p> <p>The Wrexham Road bridge was not listed as a Heritage Item. The reconstruction of the bridge forms part of the Project application.</p> <p>Traffic increase</p> <p>Addressed in Issue 27 above.</p>

Proforma submissions

No.	Nature	Comment/Issues Raised	Issue Summary	Response
1	Objection	<ul style="list-style-type: none"> ▪ Extensive Aboriginal cultural heritage exists on the site. The site must be declared an Aboriginal Place of State & National Significance; ▪ The proposal will threaten local biodiversity, including threatened species & endangered ecological communities. Natural areas, including forest, wetlands, floodplains will suffer from the cumulative impact of increasing development; ▪ Area between Woodlands & Hewitts Creek is a floodplain which is located at the bottom of a steep catchment. The catchment is severely flood prone; ▪ The original concept plan was rejected by the Land & Environment Court due to failed consideration of Environmentally Sustainable Development Principles, including impacts of climate change. The current proposal does not adequately address impacts of climate change or ESD; ▪ Oppose use of public land for private development; ▪ Traffic issues in relation to access to Thirroul and East Bulli will cause safety problems and congestion. 	<ul style="list-style-type: none"> ▪ Errors in submitted application documentation. ▪ Significant ecological issues. 	<p>The 2 items in the issue summary do not appear to relate to the issues raised column. Summary headings have been created and responses provided accordingly.</p> <p>Errors in submitted application documentation.</p> <p>We are not aware of any errors in the documentation.</p> <p>Aboriginal culture</p> <p>Addressed in Issue 5 above.</p> <p>DECC has previously considered the Aboriginal significance of the site. Specific parts of the Sandon Point site have been declared an Aboriginal Place under the National Parks and Wildlife Act.</p> <p>Floodplain</p> <p>Flooding issues in the floodplain has been addressed by flood studies prepared by Cardno Forbes Rigby, re-assessed in the Climate Change</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Response
				<p>Assessment prepared by Cardno Forbes Rigby and peer reviewed by GHD.</p> <p>Land and Environment Court Decision and ESD principles</p> <p>The matters of ESD are addressed in Section 9 of the EAR.</p> <p>Climate change</p> <p>A Climate Change Assessment has been prepared and submitted with the Project application.</p> <p>Public land</p> <p>The majority of the site is not public land. The only component of the Project which is public land is a portion of land located within Thomas Gibson Park which has been reclassified operational land under the Local Government Act, 1919 to facilitate the Wrexham Road extension and link road.</p> <p>Traffic</p> <p>Refer to Issue 27 above.</p>
2	Objection	<ul style="list-style-type: none"> ▪ The site contains Aboriginal cultural heritage items. The entire site must be declared a Aboriginal place of State & National significance; ▪ Conservation of local biodiversity, and endangered ecological communities and protection of threatened flora & fauna must be protected. The flora & fauna will be destroyed by the development; ▪ Area between Woodlands & Hewitts Creek is a floodplain which is located at the bottom of a steep catchment. The catchment is severely flood prone; ▪ The previous concept plan was rejected by the Land & Environment Court due to failed consideration of Environmentally Sustainable Development Principles, including impacts of climate change. The current proposal does not adequately address impacts of climate change or ESD; ▪ The original concept plan was rejected by the Land & Environment Court due to failed consideration of climate change impacts. The current proposal does not adequately address impacts of climate change or ESD; ▪ Oppose use of public land for private development; ▪ Traffic issues in relation to access to Thirroul and East Bulli will cause safety problems and congestion; ▪ Claims by land owner, DoP that COI recommendations are unworkable remain unsubstantiated; 	<ul style="list-style-type: none"> ▪ Aboriginal culture ▪ Biodiversity ▪ Flora & fauna ▪ Floodplain ▪ ESD principles ▪ Climate change ▪ Public land ▪ Traffic 	<p>Aboriginal culture</p> <p>Addressed in Issue 5 above.</p> <p>DECC has previously considered the Aboriginal significance of the site. Specific parts of the Sandon Point site have been declared an Aboriginal Place under the National Parks and Wildlife Act.</p> <p>Biodiversity</p> <p>The issue of biodiversity has been addressed under the heading of Flora and Fauna conservation in Issue 1 above.</p> <p>Flora & fauna</p> <p>Addressed in Issue 1 above.</p> <p>Floodplain</p> <p>Flooding issues in the flood plain has been addressed by Flood Studies prepared by Cardno Forbes Rigby, re-assessed in the Climate Change Assessment prepared by Cardno Forbes Rigby and peer reviewed by GHD.</p> <p>Land and Environment Court Decision and ESD principles</p> <p>Refer to Issue 1 of Part B – Pro Forma (above)</p> <p>Climate change</p> <p>Refer to Issue 1 of Pro Forma (above)</p> <p>Public land</p> <p>Refer to Issue 1 of Pro Forma (above)</p> <p>Traffic</p> <p>Refer to Issue 1 of Pro Forma (above)</p>

PART B - RESPONSES TO PUBLIC SUBMISSIONS TO NOVEMBER 2007 EXHIBITION

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
1	Objection	<ul style="list-style-type: none"> Existing infrastructure unable to support extra number of cars and people Traffic lights at Wrexham Road will cause further traffic congestions on Princes Highway Plans to extend Wrexham Road takes away from park land and open space. Sandon point is an important Aboriginal site and further affected by extra dwellings Sensitive environmental area and will be affected by building work 	<ul style="list-style-type: none"> Capacity of existing infrastructure Wrexham Road traffic lights Impact of Thomas Gibson Park Aboriginal heritage Environmental area 	<p>Infrastructure</p> <p>Addressed in Issue 4 in Part A above.</p> <p>Traffic Lights</p> <p>Addressed in Issue 23 in Part A above.</p> <p>Thomas Gibson Park</p> <p>Part of Thomas Gibson Park has been reclassified Operational under the Local Government Act 1993 to facilitate the Wrexham Road link. This will not affect the playing fields and Thomas Gibson Park will remain a public asset.</p> <p>Aboriginal Heritage</p> <p>Addressed in Issue 5 in Part A.</p> <p>Environmental Area</p> <p>Potential impacts are to be managed through a Construction Management Plan, Soil and Water Management Plan and regular water quality monitoring.</p>
2	Objection	<ul style="list-style-type: none"> Original Concept Plan approval is under consideration by Land and Environment Court DoP did not refer the proposal to DECC, DNR, DPI or other agencies Sydney Water has advised that “A local asset planning team of Sydney Water based in Wollongong has assessed the capacity of the Sydney Water’s sewer and water pipe network in relation to the Sandon Point (north) development stages 1 to 6... the Sydney Water letter ... was issued to Cardno Forbes Rigby.. DNR objected to Schedule 2 Part A Modification A3 stating that the APZ is not to be located within the vegetated riparian corridor, DNR 23/3/2007 letter to DFP DECC and DPI (Fisheries) refused to give advice as the subdivision was not referred by DoP. Fire Brigade Service said to comply with statutory requirements given previously. In the 2000 and 2002 masterplan Stockland agreed to build an access road to Sydney Water’s pumping station. Stockland must be required to provide access as promised. Wilkie’s Walk was created as a public walkway October 1994 using 800m² of land donated by Cooksons. It was constructed voluntarily by Northern Illawarra Residents Action Group (NIRAG) to dedicate the continuity of community access to the beach from Sturdee Street bridge and belongs to the community – not Stockland or ARV. Stockland has no right to claim ownership or the right to construct a road. DECC has refused a Declaration of Aboriginal Place #2 area of spurious grounds of “conflicting view and reports....insufficient evidence” DECC must be required to undertake a genuine study of other potential Sandon Point sites using a qualified anthropologist and required by the Planning Minister in his approval MP06_0094 and as recommended by Huys. Stockland has never made a comprehensive Aboriginal cultural heritage study on their land, despite the fact that identified burials, a women’s area, middens and an artefact tool site exist on their land – unobserved by their consultant. Appendix N, the Traffic Impact Report is not a new traffic study, just a review of reviews between 2001 and 2005, with no account taken of major traffic increases since the opening of Sea Cliff Bridge. There will be a rat run effect of local traffic avoiding Bulli Pass via Sandon Point, and this will have a major traffic and social impact on the site that requires immediate study. Thomas Gibson Park is indicated (Landscape Report) with a 1.8m cycleway. The VPA states the path/cycleway should be 2.4m wide, so Stockland’s path does not comply with the Australian Standard. Stockland and WCC appear to have ignored community requests to relocate cycleways adjacent to the railway line away from children’s soccer fields. Stockland’s entrance of three oblong blocks is not welcome to be relocated to the corner of Point Street, Bulli. Floodplain creeklines are proposed to be engineered into drains, including water works on Hannah land and tail-out works at the end of all creeks in public open space. This is not ecologically sustainable development 	<ul style="list-style-type: none"> Land & Environment Court case Agency referral Sydney Water APZ Agency referral Sydney Water access Wilkie’s Walk Aboriginal Place DECC study Aboriginal study Traffic impacts Cycleway Entrance feature Engineered Creeklines Woodlands Creek reinstated Aboriginal artefacts Keeping Place & VCA European Heritage Modified Creeklines and ESD ESD and Agency Referrals ESD and consultant studies Precautionary principle and COI ESD and Part 3A Stuart Huys report Public interest and ESD Wrexham Road Railway Bridge demolition 	<p>Land & Environment Court case</p> <p>The LEC judgement has been overturned by the decision of the Court of Appeal in September 2008. The Concept Plan approval issued on 21 December 2006 therefore stands.</p> <p>Agency Referral</p> <p>The Project was referred to the state agencies referenced in the writer’s letter at both the November 2007 and June 2008 exhibitions.</p> <p>Sydney Water</p> <p>Appendix J of the EAR contains correspondence from Sydney Water dated 2 July 2007 confirming that the proposed water and sewerage designs for stages 1 to 6 meet Sydney Water’s requirements.</p> <p>APZ</p> <p>APZs are no longer proposed and replaced with defensible space which is supported by the RFS. The Concept Plan approval permits APZs outside of the developable footprint, and the proposal is consistent with the Concept Plan approval. Section 6.4 of the EAR has addressed DNR’s comments.</p> <p>Agency referral</p> <p>The comment appears to be in relation to DFP’s original invitation to comment on the proposal, where some agencies deferred providing comments until the DoP formally referred to the Project Application once it was lodged. DECC, DPI and NSW Fire Brigade Service were all consulted by DoP and comments were provided by various agencies which are addressed in the Response to Agency submissions.</p> <p>Sydney Water access</p> <p>We are not aware of any such agreement. From the writer’s comment, it would appear that if there is an agreement then it is a separate matter between Stockland and Sydney Water and does not have any bearing on the Project application.</p> <p>Wilkie’s Walk</p> <p>Wilkie’s walk is presently an informal pathway located on private land owned by ARV and Stockland. As part of the Project application there will be a boundary adjustment to reflect the road layout and ensure the road is wholly within Stockland’s land holding. The road will provide a pedestrian footpath on the southern side of the new road (i.e. northern side of ARV’s site). The footpath will then continue south-east through Lot 235 DP 1048602 (owned by</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
		<p>and does not take account of natural landforms, ecology of sensitive cultural heritage</p> <ul style="list-style-type: none"> Stockland has ignored the fact that Woodland Creek has already re-instated itself through Hannah land, ignored the face that engineered floodplain creeks is not ecologically sustainable, and seems about to engineer water uphill “into the existing mound”. AIR site and southern Lot 235 are covered in fill from earlier stages 1 to 6 during 2002, containing thousands of artefacts and dumped without development consent. Also the eastern Lot 235 is part of an Aboriginal Women’s site identified by Stuart Huys July 2006, and recommended to DoP for an anthropological study Under the VPA Stockland proposes a keeping place on Sandon Point public headland, with artefacts kept at Bulli Tops tourist centre, despite the Aboriginal community requests for a cultural centre built by Stockland on their own donated land. Stockland breached their Keeping Place and Voluntary Conservation Agreement with NPWS in 2002 (s.90 consent NPW Act) and it is clear Stockland has no respect for the Aboriginal community. DECC and DoP have breached the Human Rights charter and Racial Discrimination Act and enabled Stockland to commit acts of cultural genocide at Sandon Point. A letter from BlueScope Steel to Stockland admits that they cannot find Sandon Point European heritage artefacts. Writer requests information regarding this. EAR shows modifications to proposed riparian zones and creeklines, however, these remain undefined so cannot be justified on ESD grounds. Writer questions whether proposal complies with ESD principles as indicated by the fact that DoP did not refer the proposal to agencies such as DECC, DNR and DPI. Consultant studies paid for by developers to achieve their own aims insulting pretence to ESD and precautionary principle Precautionary principle was employed by COI when it established environmental constraints on the site to minimise flood risks and impacts on flora and fauna including EECs. The principle of conservation of biological diversity requires that the Minister should have taken the findings and recommendations of the COI into consideration, but he failed in his duty of care, and Stockland has certainly not considered them. EP&A Act requires ESD to be considered including Part 3A applications DoP should considered Huys report. ESD is a mandatory consideration in relation to the approval of a development under Section 79C of the EP&A Act, including public interest. The requirement to consider public interest incorporates the requirement to consider ESD DoP, WCC or RailCorp considered the public interest in the Stockland's demolition of the Wrexham Road Bridge, a customary access from west Thirroul to Thomas Gibson Park, McCauleys and Sandon Point beaches for 100years. Why did DoP and RailCorp agree to the demolition, and WCC approve it without notification or consultation with the community, against the public interest? Public access has been lost for the foreseeable future. 		<p>Stockland) to connect with the regional cycleway/footpath and access to the beach.</p> <p>Aboriginal Place</p> <p>We understand the comment in relation to Aboriginal Place #2 relates to the Women’s area on ARV's and it not relevant to the subject Project application.</p> <p>DECC Study</p> <p>The suggestion for DECC to carry out further studies into Aboriginal archaeological potential is not within the scope of the Project application.</p> <p>Aboriginal study</p> <p>There has been extensive investigation into Aboriginal heritage on this property. The most recent study into the potential for Aboriginal archaeological is outlined in Issue 5 in Part A above.</p> <p>Traffic Impacts</p> <p>This issue has been addressed in the Concept Plan application. The following is Stockland's previous response to the DoP's questions in late 2006 regarding the re-opening of the Sea Cliff Bridge.</p> <p>Wollongong City Council has been consulted regarding the traffic model developed by Council and referenced in the traffic assessment contained in the EAR. Council has confirmed that the traffic model assumed that the Sea Cliff Bridge (Lawrence Hargrave Drive) was always open. The traffic volumes on Lawrence Hargrave Drive were also forecast beyond the 12 December 2005 when the bridge reopened.</p> <p>Council has also confirmed that the traffic volumes prior to the closure of the road indicated a constant increasing trend. When the road was closed, the traffic volumes dropped. When the road re-opened, traffic volumes increased which was assumed to be due to the initial curiosity and publicity surrounding its re-opening. Council has confirmed that traffic counts by the RTA after the opening of the Sea Cliff Bridge indicate that the traffic volumes have returned to a similar trend prior to its closure.</p> <p>The assessment carried out by Christopher Stapleton Consulting utilises the Wollongong City Council traffic model (as discussed above) and reassessment factoring in the opening of the Sea Cliff Bridge is therefore unnecessary.</p> <p>The traffic assessment is based on a number of future road network scenarios modelled by Gabites Porter. The modelling indicated that traffic movements are unaffected by network changes outside the immediate vicinity of the Sandon Point site. Further analysis is not considered necessary.</p> <p>Cycleway</p> <p>The Landscape Report (Appendix D) contains an plan of Thomas Gibson Reserve which was an earlier conceptual scheme. The cyclepath to Thirroul Station is proposed to be 2.5m wide as stated in the EAR and the Landscape Report.</p> <p>Entrance Feature</p> <p>The entrance walls are part of the existing Heritage Interpretation Plan relating to the existing “The Point” residential subdivision south of Sandon Drive. The relocation of the interpretive entry walls is necessary to enable the construction of the Link Road.</p> <p>Engineered Creeklines</p> <p>Past land disturbances has resulted in the alteration of the creeks, including:</p> <ul style="list-style-type: none"> straightening and diversion of Woodlands Creek including the placement of a portion of the creek within an underground culvert; and destruction of a section of the original creek banks of Hewitts Creek and the creek has been straightened and gabion baskets placed along the creek bank and bed;

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
				<p>The works proposed to the creeks is not to create engineered drains. The works proposed are to rectify past damage to the creeks and to reinstate the creek lines to a condition which is as natural as reasonably possible.</p> <p>Woodlands Creek reinstated</p> <p>Stockland has not ignored the existing alignment of Woodlands Creek on Ray Hannah's land. This current alignment is not natural and is a man made diversion. Wollongong Council's Hewitts Creek Flood Risk Management Plan, 2002 requires that the existing gabion lined channel which diverts Woodlands Creek into Hewitts Creek be closed and filled. The Project is consistent with the Hewitts Creek FRMP.</p> <p>Aboriginal artefacts</p> <p>Potential for aboriginal artefacts is discussed in Issue 5 in Part A above.</p> <p>Keeping Place & VCA</p> <p>Addressed in Issue 8 in Part A above.</p> <p>European Heritage</p> <p>The EAR notes that the Heritage Interpretation Plan prepared by Godden Mackay Logan in 2001 relied upon interpretation of moveable heritage items salvaged prior to the Thirroul Brickworks. BHP (now BlueScope) was the custodian of these items. Stockland has made enquiries with BlueScope, who have confirmed that these items are unable to be located and appear to have been disposed. A copy of this correspondence is attached at Appendix U to the EAR.</p> <p>ESD and Agency Referrals</p> <p>The Project application has been referred to agencies (and responses received) as well as publicly exhibited on two occasions.</p> <p>ESD and consultant studies</p> <p>The studies were commissioned by Stockland to address the Director-General's requirements for the Project.</p> <p>Precautionary principle and COI</p> <p>The COI findings were reviewed by Charles Hill at the request of the Minister for Planning. The findings of both the COI and Charles Hill review have been considered in the preparation of the Concept Plan application which has laid the foundations for the Project application. The Project application is consistent with the Concept Plan approval.</p> <p>ESD and Part 3A</p> <p>There principles of ESD have not been ignored in the preparation of the Project application.</p> <p>Stuart Huys report</p> <p>Stuart Huy's report has been considered by Stockland in the EAR and the Assessment of Archaeological Potential Report prepared by Susan McIntyre-Tamwoy attached at Appendix S to the EAR.</p> <p>Public interest and ESD</p> <p>The public interest and ESD have been considered in the preparation of the EAR and this response to Agency and public submissions.</p> <p>Wrexham Road Railway Bridge demolition</p> <p>The demolition of the Wrexham Road railway bridge was development under Part 4 of the EPA Act, and did not require the approval of the DoP. The consent authority was Wollongong City Council. The DA submitted to WCC was not required to be notified under their DCP. The Project application includes the reconstruction of the bridge which will reinstate access to Thomas Gibson Park. Direct access to the beaches via the bridge can only be gained by crossing privately owned land. However, the proposed subdivision will</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
				provide public access.
3	Objection	<ul style="list-style-type: none"> ▪ The project will impede or prevent most people from having access to parts of the Sandon Point area – an area which has very high Cultural and Spiritual significance to many Aboriginal people, beyond those lands included in the Sandon Point Aboriginal Place Declaration of 2007. The Aboriginal Cultural Landscape includes all foreshore land, ARV and Stockland land and the foothills leading up to the Illawarra escarpment. ▪ Aboriginal attachment exists despite the history of dispossession and environmentally destructive activities (industry, grazing, and logging). The land would respond well to a large scale Environmental, Biodiversity Conservation and cooperative Aboriginal Cultural revival project encompassing many levels and representative types of living environments and ecosystems within a large coastal park. ▪ Maps provided by the developers to describe the land or to delineate the various site study areas are inadequate. ▪ No Aboriginal cultural mapping has been undertaken, and no comprehensive, independent and culturally appropriate Aboriginal Cultural Heritage Study has been produced. ▪ The development would reduce the opportunity for Aborigine people to continue to carry out some of the traditional and contemporary Aboriginal cultural and social practices and activities that occur in the Sandon Point area. This would also curtail the on-going cultural teaching, healing and indigenous research potentials currently offered by the place. ▪ Removal of existing remnant and regenerating native vegetation and resultant reduced habitat range for existing flora and fauna species will have a negative impact on Aboriginal Wild Resources uses such as hunting and collecting food, fibre and medicines, as well as obtaining wood, leaves and bark for Sacred Fire ceremonies, and other traditional uses by the Aboriginal camp ▪ Traditional Aboriginal totems and food resources found in the four creeks, such as plants, fish, eels, turtles will be threatened by the planned reconstruction of riparian corridors along the creek lines, which combined with the relining of the creek beds and construction of bridges and roads will upset the ecological balance and functioning of the creeks and negatively affect all of the creek life. ▪ Several distinct pathways lead from higher ground through the proposed development area into the Aboriginal Place. After development the heavily increased population, pets and visitors will suppress or extinguish local access to the remaining Wild Resources that have survived in the area. ▪ The Spiritual and Physical healing powers of the Aboriginal Camp site and Teaching Place will be reduced because the development proposal would affect the natural visual amenity of the area and intrude on the Aboriginal Cultural Landscape, as seen from the Aboriginal Place lands. ▪ The new residential landscape would create a lack of privacy which would deter Kooris from coming to the designated Sandon Point Aboriginal Place ▪ Objects to the findings of the Heritage Interpretation Plan because the proposed text for heritage speaks of the Aboriginal cultural activities associated with the Sandon Point area and its resources as being in the past tense only. ▪ Objects to the findings of the Archaeological Assessment on the following grounds <ul style="list-style-type: none"> ▪ The last major overall study of Aboriginal cultural heritage was not the Charles Hill report as this report did not expressly consider Aboriginal heritage due to the DoP having commissioned a new Aboriginal heritage study to be done by Stuart Huys ▪ To understand Aboriginal cultural heritage significance the lands should not be isolated from each other for the convenience of the two developers. ▪ Report does not adequately consider or acknowledge the non-physical, social or spiritual associations Aboriginal people hold for the entire area ▪ Report fails to consider a key archaeological report “<i>Appraisal of Archaeological Studies at Sandon Point, New South Wales</i>”, prepared by Dr Peter Hiscock of the School of Archaeology and Anthropology ANU, Canberra ▪ The study is a desktop study. No consultation with other Aboriginal groups or individuals. ▪ Assertion that the Aboriginal Place will not be affected if highly debatable and Stockland has not provided any evidence that the Aboriginal Place lands on the foreshore land and ARV land would not be affected. ▪ Stockland has made little or no progress in meeting their existing Statement of Commitments on Aboriginal heritage issues, including the provision of an appropriate Keeping Place. ▪ Stockland has not dealt with the issues arising from the Stuart Huys report. 	<ul style="list-style-type: none"> ▪ Public access ▪ Coastal park ▪ Mapping inadequate ▪ Aboriginal culture ▪ Removal of vegetation ▪ Pathways to Aboriginal place ▪ Visual amenity ▪ Heritage Interpretation Plan ▪ Archaeological assessment ▪ Wilkies Walk ▪ Stage 6 ▪ Cumulative impacts ▪ Public land 	<p>Public access</p> <p>The proposal provides footpath that will allow pedestrian to walk through the residential estate and then connect through to the regional cycleway. This will formalise public access to the foreshore.</p> <p>Coastal park</p> <p>Addressed at Issue 6 in Part A above.</p> <p>Mapping inadequate</p> <p>The maps and plans provided with the Project application clearly delineate the boundaries of the subject site.</p> <p>Aboriginal culture</p> <p>The land is in private ownership and should not be accessible for activities by any group. A Heritage Interpretation Plan has been prepared to allow the community to appreciate Aboriginal culture.</p> <p>Removal of vegetation</p> <p>Flora and fauna impacts have been addressed in Issue 1 in Part A above.</p> <p>Pathways to Aboriginal place</p> <p>The proposal provides footpath that will allow pedestrian to walk through the residential estate and then connect through to the regional cycleway. This will formalise and manage public access to the foreshore including the recently declared Aboriginal Place.</p> <p>Visual amenity</p> <p>Visual impacts are addressed in Issue 13 in Part A above..</p> <p>Heritage Interpretation Plan</p> <p>The HIP has been prepared and identifies appropriate interpretive material. The tense of the report does not affect the implementation of the plan.</p> <p>Archaeological assessment</p> <p>Addressed in Issue 5 in Part A above.</p> <p>Wilkies Walk</p> <p>The location of Wilkies walk along the boundary between Stockland land and ARV land was part of the Concept Plan application. The path will continue through future open space land to connect with the regional cycleway/pathway.</p> <p>Stage 6</p> <p>The super lot located in Stage 6 will be the subject of a separate Project application.</p> <p>Cumulative impacts</p> <p>The Concept Plan approval did not require future Project application to be prepared or submitted concurrently. The issues of traffic impact and flood risk have however been considered for the site as a whole as part of the Project application.</p> <p>Public land</p> <p>Addressed in Issue 24 in Part A above.</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
		<ul style="list-style-type: none"> Report fails to address the issue of the impacts that further destruction of the natural assets that till existing within the Stockland development area would have, such as removing the remnant native vegetation around the boundaries of the Stockland and ARV lands, along the creeks and swamps and towards the northern interface with Thomas Gibson Park. The essential character and experience of Wilkies Walk and associated opportunities for continued Aboriginal cultural practice, healing and teaching along this route would be lost if the boundary is moved., mature trees removed and the shady bush-walking track becomes a sterile concrete path beside a roadway. The roadwork's (Wilkies Walk) were not part of the Concept Plan approval and it represents a significant change of plan affecting a pathway that has a very important history in Aboriginal terms, as well as a long a history of providing customary pedestrian access to the beach. The heritage, historical-social value and impacts from loss of the natural character of Wilkies Walk have not been properly researched, assessed or acknowledged. The track deserves protection in its own right. The Project application does not incorporate that area of land in the north shown as Stage 6, which Stockland proposes to develop into apartments at a future time under a separate Project application. By leaving aside questions of potential impacts. The Concept Plan approval was clearly for a combined project which included ARV, but the EA does not include the ARV land holding. The EA should consider the combined and cumulative impacts of both projects. The development will contribute nothing to the proposed regional coastal park, in fact steals land from the park and community for housing and infrastructure. 		
4	Objection	<ul style="list-style-type: none"> Development would be the worst change to the northern suburbs of Wollongong Lack of playing fields and parkland set aside to cater for the needs of the community. With the increase in population we need more parks and open space. WCC wanted to rezone the lower part of Thomas Gibson Park to allow for access to the development from Wrexham Road. Thirrour's traffic is out of control and there is no solution Car parking demands at Thirrour will increase with the development 	<ul style="list-style-type: none"> Change to northern suburbs Lack of playing fields Rezoning of Thomas Gibson park Traffic impacts Car parking impacts 	<p>Change to northern suburbs</p> <p>The land has been zoned for residential development since 1997.</p> <p>Lack of playing fields</p> <p>When the land was rezoned, a Local Environmental Study was carried out by WCC. The LES and rezoning process provided Council with the opportunity to identify the demands for additional recreational open space. The land was not rezoned for recreational open space.</p> <p>Rezoning of Thomas Gibson park</p> <p>The reclassification of the south-western portion of Thomas Gibson Park has been completed by WCC and is now operational land. This does not impact upon the playing fields of Thomas Gibson Park.</p> <p>Traffic impacts</p> <p>Traffic impacts were considered in the Concept Plan approval process. The density of development in the Project application is consistent with the density of the approved Concept Plan and traffic generation is therefore unchanged.</p> <p>Car parking impacts</p> <p>The subdivision is within easy walking or cycling distance of Thirrour providing the opportunity to reduce vehicle trips to Thirrour and therefore car parking demands within Thirrour.</p>
5	Objection	<ul style="list-style-type: none"> Construction of noise barriers on only one side of the railway line will amplify the rail noise west of the line Strongly opposed to acoustic wall which could be a potential dam wall downstream from our dwellings. If the acoustic wall is to be put in place in the new subdivision, then the developer has an obligation to similarly equip all homes on the west of the railway line. Further increase in traffic volumes on Lawrence Hargrave Drive will make it almost impossible to exit from Hewitts Avenue 	<ul style="list-style-type: none"> Acoustic barrier Traffic impacts 	<p>Acoustic barrier</p> <p>Wilkinson Murray has reviewed this issue and their advice is attached at Appendix C In summary most of the reflected sound will be shielded by the train itself, although a small component will be reflected and pass by the front and rear of the trains. Some of the noise will be reflected onto the ground where it will be partially absorbed. The predicted contribution of the reflected sound would increase the LAeq by a maximum of 0.5dBA. This change is not noticeable and would have negligible noise impact.</p> <p>The LMax will not change as it is due to the engine of locomotives on the nearside track. When this passes any residence, any reflection from the fence will be largely shielded by the rest of the train.</p> <p>Traffic impacts</p> <p>Traffic impacts were considered in the Concept Plan approval process. The</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
				density of development in the Project application is consistent with the density of the approved Concept Plan and traffic generation is therefore unchanged.
6	Objection	<ul style="list-style-type: none"> ▪ Little consideration of local residents ▪ Increased noise of acoustic wall to residents on the western side of the railway line. Rebound noise is a common issue that can be resolved by duplicating the barrier. ▪ Impact on the natural environment ▪ Impact on local residents ▪ Impact on traffic flow ▪ Impact on beauty of the current landscape 	<ul style="list-style-type: none"> ▪ Resident considerations ▪ Acoustic wall ▪ Impact on natural environment ▪ Traffic impact ▪ Landscape impacts 	<p>Resident considerations</p> <p>The impacts of the potential for the redevelopment of the site has been considered over many years including the Local Environmental Study conducted by Council, COI, review by Charles Hill and Environmental Assessment accompanying the Concept Plan application.</p> <p>Acoustic wall</p> <p>Addressed in Issue 5 in Part B above.</p> <p>Impact on natural environment</p> <p>The impact on the natural environment has been considered in the Concept Plan Environmental Assessment, and the Concept Plan approval modified the Project to address impacts in relation to the riparian corridors. The Project application is consistent with the Concept Plan approval.</p> <p>Traffic impact</p> <p>Traffic impacts were considered in the Concept Plan approval process. The density of development in the Project application is consistent with the density of the approved Concept Plan and traffic generation is therefore unchanged.</p> <p>Landscape impacts</p> <p>The Concept Plan application considered the impacts upon the surrounding landscape in its visual/scenic assessment. The Concept Plan approval modified the project creating a significantly wider corridor to Woodlands Creek. The widening of the riparian corridor has reduced the residential footprint and increased landscaping opportunities.</p>
7	Objection	<ul style="list-style-type: none"> ▪ No identification of the pedestrian/cycleway demand for access across Wrexham Road bridge and continuing southeast wards towards the sea to join up with the cycle path to Wollongong. A properly designed pedestrian/cycle link from Wrexham Road bridge to the seat and the coastal path should be an essential part of the development. ▪ Proposed buildings on northern boundary of the development site seem quite large and out of scale with the rest of the proposed development. The montage shows them as warehouses with no windows opening on to Thomas Gibson Park. The buildings are too large and out of proportion with all other buildings in the area 	<ul style="list-style-type: none"> ▪ Pedestrian/cyclepath ▪ Apartments 	<p>Pedestrian/cyclepath</p> <p>A pedestrian and cyclepath is provided through the subdivision to the south-eastern corner of the site and continues through Stockland land to connect to the regional cycleway</p> <p>Apartments</p> <p>The Concept Plan approval has approved building envelopes for three apartment buildings containing up to 80 dwellings. The montages illustrate building envelopes and are therefore not illustrating a fully articulated building. The design and architecture of these buildings will be the subject of a future Project application.</p>
8	Objection	<ul style="list-style-type: none"> ▪ Acoustic wall along eastern side of the railway line will amplify railway noise. Residents of Hewitts Avenue should be given consideration and a wall erected on the western side of the railway line. ▪ Would prefer to look at houses on the opposite side of the railway line than an acoustic wall. ▪ Fail to see the logic in the access to and from this development from Wrexham Road. Lawrence Hargrave Drive is already a very busy road. With the opening of the Seacliff Bridge, traffic is very heavy during the day. The addition of more traffic from this development will create more problems. ▪ Development should link with the existing development in Sandon Point to east traffic on Lawrence Hargrave Drive. 	<ul style="list-style-type: none"> ▪ Acoustic wall ▪ Visual impact ▪ Traffic impacts 	<p>Acoustic wall</p> <p>Addressed in Issue 5 in Part B above.</p> <p>Visual impact</p> <p>The landscape plans attached at Appendix D of the EAR illustrate that landscaping on the western side (corridor side) of the acoustic will screen the wall.</p> <p>Traffic impacts</p> <p>Traffic impacts were considered in the Concept Plan approval process. The density of development in the Project application is consistent with the density of the approved Concept Plan and traffic generation is therefore unchanged. The impact of the re-opening of Seacliff Bridge road has been considered in traffic modelling as part of these earlier studies. The use of Wrexham Road as an access point is consistent with the COI and Charles Hill review. The development does connect with Sandon Point South (to Point Street), providing a link road through the subdivision which is also consistent with the COI and Charles Hill review.</p>
9	Objection	<ul style="list-style-type: none"> ▪ Objects to the development of 15 lots on Sandon Drive due to the native birds and wildlife. 	<ul style="list-style-type: none"> ▪ Flora and fauna impacts 	<p>Flora and fauna impacts</p>

No.	Nature	Comment/Issues Raised	Issue Summary	Stockland Response
		<ul style="list-style-type: none">▪ Traffic flow on Sandon Drive will be excessive and the road is very narrow with slow down curves making it difficult for two cars to pass.▪ Sandon Drive has no allowance for visitor parking to the properties on the street and if there are 15 more families living on Sandon Drive it will be near impossible to drive on the road.	<ul style="list-style-type: none">▪ Traffic impact▪ Parking impacts	<p>Addressed in Issue 1 in Part A above.</p> <p>Traffic impact</p> <p>There are 8 allotments fronting Sandon Drive, not 15 allotments. Additional traffic along Sandon Drive will therefore be low. The remainder of the subdivision are unlikely to use Sandon Drive east of the link road and it is not a through road.</p> <p>Parking impacts</p> <p>There are 8 allotments fronting Sandon Drive. The design guidelines require a minimum setback of 5.5m between the garage and the property boundary allowing for off street car parking.</p>



town planners

APPENDIX A

Our Ref: 106062-03 / Letter 001 Rev 2

Contact: Paul Nichols



31 October 2008

Mr David Kettle
Don Fox Planning
PO BOX 230
PENNANT HILLS NSW 1750

Attention: Mr David Kettle

**RE: RESPONSE TO DECC COMMENTS ON MP06_0094 & MP07_0032 –
CONCEPT PLAN AND PROJECT APPLICATION FOR DEVELOPMENT AT
SANDON POINT**

We are pleased to provide our response to the detailed issues set out in Attachment 1 to DECC's letter dated 7 July 2008 concerning Concept Plan MP06_0094 and Project Application MP07_0032 for proposed residential subdivision, aged persons accommodation and associated infrastructure development at Sandon Point.

DECC Comment F-1

Adverse Flood Impacts to existing development — It is a major concern that there is no assessment of the impact of the proposed development on flood behaviour. As the development proposal involves significant modifications to the floodplain, this may lead to increased flooding to existing development. The local hydrologic behaviour of the site will change as a consequence of the development. There may be potential to offset adverse impacts through appropriate measures, however the adverse impacts have not yet been assessed either under existing conditions or following any future augmentation of the railway culverts (ie a recommended measure in Council's Hewitts Creek Floodplain Management Plan). It is noted that the Department, Council and Patterson Britton (January 2007) have previously advised the DoP of the need to assess adverse impacts and this was also a requirement of the approval authority. It is therefore recommended that the approval authority ensures a flood impact assessment be undertaken that compares existing conditions with developed conditions for both existing and augmented railway conditions. Off-site impacts of the development on flooding and erosion requires assessment for the full range of potential floods.

CFR Response to DECC Comment F-1

The potential off-site flood-related impacts from the Sandon Point project are limited to those locations where flood inundation limits extend beyond the site boundary or where creek upgrade works interface with existing creeks. Locations where such situations could possibly apply are as follows:

- (i) Post-development flood levels affecting the properties off Sea Breeze Place, to the east of the existing gabion wall along Hewitts Creek (constructed in the early 1990's).
- (ii) Post-development flood levels affecting properties on the southern side of Sandon Drive.

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- (iii) Potential erosion where the upgraded reaches of Hewitts, Woodlands and Tramway creeks join the existing creek channels downstream.

In regard to (i), we have undertaken further modelling to assess flood impacts on the properties off Sea Breeze Place, to the north of the existing gabion wall along Hewitts Creek. This has confirmed that the Sea Breeze lots are not affected by any flooding, including the PMF, under post-project conditions. Flood levels are documented in the tabulation below, and the extents of flooding for both the 1% AEP and PMF events (for the upper bound climate change scenario with conservative manning's n values) are shown on the attached Drawing No SK-07. Modelling files are available for presentation to the independent reviewer on appointment.

Table 6.2A – Effects of Climate Change on Calculated Flood Levels in Hewitts Creek

Cross-section	1% AEP			PMF		
	Hewitts Creek flood study using actual 'n' values	Existing Climate + conservative 'n' values	'Upper Bound' Climate Change+ conservative 'n' values	Hewitts Creek flood study using actual 'n' values	Existing Climate + conservative 'n' values	'Upper Bound' Climate Change+ conservative 'n' values
416.951	12.04	12.03	11.78	13.11	13.15	12.78
332.230	10.00	11.43	11.18	10.89	12.55	12.18
315.928	9.64	11.24	10.99	10.86	12.34	11.97
226.906	8.99	10.42	10.16	10.12	11.48	11.12
124.955	8.46	9.19	8.93	9.77	10.33	10.16
39.873	8.00	8.15	7.58	9.46	9.77	9.07
30	7.70	7.62	7.36	8.88	9.06	8.68
17.5	7.08	7.02	6.09	8.52	7.69	6.65
1.968	5.42	6.06	5.09	6.19	6.83	6.55

Note: Flood levels shown in italics are different to the flood levels presented in Table 6.2 in Report 001 Rev 1 Sandon Point Flood Study: Concept Plan Application – Climate Change Assessment. This is because the gabion baskets that exist near Sea Breeze Place have been specifically accounted for in all models.

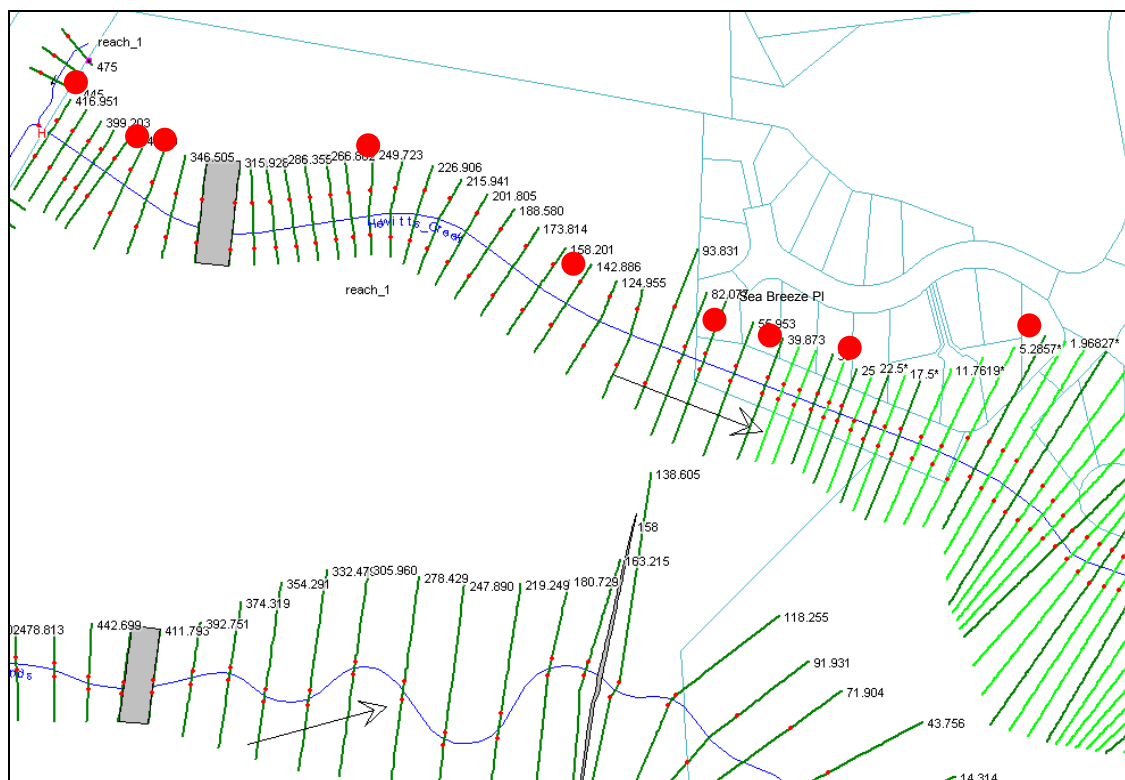


Figure 6.1A – Schematic Locations of HECRAS Cross-Section for Hewitts Ck

Note: The 'red dots' (and chainages) correspond to the cross-section locations presented in Table 6.2A

In regard to (ii), modelling conducted as part of CFR's 2008 report indicated that the 1% AEP flood covers Sandon Drive to a depth of about 0.2 m in the existing climate scenario and that this increases to slightly more than 0.3 m in the 'upper bound' climate change scenario, which is the point at which vehicles become unstable due to buoyancy. The extent of inundation of the 1% AEP flood does not extend to the existing lots on the southern side of Sandon Drive for either the existing or changed climate scenarios. CFR's 2008 report also show that the Sandon Drive low point is inundated during the PMF event to a depth of 1.2 m in the climate change scenario, compared to 1.0 m under the existing climatic regime. This potentially restricts emergency evacuation. Such depths of PMF flooding cut off to emergency vehicle access via Sandon Drive to existing properties to the east, but this is not significant as any such isolation would be short-lived (ie, road would be cut off for a few hours only) and in any case access for emergency vehicles could still be achieved via Point St and the cycle way along the beachfront reserve frontage, thus satisfying the requirement for emergency access to be available even under the (climate-changed) PMF event.

In regard to (iii), potential erosion where the upgraded reaches of Hewitts, Woodlands and Tramway creeks join the existing creek channels downstream) is minimally changed as a result of climate change and has been addressed in the previous application and accepted by DoP. CFR confirms that the designs presented satisfactorily address the potential for erosion at these locations.

DECC Comment F-2

Flood Planning Levels — the CFR08 rationale to support design flood planning levels for new development is unclear and this may lead to an exposure of new development on the floodplain to flooding. DECC notes that CFR08 challenges the hydraulic modelling parameters recommended by Council, DECC and the Commission of Inquiry findings. As the results in Chapter 6 of CRF08 indicate, climate change and natural vegetation growth in the channel has the potential to increase design flood levels in the order of 1 m (1% AEP) and 2-3metres (PMF) above those currently proposed.

Comments in section 6.2 also indicate that the recommended flood planning levels assumes that culvert upgrade works will be undertaken and this cannot be guaranteed given the complexities and funding constraints associated with Council upgrading high cost Railcorp assets. It also remains unclear as to why estimated increases of flood levels due to climate change in the order of 300-500mm have not resulted in any recommended increase in flood planning levels.

CFR Response to DECC Comment F-2

In regard to DECC's first point on CFR challenging the hydraulic modelling parameters, please refer to CFR's Letter 003 responding to WCC's comments (comment F-4).

DECC's second point was that we should not base recommended flood levels on culvert upgrade proposals as funding cannot be guaranteed. We note however that CFR has ignored culvert upgrade proposals for Hewitts Creek for the existing climate scenario, and has only assumed that the upgrade works will be completed for the climate change scenario, which is based on upper-bound climate change predictions in 100-year's time. It had been our assessment that, delays notwithstanding, Council would have completed the works within 100 years given that they have already committed to the community that the works are high priority ('within 5 years'). Indeed, Council's website (as at 1 September 2008) says:

"....Woodlands Creek, Bulli - upgrade of railway culvert

Significant flooding is also known to occur in the area immediately upstream of the Illawarra Railway line embankment (including the Princes Highway) due to the inadequate capacity of the existing culvert beneath the railway line and its potential to block with debris. This project aims to reduce the incidence of flooding along the section of Woodlands Creek immediately upstream of the railway embankment by upgrading the existing culvert system. As a result, the capacity of the upgraded system will be significantly increased, therefore reducing its potential to block, and resulting in lower flood levels upstream of the railway line.

The project is currently in the preliminary design phase."

DECC's third point was that CFR's flood planning levels are inappropriate as CFR assumed that currently unfunded culvert upgrade works will be undertaken. We acknowledge that the high priority flood mitigation works (to be completed 'within 5 years') involving amplification of the Woodlands and Tramway Creek culverts will depend on the availability of funding. Council has not been able to meet this component of its Plan to date, as 5 years have already passed and the works have not been undertaken. Nevertheless, the Plan still stands and no other alternative cost-effective flood mitigation measures have been proposed. It is not unreasonable therefore to expect that funding for works that local and state government considers 'high-priority' (within a nominal 5-year planning period) will be completed by the year 2030 when the flood risk effects of climate change are expected to start to become apparent (but well before the full impacts expected over a 100-year planning horizon as modelled by CFR). This is discussed further at the response to WCC Comment F-13 in the separate letter to Council (CFR Letter 003, dated with the same date as this letter).

DECC's fourth point was that additional freeboard should be provided above calculated flood levels. We do not agree. We have been entirely consistent with the freeboard measures specified in DCP54, as discussed further in CFR's Letter 003 responding to the WCC comments (refer comment F-5). We contend that DCP54 is the appropriate document to use and note that it has been formally adopted by Council and is used to assess the flood risks of every other development in the Wollongong LGA. DCP54 was formulated through the process stipulated by the NSW Government's Floodplain Development Manual, with the involvement of DECC.

We also note that the 'estimated increases of flood levels due to climate change in the order of 300-500mm' represents the upper bound case of a 30% increase in rainfall nominated in DECC's 2007 climate change guideline. DECC's guideline indicates that increases of 10%, 20% and 30% should be considered, but does not advocate that the upper end of this predicted range must be adopted - only considered. We contend that this has been done and hence stand by our assessment.

DECC Comment F-3

The adoption of a 0.5 metre freeboard provision is unlikely to account for the range of uncertainties in the design flood levels at this site of which climate change is only one.

CFR Response to DECC Comment F-3

Refer to CFR's response to DECC Comment F-2 above.

DECC Comment F-4

[channel stability]As identified in section 6.3 and Appendix I, the design channel velocities and shear stresses exceed stability thresholds for natural stream treatments. It is noted that a simplistic approach has been taken in CFR08 for stability threshold analysis and quoted velocities are averaged and localised velocities are not estimated.

It is also noted that shear stresses will exceed stability thresholds for natural treatments for much of the channel length even in frequent design floods (i.e. 5 year ARI).

CFR Response to DECC Comment F-4

We do not agree with DECC's comment that a 'simplistic' stability threshold analysis has been undertaken with regard to the Climate Change assessment and that quoted velocities are averaged. The velocities referred to in Figures 6.4, 6.5 and 6.6 are channel velocities, and are not velocities averaged across the floodplain. It is thus not correct to say that CFR's analysis is simplistic through

averaging of calculated velocities. As noted in CFR's Letter 003 responding to the WCC comments (refer comment F-2 in the letter to WCC), the Project Application drawings dated March 2007 do show use of cobbles in various locations but it is noted that these drawings (CFR drawings 1702-1709) were prepared with respect to existing climatic conditions, and need some minor revisions to show the additional armouring required for the climate change scenario. This could be ensured as either a proposed Commitment by the Applicant or a condition of approval.

DECC Comment F-5

Given that the stream design is largely unchanged, the prior advice to DoP from State Government agencies, Council, the Col findings and the Patterson Britton report (January 2007) remains relevant and concerns regarding future erosion of the watercourses have not been addressed. It also remains of concern that solutions that meet both stability and ecological function requirements via wider riparian zones (with increased stream meander to reduce energy and velocities to acceptable levels) have not been considered or proposed.

CFR Response to DECC Comment F-5

The stream design for Woodlands Creek (the main issue raised by Patterson Britton & Partners) has been substantially changed from that indicated in the original concept application. The riparian corridor has been considerably enlarged, particularly for Woodlands Creek. In addition stream meanders have been incorporated, as evident on CFR Drawings 1705 to 1707.

The width of the Woodlands Creek corridor has been substantially increased, with the lower (eastern) section of the riparian corridor widened to around 100m. This resulted in a complete revision of the proposed lot layout and in turn affected flood levels, flood behaviour and the extent of flooding, as can be seen by comparing CFR2008 to the 2006 Stormwater Masterplan prepared by Brown Consulting. Together with the widening of the riparian corridor, a low flow channel has also been included in the design of Woodlands Creek.

DECC Comment F-6

It is therefore clear that the current proposal will lead to hard engineered channel treatments and this substantially departs from the NSW Government's position for natural stream treatments and rehabilitation of ecological function as set out in policy, best practice guidelines, the Illawarra Regional Strategy and the NSW State Plan. Given the regional significance of Woodlands Creek in particular, and the ability to implement natural stream treatments that provide both stability and appropriate ecological function (as per the Col findings, prior advice of the Department and the Patterson Britton report) these are considered liabilities that could otherwise be avoided. In addition to the ability to implement an appropriate channel design, opportunity also exists for the approval authority to require a bond from the proponent (to cover the cost of channel reconstruction following a major flood) to protect the Government and local community from associated cost liability.

CFR Response to DECC Comment F-6

The designs proposed do not rely on hard engineering structures (ie, concrete and gabion mattresses), but only use native grasses, cobbles and (in some limited locations) boulders. Indeed, parts of the gabion lining of Hewitts Creek are to be removed as part of the project and their replacement with native grasses and cobbles. Refer also to response to WCC comments F-2 and F-3 in CFR's Letter 003 in relation to similar comments by Council.

DECC Comment F-7

It appears that the current proposal still does not adequately recognise the regional significance of the creek systems as evidenced by reduced buffer widths and treatments that compromise the rehabilitation of the natural stream functions. It remains unclear, and a serious concern why the adverse flood impacts of the proposed development still have not been estimated and the impacts of flooding on the proposed development and creek stability (both on and off the development site), including those associated with climate change, have not led to any change in the proposal.

CFR Response to DECC Comment F-7

The current proposal incorporates amendments to drawings accompanying the original application specifically called for in the Minister's previous approvals conditions, including a widened corridor for Woodlands Creek. We contend therefore that the current proposal does recognise the regional significance of the creek systems and is consistent with the Minister's prior conditions of approval.

The issue of climate change has been addressed by CFR's 2008 report, which demonstrates that associated changes to the impacts of flooding on the proposed development and creek stability are not significant. The potential adverse flood impacts of the proposed development are addressed in CFR's 2008 report (refer sections 6.2, 6.3, 7.3, 7.4 and 8.2) and within this letter.

DECC Comment F-8

DECC previously commented (correspondence dated 20 November 2007) on the location of bio-retention ponds that were located outside the Stocklands site and within the riparian corridors. It was recommended that they be relocated outside the corridors due to the presence of endangered ecological communities and potential Aboriginal cultural heritage values. DECC understands that the location of the bio-retention ponds is outside the 30m wide riparian corridor (Figure 02 Brown Consulting). However, DECC remains concerned about the siting and construction of these ponds, particularly as they directly abut the "core" riparian zone and may involve areas of endangered ecological communities that would be lost as a result of the construction. The above matters could be partially addressed in any conditions of consent that are prepared should the proposal receive approval.

CFR Response to DECC Comment F-8

This is a matter that was previously addressed (and found to be acceptable to the DoP and the DoP's independent reviewer), and does not arise as a consequence of the climate change assessment.

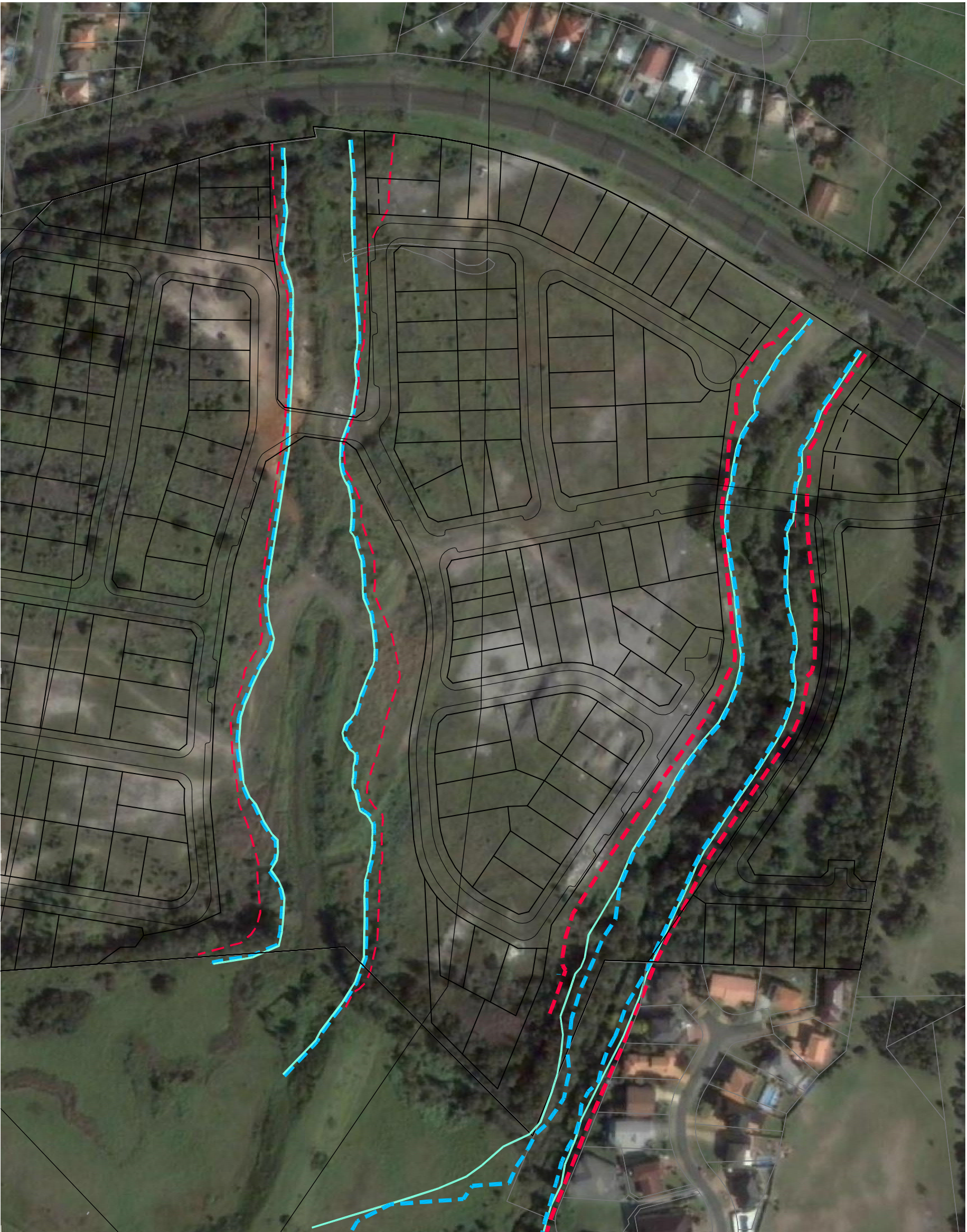
Yours faithfully



Paul Nichols (Principal/Business Unit Manager)
for **Cardno Forbes Rigby**

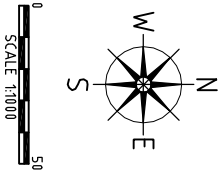
Encl: CFR Drawing No SK-07

DO NOT SCALE IF IN DOUBT ASK



NOTE
THIS DRAWING SHOWS THE FLOOD ASSESSMENT FOR THE SANDON POINT DEVELOPMENT SITE. THE HECRAS MODEL, USED TO CALCULATE THIS FLOOD EXTENT WAS ORIGINALLY PREPARED BY CRR FOR THE PREVIOUS TRAFFIC APPROVAL. THIS FLOOD EXTENT HAS BEEN ADAPTED CLIMATE CHANGE FLOOD STUDY FLOWS AND MANNINGS VALUES OF $n=1.1$ FOR THE STREAM BED AND $n=0.15$ FOR THE STREAM BANKS TO REFLECT A FULLY RESTORED STREAM CORRIDOR.

- LEGEND**
- CALCULATED 1% AEP FLOOD LEVEL FOR EXISTING CLIMATE
 - - - CALCULATED 1% AEP FLOOD LEVEL FOR UPPER BOUND CLIMATE CHANGE
 - CALCULATED 1% AEP FLOOD LEVEL FOR UPPER BOUND CLIMATE CHANGE
 - - - CALCULATED 1% AEP FLOOD LEVEL FOR UPPER BOUND CLIMATE CHANGE



DETAILS				DRAWING STATUS			
REV	DATE	BY	APP.	DESIGN BY	MBF	12/03/08	
P1	21/10/08	MBF	PSN	PLAN UPDATED TO REFLECT EFFECTS OF EXISTING GABION BASKETS AND FLOOD EXTENT ADDED FOR LOTS ON SEA BREEZE PLACE.			
P2	28/10/08	MBF	PSN	PLAN NAME UPDATED			
				DESIGNING CHECK	PSN		
				DESIGN CHECK			
				FINAL APPROVAL			
PRELIMINARY							

SCALE:	
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HEIGHT DATUM	
AHD	

278 KEIRA STREET, WOLLONGONG, NSW 2500	
Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACH: 051 074 992	
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PROJECT TITLE	
SANDON POINT	
CLIMATE CHANGE SUBMISSION	
for	
STOCKLAND DEVELOPMENT PTY LT	

DRAWING TITLE	
POST-DEVELOPMENT	
FLOOD EXTENTS FOR	
HEWITTS AND WOODLANDS CREEKS	
Project No.	106062
Com No.	3
Drawing No.	SK07
REV	P2

File Plotted: U:\2006\106-062-03 - SANDON POINT - CLIMATE CHANGE SUBMISSION\DRAWING\BUILD\SK07 PROPOSED FLOOD EXTENTS HEWITTS AND WOODLANDS CREEKS.DWG
October 28, 2008 5:34:42 p.m.
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Our Ref: 106062-03 / Letter 002 Rev 2

Contact: Paul Nichols



31 October 2008

Mr David Kettle
Don Fox Planning
PO BOX 230
PENNANT HILLS NSW 1750

Attention: Mr David Kettle

**RE: RESPONSE TO SES COMMENTS ON CONCEPT PLAN MP06_0094
AND PROJECT APPLICATION MP07_0032 - SANDON POINT**

We are pleased to provide our response to matters raised in the SES's letter dated 14 July 2008 on Concept Plan MP06_0094 and Project Application MP07_0032 for proposed residential subdivision, aged persons accommodation and associated infrastructure development at Sandon Point.

SES Comment S-1

The SES's assessment of the Sandon Point proposal is based on a core flood emergency management requirement ie in the event of a flood it must be possible for people to be evacuated to a site where they are no longer at risk from rising floodwater. This means that people must be able to reach an area that is above the highest possible flood level, the Probable Maximum Flood (PMF). The 1% Annual Exceedance Probability (AEP) flood level is not a suitable standard for risk to life.

CFR Response to SES Comment S-1

We agree with the SES that the 1% Annual Exceedance Probability (AEP) flood level is not a suitable standard for risk to life, and we confirm that we have used a higher standard, being the Probable maximum Flood (PMF).

The proposed development has been designed in accord with the SES's comments. None of the lots adjoining Hewitts or Woodlands Creek are affected by PMF flooding, nor is the ARV site - with respect to both the existing and upper-bound climate change scenarios. The only part of the site affected by PMF flooding is residential Stage 5 on the southern side of Tramway Creek, where 2 lots only are marginally affected by the PMF event. Residents of these lots are readily able to 'evacuate' to land above the PMF by walking to the other side of their lots and onto the (flood-free) street. As further discussed in s.8.2 of CFR's 2008 report, this is in accordance with DCP54 'Managing our Flood Risks' and Council's adopted Hewitts Creek Floodplain Risk Management Plan (which was formulated through the process stipulated by the NSW Government's Floodplain Development Manual, with the involvement of the SES).

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SES Comment S-2

This development appears to be based on the intention of having all residential land (as opposed to just flood levels) located above 1% AEP plus 500mm freeboard and trafficable access in the event of flooding up to the 1% AEP flood event. The net result of this approach is that most of the residential land will be above the level of the PMF. This leads to a general conclusion in the reports that flood evacuation capability is not a necessary consideration.

However, there is an apparently contradictory statement in both Part 2 of the Environmental Assessment as well as in the Surface Water Management Report by GHD, which refers to measures which mitigate the impacts of flooding on the proposed development including "Flood risk management using flood planning levels and flood evacuation."

CFR Response to SES Comment S-2

We confirm that the whole of the site (Stockland and ARV components) is served by a road network that can provide access in all floods including the PMF event - with respect to both the existing and upper-bound climate change scenarios.

SES Comment S-3

It is unclear how it is intended to address the issue of flood evacuation other than providing a 'muster area' within the complex which appears to be located on a 'flood island'.

CFR Response to SES Comment S-3

Refer response to SES Comment S-2 above.

SES Comment S-4

In the assessment of climate change impacts it is forecast that over time, the frequency of flood events of a particular magnitude may change. The sites which are above the level of flooding attributed to the Probable Maximum Flood (PMF) of today, are forecast to progressively lose this safety factor. There is however no explanation of the consequences of this frequency shift which will in fact progressively change the risk profile for this site.

CFR Response to SES Comment S-4

As indicated above, it is reconfirmed (CFR 2008, s.8.2) that none of the lots adjoining Hewitts or Woodlands Creeks nor the ARV site are flood prone (with respect to the PMF event) when calculating flood levels using conservative roughness parameters under an 'upper bound' climate change scenario.

The proposed Stage 5 residential lots adjoining Tramway Creek are marginally affected by PMF flooding but not the 1% AEP event. This is allowable under Wollongong Council's DCP54 provided that various prescriptive controls are followed, including minimum floor levels and an evacuation strategy in the PMF event where required. In the case of residential development habitable floor levels need to be raised 500 mm above 1% AEP flood levels, which is readily achievable for the proposed Stage 5 lots. Evacuation can also be readily undertaken via the proposed subdivision road which quickly rises (over a distance of less than 100 m) to land above the PMF. This situation does not vary for the climate change scenario.

SES Comment S-5

It is our understanding that the development as it is proposed today will be based on 1% AEP flood level plus 500mm of freeboard, placing most sites above the level of the current PMF. However, the implication of what is forecast under climate change is that at some time in the future, these same sites may be closer to the 1% AEP flood level and with little or no freeboard. These sites will no longer be 'flood free' in the true sense of above PMF. This means that if it is assumed that people are not at risk of drowning if they do not evacuate under current flood levels, then in the future that risk will become a factor making evacuation essential. In a similar way, the access roads which may only be affected by less frequent floods under present circumstances (i.e. only floods >1% AEP), may progressively become susceptible to more frequent floods, thereby increasing the isolation risk.

CFR Response to SES Comment S-5

The SES's understanding is not correct. See response to comment S-4 above.

SES Comment S-6

The risk to the people is caused by the fact they will be totally isolated from the rest of the community during large flood events. The risk from isolation is one that must not be down-played or assumed to be irrelevant. Land and Environment Court cases in which the SES has been involved over recent years have identified three specific risks that must be considered. These are the risk of a resident experiencing a serious and life threatening injury or medical emergency such as a cardiac arrest or stroke, the risk of a fire breaking out in a building, and risk of requiring intensive external support to maintain reasonable living conditions - what the SES terms resupply.

CFR Response to SES Comment S-6

We contend that this is a matter that was previously addressed and does not arise as a consequence of the climate change assessment. As with the previous application, the only isolation that will occur is the same 'isolation' which affects all residents between Thirroul and Coalcliff, who were cut off in the flood of August 1998. Lawrence Hargrave Drive was impassable south of the Bulli Pass intersection or north of Coalcliff in the August 2008 flood (which was approximately a once in 50-year event).

If this issue is held to be a concern in regard to the proposed development, then this would imply that no further development should be permitted in the northern suburbs of Wollongong between Thirroul and Coalcliff.

SES Comment S-7

In the case of an aged care or retirement facility proposed as part of this development it stands to reason that these issues must be addressed in a more detailed manner given the vulnerability of the community at risk.

CFR Response to SES Comment S-7

It is confirmed that the ARV site is above the PMF and a flood-free evacuation route is available between the site and existing services in Thirroul.

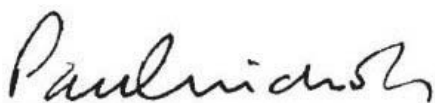
SES Comment S-8

It is recommended that prior to any approval being given, the issues of consequential risk creep due to climate change and the risk associated with isolation (both now and into the future) are considered in more detail than is currently the case in the assessment reports

CFR Response to SES Comment S-8

This has already been done in section 8.2 CFR's 2008 report, and is further discussed at the response to WCC Comment F-5 in the separate letter to Council (CFR Letter 003, dated the same date as this letter).

Yours faithfully

A handwritten signature in black ink, appearing to read "Paul Nichols".

Paul Nichols (Principal/Business Unit Manager)
for **Cardno Forbes Rigby**

Our Ref: 106062-03 / Letter 003 Rev 2

Contact: Paul Nichols



31 October 2008

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**RE: RESPONSE TO WCC FLOODING COMMENTS ON CONCEPT PLAN
MP06_0094 AND PROJECT APPLICATION MP07_0032 - SANDON POINT**

We are pleased to provide our response to flooding issues raised in Wollongong City Council's letter dated 7 July 2008 concerning Concept Plan MP06_0094 and Project Application MP07_0032 for proposed residential subdivision, aged persons accommodation and associated infrastructure development at Sandon Point.

WCC Comment F-1

The flood study by Cardno Forbes Rigby (CFR) dated March 2008 does not quantify the amount of discharge (flow) for the 20 year Average Recurrence Interval (ARI), nor does it confirm the capacity of the channels for the volume of flow for this recurrence period as required by the Director General.

CFR Response to WCC Comment F-1

Flows for the 20 year ARI event were not included in the main body of text, but are fully detailed in Appendix F. The 20-year line was not shown on Figures 6.4, 6.5 and 6.6 as it clearly lies between the lines for the 5 year and 100 year ARI events. Irrespective of wherever the 20-year line plots between these two limits, the conclusions of the report are unchanged. Please refer to **Attachment A** for a set of figures with the 20-year lines added.

WCC Comment F-2

The channel designs are inadequate to maintain channel stability up to the 20-year ARI as per the Director General's requirements for the climate change scenario. The scour protection proposed within the channels is only capable of protecting the channels up to a 5-year ARI based on the flow velocities and shear stress results found within the flood study.

CFR Response to WCC Comment F-2

It is agreed (as is stated in the CFR 2008 report) that native grass planting alone in the channel will ensure stability in events up to the 5 year ARI. For larger events, up to and including the climate change 'upper bound' 100-year event, the use of cobbles in localised areas, (and possibly boulders in some limited locations) will produce a stable channel design using natural materials.

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The Project Application drawings dated March 2007 do show use of cobbles in various locations but it is noted that these drawings (CFR drawings 1702-1709) were prepared with respect to existing climatic conditions, and need some minor revisions to show the additional armouring required for the climate change scenario. This could be ensured as either a proposed Commitment by the Applicant or a condition of approval.

WCC Comment F-3

No channel designs have been submitted for either Tramway or Cookson Creeks to allow a detailed assessment to be carried out with respect to channel stability.

CFR Response to WCC Comment F-3

There are no significant changes proposed to Tramway Creek. Essentially, it is to be retained in its existing form as proposed in the original application, which was accepted by DoP. The changes to velocities and shear stresses for Tramway Creek under the climate change scenario are minimal, as can be seen in the figures included as **Attachment A**.

Again, as with the original application, which was accepted by DoP, separate modelling by GHD confirmed that flows to be carried by Cookson Creek are still relatively small under the climate change scenario and can be readily engineered into final designs for the post-development landform.

WCC Comment F-4

CFR have neglected to use the flood levels based on the extreme upper bound of roughness coefficient $n=0.2$ for the riparian corridors to determine flood planning levels for the proposed Sandon Point development. This may result in building platforms becoming inundated in the future due to the significant establishment and lack of maintenance of these riparian corridors.

CFR Response to WCC Comment F-4

It is not correct to say that CFR has 'neglected' to use the flood levels based on the extreme upper bound of roughness coefficient $n=0.2$ to determine flood levels. CFR used the same approach as in the original Concept Plan application, in that we considered flood levels based on the extreme upper bound of roughness coefficient $n=0.2$, but we did not adopt them in setting flood planning levels. We contend therefore that this is a matter that was previously addressed and does not arise as a consequence of the climate change assessment.

We further note that CFR's 2008 report adopted Manning's 'n' values of $n = 0.10$ for the main channel and $n = 0.15$ for the overbank areas, to reflect the degree of planting/re-vegetation envisaged within the proposed riparian corridors for Hewitts, Woodlands and Tramway Creeks. These Manning's n values are significantly higher than those used in the calibrated model adopted by Council (ie, the 2002 Hewitts Creek Flood Study), which used an n value of 0.05 for the channel and $n = 0.10$ for overbank flow reflecting the 'existing' creek vegetation at the time the study was conducted.

CFR also undertook sensitivity assessment using even higher Manning's 'n' values of $n = 0.20$ for both the channel and overbank areas (as requested by DECC). This is consistent with the approach adopted by Brown Consulting for the original Concept Plan application, which included a sensitivity analysis (in Appendix C of the May 2006 'Stormwater Concept Plan' report) of the effects on flooding behaviour of the high Manning's 'n' value of 0.2. Browns however did not adopt flood levels associated with these extreme 'n' values when setting flood planning levels.

In reviewing the results of flood modelling using the extreme upper bound of Manning's roughness of 0.20, CFR and GHD (the peer reviewer of CFR's 2008 climate change flood risk assessment) considered the use of such values of Manning's 'n' was inappropriate for large events as the very high flows in the 1% AEP and PMF events would tend to bend down or strip away protruding limbs of vegetation and thus reduce hydraulic roughness, particularly in the base of the channel where only low planting is proposed. We therefore adopted the same approach as Browns as in the original application, which was accepted by DoP.

It is observed that the Brisbane City Council Natural Channel Design Guidelines describe the vegetation community associated with a Manning's 'n' of 0.15 (as adopted in CFR 2008) as "*Trees and shrubs at 1m spacings, some vines, low branches, fallen trees, difficult and slow to walk through*". This vegetation description does not correspond to typical densities associated with sub-tropical rainforest in the Illawarra area where competition for light precludes the establishment of such plant densities – thus implies a significant degree of conservativeness.

It is further noted that the DWE has recently advised Kiama Municipal Council (letter dated 9 July 2008, in regard to a Land & Environment Court matter) that appropriate Manning's Roughness Values for vegetation/plant densities within Illawarra riparian corridors should be 0.10 to 0.12 (left and right overbank) for the core riparian zone. These values are much less conservative than those adopted by CFR.

WCC Comment F-5

The flood study has failed to consider the optimum climate change management strategy as recommended by the Department of Environment and Climate Change (DECC) for new developments. In particular, a higher flood planning level is recommended for such development, which provides a factor of safety in addition to the general freeboard. The view adopted by CFR reflects the climate change impacts being absorbed within the general freeboard and no additional factor of safety for inaccuracies within the flood modelling.

CFR Response to WCC Comment F-5

We do not agree that CFR has failed to consider the 'optimum' climate change management strategy as recommended by DECC for new developments. The suggestion by Council to adopt a higher flood planning level in this case is inconsistent with Council's current adopted Policy as contained in DCP54 '*Managing our Flood Risks*'.

DCP54 provides schedules of prescriptive controls relating to the floodplains for which local Floodplain Risk Management Studies and Plans have been prepared and adopted by Council. Schedule 4 contains prescriptive controls specifically relating to the Hewitts Creek catchment (which also includes the floodplains of Slacky, Woodlands, Tramway and Thomas Gibson Creeks). One of the prescriptive controls in DCP54 (relating to 'Flood Planning Levels') is the provision of freeboard in setting floor levels above calculated 1% AEP flood levels for residential development (and above PMF levels in the case of aged care developments).

The provisions of *Wollongong DCP54 Managing Our Flood Risks* are complied with. The objectives of DCP54 are primarily directed to minimising risk to property and human life. The current prescriptive standards in DCP54 include a requirement that the habitable floor level of dwellings be no lower than the current 100 year flood plus 0.5m freeboard (which as presently defined includes an allowance for climate change). The proposed subdivision would allow for all future dwellings to be at a level above the current PMF and therefore more than complies (given that the PMF is typically 0.65 to 1.2 m higher than the 100 year flood in each of Hewitts, Woodlands and Tramway Creeks). This also provides for the ability for all future residents to shelter in place if necessary during floods up to a

PMF (consistent with the requirements of DCP54) but as an additional measure the carriageways of all proposed internal roads are also to be constructed at a level above the current PMF.

Assuming Council is questioning the veracity of its own planning controls that deal with flood risk (inclusive of climate change) a further assessment has been undertaken to assess compliance with DCP54 in 100 years time applying the upper bound change scenario suggested by the DECC Guideline. The DECC Guideline suggests a procedure to assess additional flood risks that may arise due to climate change. There are some uncertainties associated with the degree of change, particularly with respect to rainfall intensities. Consequently the DECC Guideline suggests a sensitivity analysis applying different scenarios for change. After applying the upper bound scenario to the suggested planning horizon (100 years in the future) the proposed subdivision would still allow for all future dwellings to be constructed with habitable floors at a level above the PMF. Therefore the proposal more than complies with the DCP in the future after consideration of climate change flood risk as suggested by the DECC Guideline. In the upper bound climate change flood risk scenario only proposed lots 225 and 226 have any material affection by the PMF (albeit minor and unaffected in a 100 year flood) but remain capable of more than minimum compliance with DCP54. Additionally, the compliance of the proposal with the emergency management requirements of DCP54 remains unchanged.

WCC Comment F-6

The flood study fails to clarify the impact of flooding on the development due to overtopping of the railway embankment in the PMF event. This was identified within the Hewitt's Creek Floodplain Risk Management Study and Plan (2002), but was not explored within the recent CFR Climate Change Study.

CFR Response to WCC Comment F-6

Flows overtopping the railway in the PMF event are directed back to the creeks within railway land between the track formation and the subdivision fill. The railway track levels at the creek crossings are at approx. RL 15.5 m AHD for Hewitts Creek and approx. RL 16.7 m AHD for Woodlands Creek. The rail embankment crest slopes down generally at a constant grade between these two points.

The railway land corridor between the track formation and subdivision boundary is approximately 10-15m wide sloping from west to east generally at a gradient of 1(V):5(H). The proposed subdivision fill will batter back toward this corridor at a slope of 1(V):2(H), effectively creating a channel between the rail embankment and subdivision. A concrete acoustic barrier approximately 2m high is proposed to be placed at the top of the subdivision batter, which will act as a temporary flood levee on the upstream edge of the subdivision, until Woodlands Creek railway culvert is upgraded.

We have undertaken hydraulic modelling of flows in the rail corridor channel and our modelling indicates that the channel will have sufficient capacity to relay any flows overtopping the railway in the PMF event back to Hewitts and Woodlands creeks in both the existing climate and post climate change scenarios, without any adverse impacts to the west of the railway line or to the proposed development. Under these conditions, PMF floodwaters are generally contained to within the channel, although at some points along the channel the flood level reaches marginally above the base of the concrete barrier. The acoustic barrier will be subjected to nominal hydrostatic pressures in these areas and will be designed accordingly.

Modelled flood levels in the railway corridor channel are well below the railway embankment crest at all locations along the channel and floodwaters are excluded from the subdivision by a filling and/or the concrete acoustic barriers. This confirms that overtopping of the railway embankment during the PMF event will not cause inundation of the proposed subdivision lots, and there will be no impact on

flood levels upstream of the railway embankment as a result of the proposed acoustic barriers. Refer **Attachment B** for outline of modelling, including location of cross-sections and calculated flood levels at typical sections.

Upgrading of the Woodlands Creek railway culvert is recommended as high priority in the Hewitts Creek Floodplain Risk Management Plan adopted by Council ('within 5 years') and a reduction in flows overtopping the railway embankment during high flow events will be achieved once this upgrade has taken place.

Even so, we confirm that the development has been designed to cater for 'maximised' peak flows in Hewitts Creek immediately downstream of the railway line for existing climate conditions (ie, without any culvert upgrade), reflecting the following blockage culvert status:

- The Lachlan St culvert is clear (which diverts less flow out of Hewitts Creek)
- The existing (non-upgraded) railway culvert at Woodlands Creek is 100%-blocked (which diverts more flow into Hewitts Creek)
- The Railway bridge at Hewitts is 25%-blocked (which reduces dynamic attenuation by the informal basin above the railway), with flow passing to Hewitts Creek downstream of the railway by way of 'weir' flow over the railway formation.

The impacts of any railway overtopping flows on the proposed development will be further managed by appropriate configuration of the acoustic barriers which will be designed to wrap around the 'corners' of the subdivision and not to encroach into the riparian corridors of Woodlands and Hewitts Creeks.

Flows overtopping the railway in the PMF event at Tramway Creek are similarly directed back to the creeks within railway land between the track formation and the subdivision access road, as proposed in the Brown Consulting for the original Concept Plan application (May 2006 'Stormwater Concept Plan' report).

WCC Comment F-7

The study does not reflect any flood modelling/analysis upslope of the railway line embankment for any of the watercourses (Hewitts/Woodlands/Tramway/Cookson), to determine whether any flooding impacts occur west of the railway line as a result of the proposed development. In particular, the impacts due to any afflux at the proposed bridges within the development and also the impacts due to the acoustic barriers proposed along the railway embankment and adjacent to the watercourses.

CFR Response to WCC Comment F-7

We have now modelled the proposed bridges over Hewitts and Woodlands Creeks for both unblocked and blocked conditions (ie, 25% bottom-up blockage, and 100% blockage of handrails), for the 1% AEP and PMF events. It is confirmed that the blocked scenarios do not cause afflux at the railway. We have also specifically modelled the impact of acoustic barriers for PMF overtopping of the railway, and confirm that the acoustic barriers do not cause a problem. Modelled flood levels are tabulated below:

Table 6.5A Quantification of Afflux at Railway

Flood Level at Railway Embankment	Immediately U/S ^[a]	Immediately D/S Clear ^[b]	Immediately D/S 25% Blocked ^[b]	Does Afflux Affect U/S Properties?
Hewitts Creek	16.19	12.81	12.90	NO
Woodlands Creek	17.80	15.19	15.27	NO
Tramway Creek	17.60	12.11	12.11	NO

[a] Based on 2002 Hewitts Creek Flood Study for Existing Climate

[b] For climate changed conditions

In regard to Tramway Creek, we note that the new road bridge is a short distance downstream of the existing railway bridge and it is assumed that if the Tramway Creek road bridge could only be 25%-blocked if the railway bridge is 25% blocked. Further modelling has confirmed that under such conditions there are no flooding impacts west of the railway line as a result of the proposed development.

The modelling confirms that none of the bridges are overtopped in the climate changed PMF event under 'blocked' conditions. Modelling files are available for forwarding to the DoP's independent reviewer on request.

It is not considered conceivable that any sensible design for Cookson Creek could result in afflux resulting in increased flooding impacts west of the railway line. Nevertheless, if desired, safeguarding against such an (implausible) adverse impact during subsequent detailed design of the site internal stormwater management (which would include Cookson Creek) could be ensured as either a proposed Commitment by the Applicant or a condition of approval.

WCC Comment F-8

The flood study does not reflect compliance with Council's Conduit Blockage Policy, which states a 25% bottom up blockage for structures with a major diagonal opening width of greater than 6 metres. In particular, no obstructions were found within the Hec-Ras hydraulic model cross sections that represent a 25% bottom up blockage for any of the bridge structures. The flooding impacts due to this requirement needs to be clearly identified and fully investigated for all structures, including handrails on all bridge structures and the proposed footbridge.

CFR Response to WCC Comment F-8

The modelling referred to in the response to WCC Comment F-7 also addresses WCC Comment F-8.

WCC Comment F-9

The results of the flood study indicate flood levels for the Probable Maximum Flood (PMF) reaching/overtopping the structures over Hewitt's, Woodlands and Tramway Creek. This is likely to have an impact on the future lots although has not been clarified within the study.

CFR Response to WCC Comment F-9

The modelling referred to in the response to WCC Comment F-7 also addresses WCC Comment F-9.

WCC Comment F-10

The flooding impacts of the proposed footbridge, which spans across Woodlands Creek, and the proposed road crossing, which spans across Tramway Creek have not been referred to or modelled within the recent flood study by CFR.

CFR Response to WCC Comment F-10

The modelling referred to in the response to WCC Comment F-7 also addresses WCC Comment F-10.

WCC Comment F-11

There is an inconsistency within the flood study with respect to the road bridge over Woodlands Creek. In particular, the Hec-Ras hydraulic cross section shows 3 rows of piers — the general arrangement bridge drawing by CFR only indicates 2 rows of piers.

CFR Response to WCC Comment F-11

Detailed designs have not yet been prepared for these bridges, but it is observed that 3 piers is the more critical case from the perspective of flood hydraulics, which was the case modelled. So if the flood hydraulics are acceptable for a 3-pier bridge, they would also be for a 2-pier bridge.

WCC Comment F-12

No flood modelling has been undertaken on Cookson Creek to determine the impacts on the Retirement Village development due to climate change. This creek also needs to be analysed with detailed modelling by CFR, considering the recent Land and Environment Court ruling.

CFR Response to WCC Comment F-12

A separate simulation of Cookson Creek was not conducted in CFR's 2008 report as it is much smaller than the other creeks and hence consider readily manageable. The catchment of Cookson Creek upstream of the railway only amounts to some 1.7 ha, with the major part of the catchment of Cookson Ck (which total 6 ha at the confluence with Woodlands Creek) being the development site itself, so the management of Cookson Creek in effect falls under the internal stormwater management plan for the site. Separate modelling by GHD confirmed that flows to be carried by Cookson Creek are still relatively small under the climate change scenario and can be readily engineered into final designs for the post-development landform.

WCC Comment F-13

The flood modelling by CFR under the climate change scenario is only based on the amplification of all railway culverts west of the subject Sandon Point Development Site. The flood modelling should also examine the impacts of climate change on the subject and surrounding developments in the event of no culvert amplifications or only partial/staged amplification, since the recommendations with respect to culvert amplification were based on engineering judgement made at the time and may be subject to change in the future, and also highly dependant on funding being available for the given time for any proposed works.

CFR Response to WCC Comment F-13

The Hewitts Creek Floodplain Risk Management Plan adopted by Council states that the 'high-priority' upgrade of the Woodlands Ck Railway culvert is to take place 'within 5 years'

Council is correct in stating that CFR has assessed the climate change scenario based on the assumption that the 'high-priority' upgrade works proposed for the railway culverts at Woodlands and Tramway Creeks. This is considered a valid assumption as Council's adopted Plan for Hewitts Creek catchment indicates that these upgrade works are to take place 'within 5 years'. In comparison the climate change scenario will take 100 years to manifest to the extent assessed in the high-range scenario adopted by CFR.

We differ however with the negative implications of Council's comment that the railway culvert amplifications were based on *'engineering judgment made at the time which may be subject to change in the future'*. The August 1998 floods demonstrated the vulnerability to flooding of existing houses in the area between Hewitts and Woodlands Creeks upstream of the Illawarra railway line. The Hewitts Creek Floodplain Risk Management Study established that amplification of the Woodlands Creek railway culvert is the most effective way to mitigate flooding in these areas. It is both a practical and feasible solution. We do not see how it can be argued, 5 years on, that the upgrade of Woodlands Creek railway culvert is any less pressing than it was in 2003. Council's Plan in this respect was a sound one, and still is. We reaffirm that Council's 'engineering judgment' in identifying the works as high priority (to be completed 'within 5 years') remains in the best interests of the community. The effects of climate change will only put the residents upstream of the railway line at further risk should Council not implement the high-priority upgrade of the Woodlands Creek railway culvert.

We acknowledge Council's comment that the amplification of the Woodlands and Tramway Creek culverts will also depend on the availability of funding. Council has not been able to meet this component of its Plan to date, as 5 years have already passed and the works have not been undertaken. Nevertheless, the Plan still stands and no other alternative cost-effective flood mitigation measures have been proposed. It is not unreasonable therefore to expect that funding for works that local and state government considers 'high-priority' (within a nominal 5-year planning period) will be completed by the year 2030 when the flood risk effects of climate change are expected to start to become apparent (but well before the full impacts expected over a 100-year planning horizon as modelled by CFR).

It should also be recognised (as promoted by DECC's counterpart agencies in other states of Australia) that when assembling design assumptions for flood modelling that may be *'reasonable when considered in isolation, it is essential that the build-up of conservatism is not forgotten'*. We would contend that there is considerable build-up of conservatism in CFR's approach to date.

CFR's modelling has assumed that all of the following assumptions occur simultaneously:

- Assuming that where blockages occur, they involve 100% blockage of structures less than 6-m wide (despite only tenuous evidence that this actually happens in real floods. - it is rare that vegetation would create full and total blockage of a waterway structure) – this goes well beyond the requirements of the State Government Floodplain Development Manual, which does not require that culverts be considered fully blocked in the setting of flood levels.
- Assuming that culverts are 100% blocked at the peak of the flood, at which time the effects on calculated flood levels are the greatest - this is again a conservative assumption not fully supported by the data-set of historical flood blockages for the Wollongong Local Government Area.
- Further assuming the most adverse combination possible of culvert blockages (ie, 'blocking' only those culverts that make flooding worse at a particular location, but leaving 'unblocked' those culverts which would serve also to make flooding worse) - this is a combination of low probabilities

in that it implies blockage and flooding always happen at the same time, which is not correct. This assumption in effect makes calculated flood levels for the 1% AEP event of a probability much rarer than 1% per annum.

- Adoption of both the high range sea level increase and the upper-bound case of rainfall intensity increases described in DECC's climate change flood risk guideline (ie, rather than adopting the mid-range scenarios)
- The inclusion of freeboard (of minimum floor levels over calculated flood levels) as a further factor of safety.

We contend that adding a further assumption that Council will not be able to find the funds within 100 years for works they say should be done within 5 years, in combination with the above conservative assumptions, is inappropriate.

Our modelling incorporates an allowance for increased flow in Woodlands Creek once the Woodlands-to-Hewitts diversion is reduced, for both the existing climate and the upper-bound climate change scenarios. Equally this design assumption has been applied to Hewitts Creek for the upper bound climate change scenario.

In regard to Tramway and Woodlands Creeks, flooding is actually made worse by Council's proposed culvert upgrade works. This worst-case arrangement has been taken into account in our modelling for the climate change scenario - even though the effectiveness of the Tramway Creek railway culvert upgrade proposal is questionable (as noted in the recommendations of CFR's 2008 report). Development proposals in these creeks are therefore not affected by Council failing to implement its Plan,

WCC Comment F-14

The proposed tail-out works as stated in the CFR study for Hewitt's and Woodlands Creek are not consistent with the Hewitt's Creek Floodplain Risk Management Plan (FRMP). The FRMP recommends filling and closure of the existing diversion of Woodlands Creek into Hewitt's Creek and reinstatement of the original route of Woodlands Creek towards Tramway Creek. The reinstatement of Woodlands Creek involves excavation of an enlarged channel and rock armour bank protection through the downslope property. The CFR study proposes works primarily on the Stockland site, which is unsatisfactory since these 'incomplete works' have the potential to impose a greater risk to property downstream. This would also be contrary to the requirements imposed by the Department of Planning.

CFR Response to WCC Comment F-14

It is not accepted that the proposed interim works on the Stockland site have the potential to impose a greater risk to property downstream.

Under existing conditions, the natural flood flows in Woodlands Creek are unable to pass through the undersized railway culvert and are diverted to Hewitts Creek. It is only when the Woodlands Creek railway culvert is upgraded will there be significant flood flows carried in Woodlands Creek downstream of the railway.

Tail-out works are proposed on the adjoining downstream land as an interim step in order for the works as designed to be constructed, in a manner commonly undertaken in association with subdivision development. No cutting of the floodplain or adjacent areas is proposed. The re-diversion of Woodlands Creek into Tramway Creek, indicated as being a high priority in the Hewitts Creek Floodplain Risk Management Plan, is not a matter directly attributable to the proposed development. The tail-out drain can be readily upgraded in due course once Council negotiates permission with the affected landowner, and implements the adopted recommendations of the

Floodplain Risk Management Plan. This is not required however until the Woodlands Creek railway culvert is upgraded.

WCC Comment F-15

The flood study has not demonstrated how 'flood free' access will be available in the PMF event for the future occupants from both the proposed residential subdivision and retirement village, considering that overtopping of the railway embankment will occur in the PMF, as identified within the Hewitt's Creek Floodplain Risk Management Study and Plan (2002).

CFR Response to WCC Comment F-15

Flood-free access will be available in accordance with modelling adopting CFR's recommended Manning's n values (refer also to comments above in response to Council Comment F-4, and also to further comments in CFR's letter to the SES dated 24 September 2008).

WCC Comment F-16

The flood study has not accurately or clearly documented the impact of the development on surrounding properties as a result of filling of flood storage areas, channelisation works on the watercourses and proposed bridge structures.

CFR Response to WCC Comment F-16

We contend that this is a matter that was previously addressed in the original Concept Plan Application (which was assessed by the DoP and the DoP's independent reviewer Patterson Britton & Partners and found to be satisfactory), and does not arise as a consequence of the climate change assessment. Nevertheless, further detailed discussion of impacts of the development on surrounding properties is presented in the response to WCC Comment F-1 above. Filling of storage areas was envisaged in the original application, and is consistent with Council's OSD Policy which indicates that flood storage is not critical in the lower reaches of a catchment, and shows the Sandon Point Development Site being located within the 'concession' zone where OSD is not required.

Council has already made separate specific comments above on 'channelisation' works on the watercourses and proposed bridge structures. It is therefore assumed that the answers given above satisfactorily address these last two points.

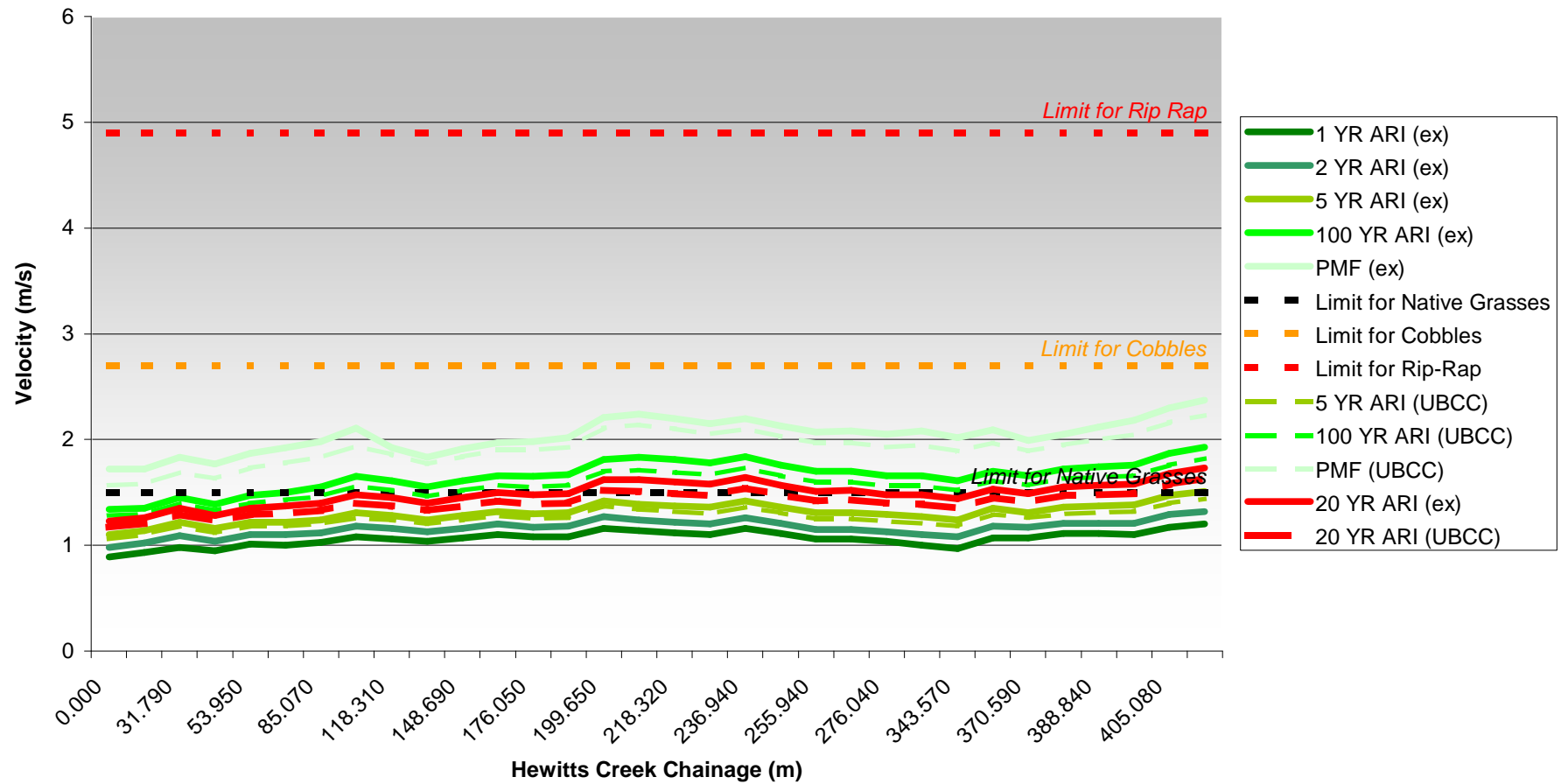
Yours faithfully



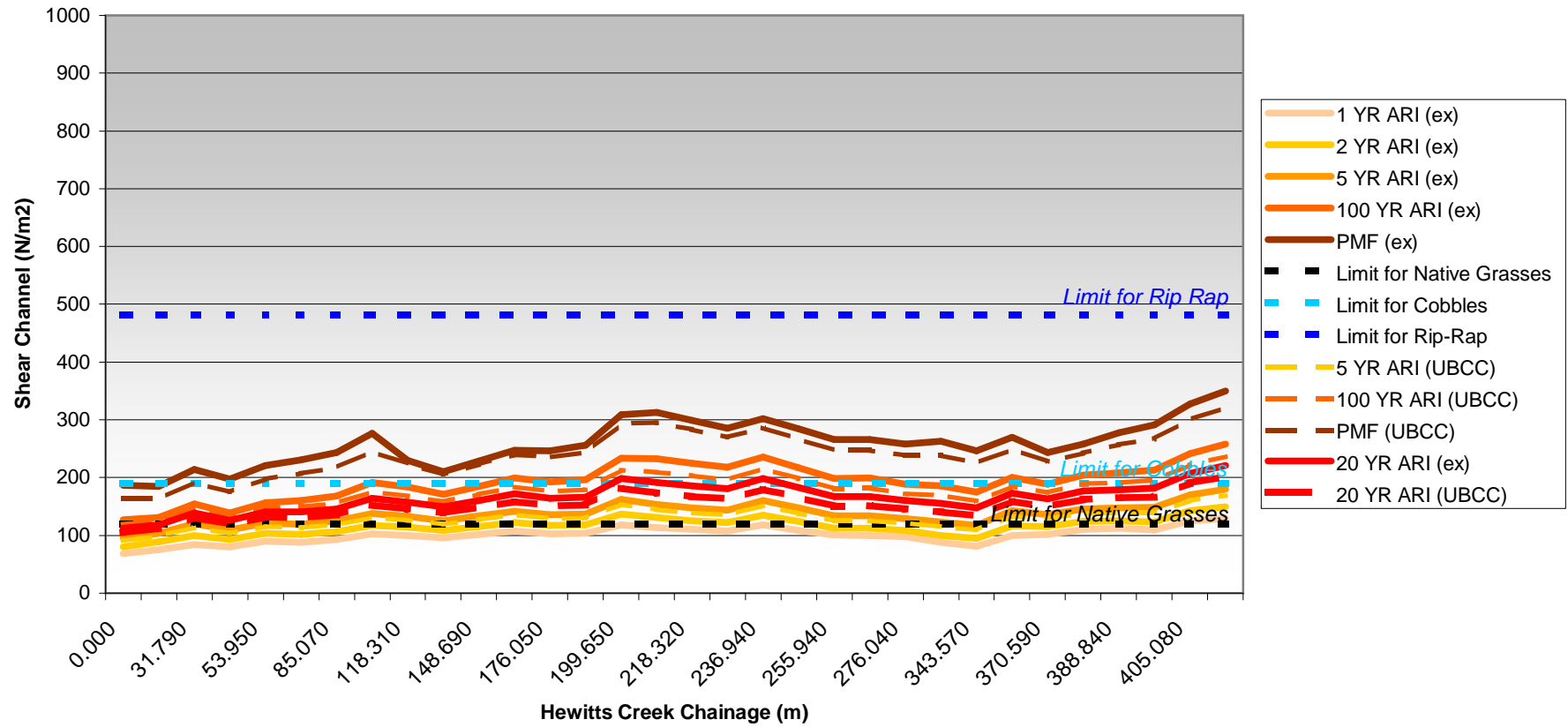
Paul Nichols (Principal/Business Unit Manager)
for **Cardno Forbes Rigby**

ATTACHMENT A

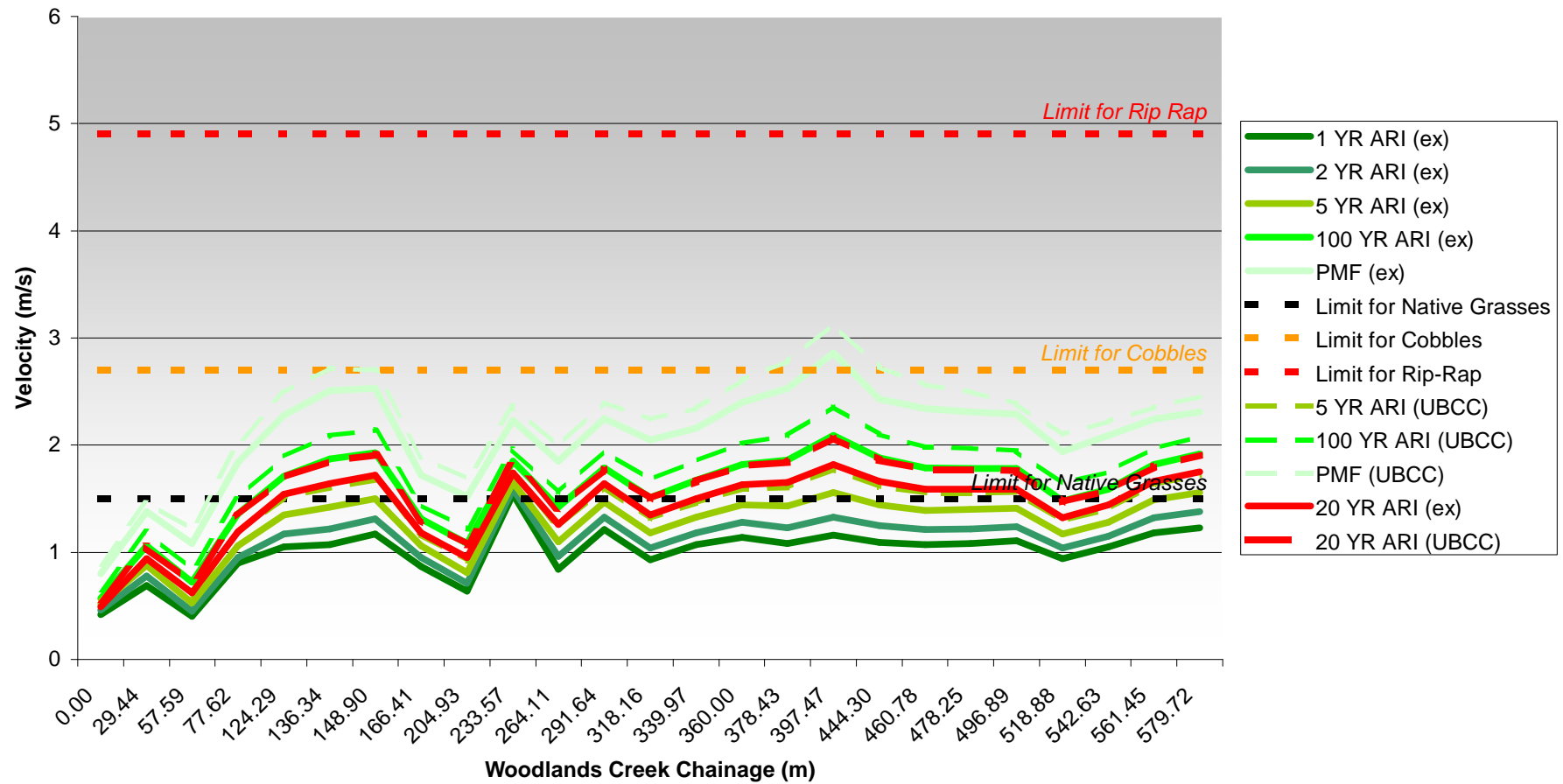
Proposed Hewitts Creek Channel Velocity Thresholds



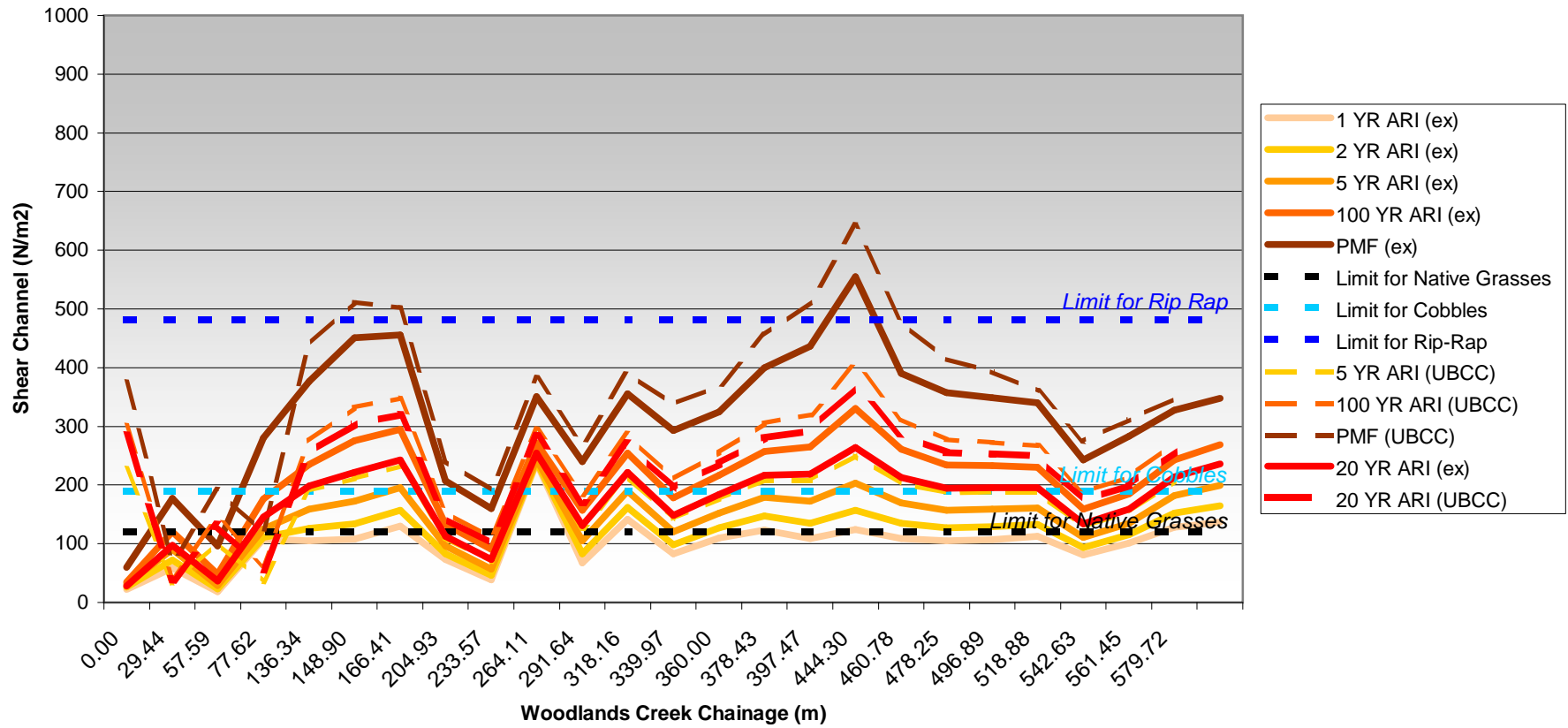
Proposed Hewitts Creek Channel Shear Thresholds



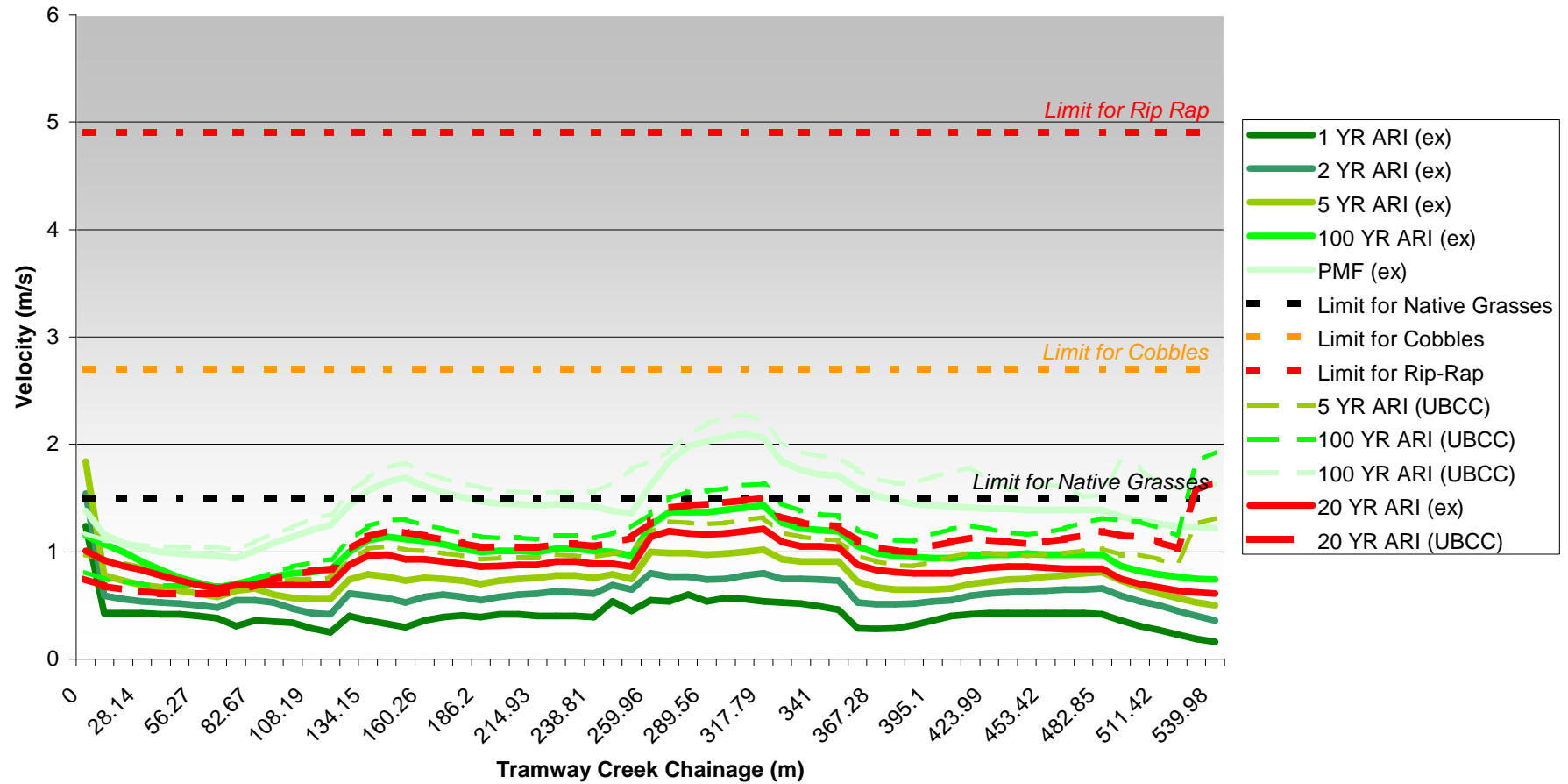
Proposed Woodlands Creek Channel Velocity Thresholds



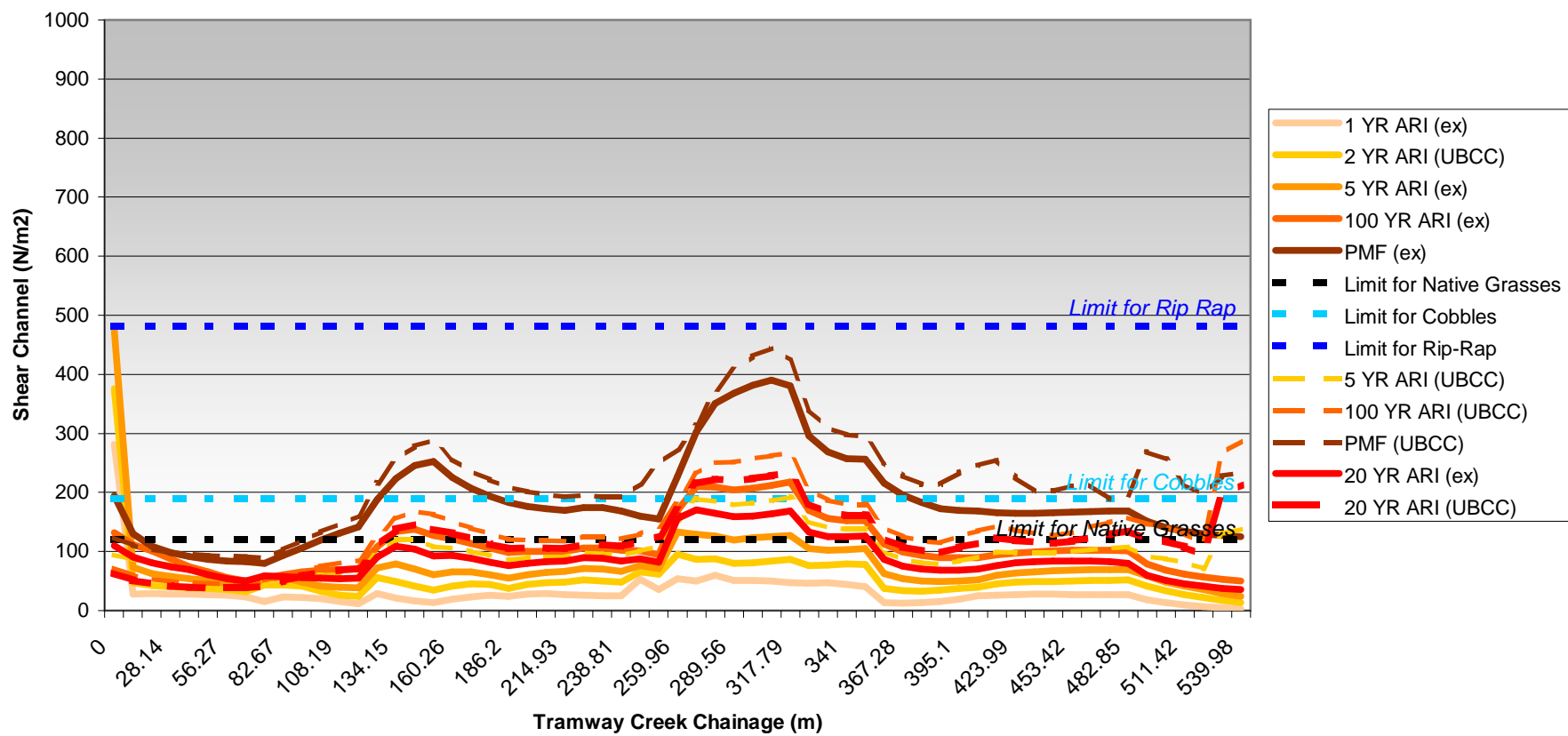
Proposed Woodlands Creek Channel Shear Thresholds



Proposed Tramway Creek Channel Velocity Thresholds



Proposed Tramway Creek Channel Shear Thresholds



ATTACHMENT B

Flood waters in railway channels up to the PMF do not affect the proposed lots.

This figure demonstrates that the proposed channels designed to accept weir flows that overtop the railway embankment have the capacity to collect the full amount of flow and feed it back into Hewitts and Woodlands Creeks in all events up to the PMF. Flood waters DO NOT affect the proposed lots. It is noted that under future climate change conditions once Woodlands Creek culvert is upgraded (to be greater > 6 m dia), a reduced amount of flow will enter the channels.

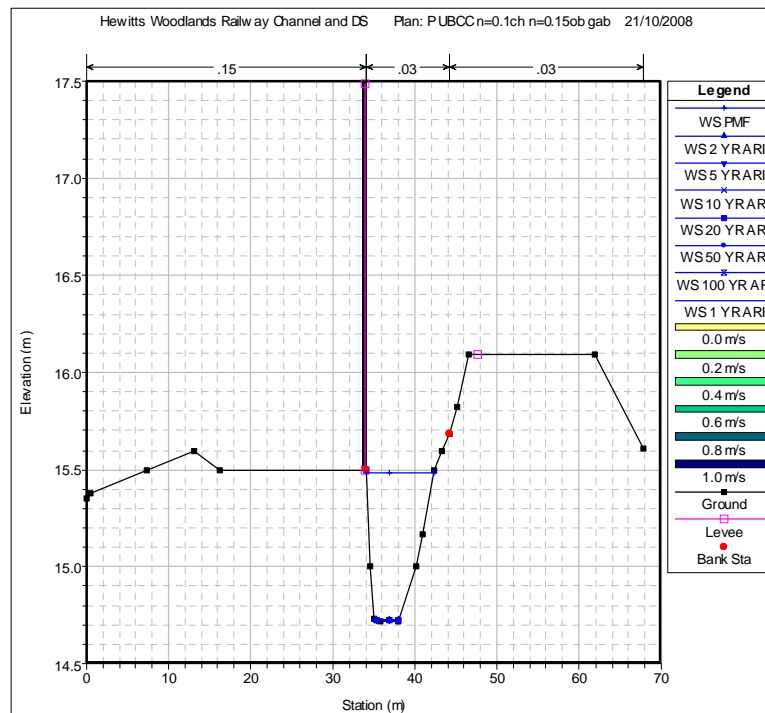
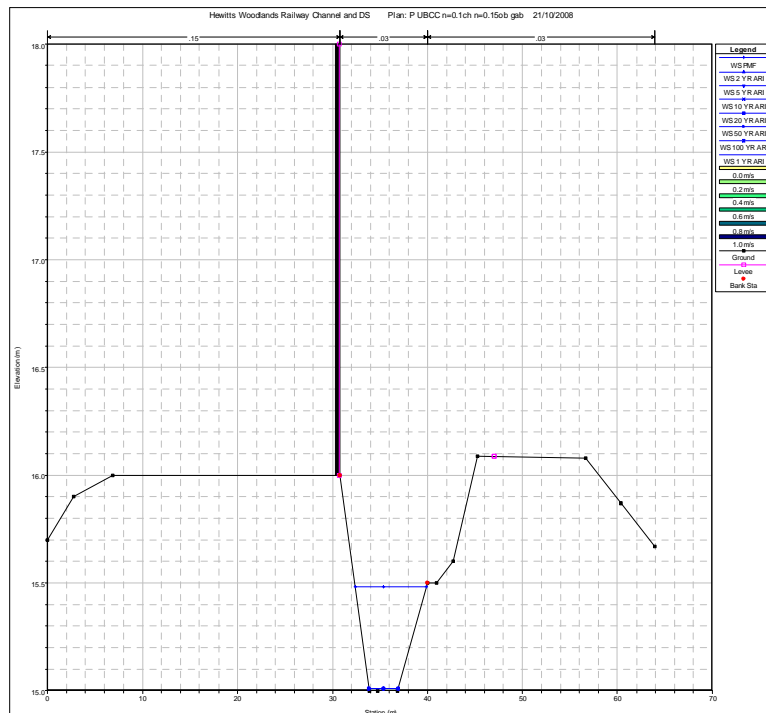
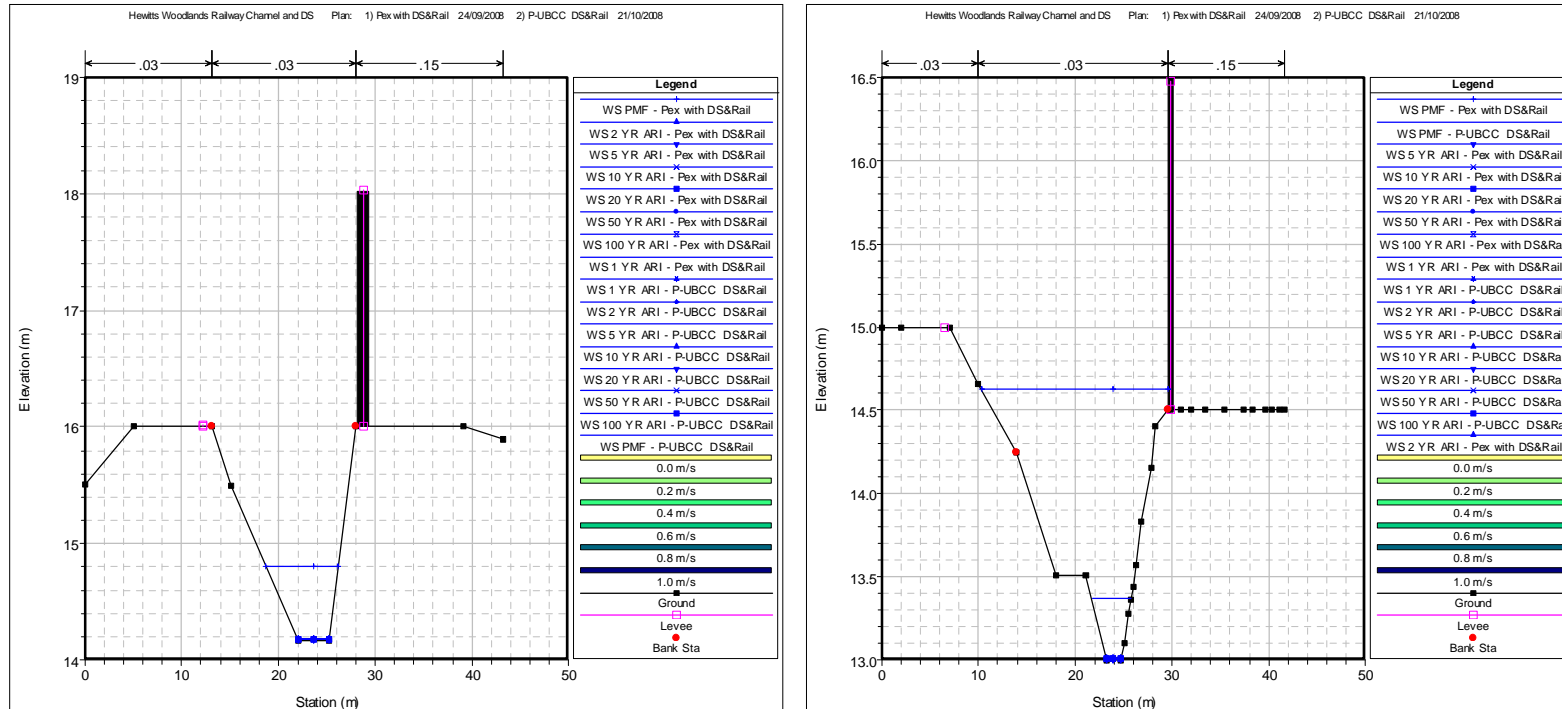


Figure 2A Typical Sections Through Woodlands Creek Railway Diversion Channel for the Existing Climate PMF Event

Typical Sections Through Hewitts Creek Railway Diversion Channel





town planners

APPENDIX B

Our Ref: 106062-03 / Letter 004

Contact: Peter Moy



1 August 2008

Mr David Kettle
Don Fox Planning
PO BOX 230
PENNANT HILLS NSW 1750

Attention: Mr David Kettle

**RE: RESPONSE TO WCC ISSUES ON MP06_0094 & MP07_0032 –
CONCEPT PLAN AND PROJECT APPLICATION FOR DEVELOPMENT AT
SANDON POINT**

WCC Comment 001

The design and impact on the ongoing maintenance burden of assets which Council will inherit being roads, bridges, footpaths, drainage works and open space will need to be considered. (see below for specific comments)

CFR Response 001

As part of Council's standard conditions an Asset Management Plan is prepared by the developer prior to issue of Construction Certificate, which includes costs for ongoing maintenance.

WCC Comment 002

The proposed bridges over the rail line should be under the ownership of the relevant rail authority, as Council is unable to effectively maintain bridges over rail lines. It is not clear whether the relevant rail authority have agreed to accept these bridges.

CFR Response 002

Volume 4: Sandon Point Submission to the Minister for Planning Agreement for Infrastructure forming part of the Concept Plan package sets out the future ownership and management of roads, bridges, footpaths, drainage works and open space. Council at its meeting on 1 June 2007 considered the draft VPA contained in Volume 4 and resolved in part as follows:

- "1. Council endorse, in principle, the entering into a Voluntary Planning Agreement with Stockland Development Pty Ltd generally in accordance with the terms of the Voluntary Planning Agreement attached to the report.

The Planning Agreement submission set out that the Wrexham Road connection, rail bridge and intersection works would be managed and owned by Council.

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Hervey Bay

Sunshine Coast

Toowoomba

Gold Coast

Gosford

Baulkham Hills

Busseton

Wollongong

Papua New Guinea

Indonesia

Vietnam

China

Kenya

United Arab Emirates

United Kingdom



In similar developments within the Wollongong LGA (eg Haywards Bay), Wollongong Council has taken ownership of bridges crossing rail corridors by subdividing the bridge 'space' with the use of a stratum lot. The overriding argument being Council will receive revenue from rates provided by the new development.

RailCorp regularly shuts down the rail network to attend to rail infrastructure maintenance. This provides opportunities for all authorities and Council to 'piggy-back' onto the planned shut down to maintain their assets.

RailCorp has maintained the stance during negotiations that the bridge will come under the ownership of Wollongong City Council.

WCC Comment 003

Council considers that it would be premature to approve the concept and project plans before water, sewerage and energy service providers have been able to comment and confirm their ability to provide and maintain adequate services to the site.

CFR Response 003

CFR has liaised with all service authorities and has established that there is sufficient capacity within the existing networks for this development.

WCC Comment 004

Consideration also needs to be given to the maintenance of existing assets that may be damaged and/or worn by additional usage from construction activities and new residential development.

CFR Response 004

This is a consideration for all new developments. The Developer is responsible for making good any damage caused to Council's assets as a result of the construction phase. This is a standard condition in all development consents of this nature.

WCC Comment 005

Council feels that the proponent should dedicate land to facilitate the connectivity between the proposed extent of the pedestrian cycleway and the existing cycleway to an agreed Council standard. In reference to the proposed Regional Park, riparian corridors and road works, the proponent should commit to providing maintenance of such infrastructure for a period of five (5) years after construction of the subdivision and associated dwellings are completed. Additionally Council has no direct control over the dedication or maintenance of the land currently owned by Ray Hannah Motors Pty Ltd for the purposes of providing the Regional Park.

CFR Response 005

The Submission on Planning Agreement for Infrastructure sets out the maintenance obligations for open space and roads. Stockland will maintain the infrastructure facilities for the following periods after works are dedicated to Council:

- Regional Park riparian corridors (24 months);
- Road works (6 months).

After the expiration of the maintenance periods, these facilities will be managed by Council.

We note that Council endorsed, *in principle, the entering into a Voluntary Planning Agreement with Stockland Development Pty Ltd generally in accordance with the terms of the Voluntary Planning Agreement at its meeting on 1 June 2006.*

WCC Comment 006

With respect to the bridge structures proposed within the Sandon Point Development, the following comments provided:

The levels of roadway on the western side of Wrexham Road Bridge appear to higher than the existing road levels, which is likely to impede vehicular access to the adjoining private properties. With respect to the proposed bridges over Hewitt's and Woodlands Creek, the following items are outstanding from the design plans:

- The Monier M-Lock Beams proposed for the bridge decks may not be sufficient for the proposed spans;*
- If the M-Lock system is used, then lateral post tensioning and Asphaltic Concrete deck wearing surface shall be utilised;*
- No intermediate vehicle barriers are shown;*
- The height of pedestrian barrier is missing;*
- The Durability of each bridge requires a minimum 100yr design life;*
- The pedestrian/vehicle barriers shown are not of the approved RTA type;*
- No barrier terminations are shown.*

CFR Response 006

The Wrexham Road Bridge is higher in elevation than the previous bridge due to changes to RailCorp design standards relating to clearances to trains. The detail design for the approach roads to the bridge is in the preliminary stage and CFR recognises that provision of acceptable vehicular access to the existing properties in Wrexham Road will need to be achieved.

The Hewitts Creek and Woodlands Creek bridges are preliminary designs to enable CFR to effectively model stormwater flows. The M-Lock bridge systems were developed by Cardno Bridge Unit in conjunction with Roda Monier and will incorporate lateral post tensioning and asphaltic concrete decking as required.

Details with respect to vehicular and pedestrian barriers will be provided upon completion of detailed designs and provided when applying for construction certificate.

WCC Comment 006

The design of the kerb return at the north-east corner of Hewitt's Creek Bridge is not sufficient. There are no details provided indicating the type of road crossing over Tramway Creek. With respect to the proposed footbridge over Woodlands Creek, the following items are outstanding from the design plans:

- The bridge should be replaced with a ground based footway with a low flow creek crossing to reduce the unnecessary costs of construction and ongoing maintenance;*
- The width for pedestrian access shown (1.5m) is insufficient - AS5100 requires a minimum 1.8m clearance.*

- *The durability of a steel vs. concrete bridge for a 100-year life span needs to be investigated on a life cycle cost basis;*
- *The barrier height shown (1.1m) is insufficient and should be increased to 1.3m for pedestrian access only.*

CFR Response 006

Details of kerb returns will be provided at the detail design stage and will be consistent with Wollongong Council's Subdivision Code.

Details of the proposed road crossing of Tramway Creek will be provided at the detailed design stage, however we expect the type of bridge or culvert to be dependent on the outcomes of the stormwater modelling.

WCC Comment 007

The following draft conditions in relation to the proposed bridge structures are suggested:

- *All bridges (including the footbridge) shall be designed in accordance with AS5100 — Bridge Design — 2004. Prior to work commencing, a Certificate of Compliance from a qualified engineer experienced in bridge design shall be submitted to the consent authority.*
- *After completion of construction, full works as executed drawings shall be submitted to the consent authority. Any variations to the certified design shall be noted and written certification by the bridge designer shall be submitted to the consent authority.*
- *The bridge designer for the footbridge shall demonstrate how the steel structure as shown in the concept plans achieves the 100-year design life specified in AS5100 without imposing an excessive maintenance burden on the asset owner. Or Prior to work commencing the bridge designer shall assess the full capital and asset maintenance cost for the proposed steel footbridge when compared to a concrete structure over the 100-year design life specified in AS5100. The system with the lowest overall maintenance cost shall be adopted.*
- *The design of all road bridges shall be in accordance with AS5100 — Bridge Design — 2004. All bridges shall incorporate a maximum of three spans, with support piers positioned outside of the low-flow channels and bio-swale systems. The decking for all road bridges shall incorporate standard RTA bridge planks in accordance with RTA standard drawings or alternatively, an RTA approved precast decking system strictly in accordance with the manufacturer's specifications for the design spans. All road bridges shall be designed to cater for an SM1 600 loading.*
- *The bridge designer shall undertake a detailed load design regarding the height, location, strength and format of the combined vehicle/pedestrian barrier shown on the concept plans. In this regard the designer should refer to RTA Bridge Policy Circular BPC2006/04 and Chief Bridge Engineer Circular CBEP8/ 1. Where barriers are within the clear zone (as determined from Section 6 of the RTA Road Design Guide), appropriate barrier terminations shall be provided for all bridges.*
- *The clear width of the pedestrian footway bridge shall a minimum of 1.8m in accordance with AS5100. The barrier height for the pedestrian footway bridge shall be a minimum of 1.3m.*

CFR Response 007

The bridges throughout the subdivision including Wrexham Road Bridge will be designed in accordance with the relevant bridge design codes applicable at the time of preparing the construction certificate plans. The codes mentioned above are consistent with current design guidelines.

WCC Comment 008

Council also suggests the following conditions in relation to pedestrian/cycleway paths:

- *marked centrelines to delineate pedestrian/cycleway,*
- *non-slip surfaces and even paving*
- *clearing any tree branches to remove any obstructions*
- *ensuring smooth transitions from the footpath to the road for bicycle, wheelchair and pram access through kerb ramps*
- *ensuring adequate lighting for safety at night*
- *Including safe crossing areas*
- *Including appropriate signage*
- *Including bicycle racks where appropriate*

CFR Response 008

We agree with the above comments and will prepare final design plans in accordance with Council's suggestions when applying for construction certificate.

Yours faithfully



Peter Moy (Principal)
for **Cardno Forbes Rigby**



town planners

APPENDIX C

29 November 2007

WM Project Number: 06343

Our Ref: dfp291107 gj

Paul Grech
Don Fox Planning
11 Dartford Road
THORNLEIGH NSW 2120

Dear Paul

**Re: Stockland Residential Development, Sandon Point
Response to Public Comment**

I have now reviewed the public comments concerning the proposal. The only comment on noise issues was concern that train noise would increase on the western side of the railway line by reflection off the proposed noise wall.

Location of Concern

This would be of most concern to the residents on Hewitts Avenue whose properties are adjacent to Stage 1 and Stage 2 of the development. Noise does reflect off walls and this was considered during the design phase. The effect was predicted to have no noise impact as described below.

Other locations would be shielded by railway cutting.

Description of Train Noise and Possible Reflections

There are two measures of train noise used in the assessment: L_{Aeq} measures the overall exposure over the day; and L_{Amax} is the maximum short-term level from any train passby.

Noise comes from many sources on the train, including the engine and wheel on track noise.

The western residences are approximately 30m from the railway track. Any noise which reflects from the barrier to those residences will have travelled an extra 30m, making a total path length of 60m. If it was *perfectly* reflected from the barrier there could be an increase of 1dBA at the western residences. However, this would require a very high barrier (say 10m), hard ground between the barrier and the houses, and nothing to shield the reflection (that is no train).

Predicted Noise

The above situation describing perfect reflection of sound will not occur at this location.

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Most of the reflected sound will be shielded by the train itself, although a small component will be reflected and pass by the front and rear of the trains. Some of the noise will be reflected onto the ground where it will be partially absorbed.

The predicted contribution of the reflected sound would increase the L_{Aeq} by a maximum of 0.5dBA. This change is not noticeable and would have negligible noise impact.

The L_{Amax} will not change as it is due to the engine of locomotives on the nearside track. When this passes any residence any reflection from the fence will be largely shielded by the rest of the train.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully

WILKINSON MURRAY PTY LIMITED

A handwritten signature in black ink, appearing to read 'Geo Jenner', written in a cursive style.

George Jenner
Associate