Salamander Project

Preferred Project Report -Final

February 2010

Department of Planning Ref – 05 - 0020

This Final Preferred Project Report for Lot 4 DP 1117732 at Salamander Bay in the Port Stephens Local Government Area is submitted under Part 3A of the Environmental Planning and Assessment Act 1979

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Preferred Project Report
Salamander Project –
Subdivision of 4.5 hectares into 33 residential lots

Background

The subject site is an irregular shaped parcel of 4.5ha located off Soldiers Point Road at Salamander Bay. To the south and east of the site is existing residential development, to the west, wooded, undeveloped residentially zoned land and to the north are playing fields developed on a former a land fill site.

The site itself has been extensively used for sand mining and as a result has been significantly modified. Access has been off Old Soldiers Point Road which is a formed but undedicated road. With the creation of the playing fields a new road has been constructed, Tarrant Road, this now provides access to the site.

A proposal was developed for a 33 lot residential subdivision, which given the site was within the Coastal Lands Protection Area, required the proposal to be submitted to the Department of Planning under Part 3A of the EP&A Act. As a result the Director Generals requirements were issued in July 2006 and the site was placed on public exhibition concluding in May 2008.

This Preferred Project Report reviews submissions made and identifies changes proposed as a result of their consideration. Additional reports attached include assessment of the Giant Dragonfly and further consultation with the Aboriginal Community as requested by Department of Environment Climate Change and Water (DECCW). A report on Climate Change and in particular sea level rise requested by the Department has also been included.

As a result of submissions amendments were made to the plan which required additional reports to be prepared on bushfire considerations and water management. These reports are discussed later in this report and are included in the Annexures.

An amended plan is proposed which retains lot numbers but on smaller lot sizes, retaining a small stand (0.2ha) of mature vegetation previously on lots 9, 10,11 and amends the road pattern.

Site Identification

The subject site was previously known as 360 Soldiers Point Road (Part Lot 59 DP 8312563). As a result of subdivision and construction of a road to the newly created playing fields the property is now known as No. 3 Tarrant Road, (Lot 4 DP 1117732) Salamander Bay.

Representations to the Proposal

The proposed subdivision was placed on public exhibition in March 2008 and submissions were received from Government agencies, Port Stephens Council Town Planning Department (using an independent consultant, Strategy Hunter) and the public. The submissions and their consideration are as follows.

1) Department of Environment Climate Change and Water – Aboriginal Archaeology

DECCW made the following points in its representations with regard to Aboriginal Archaeology:

(i) *The need for provisions to cease work if aboriginal cultural objects are unearthed*.

These requirements are to be included as conditions of consent.

(ii) *No evidence is provided of consultation with broad based aboriginal community*.

Mary Dallas, archaeological consultant advised that she believed we had done what was necessary in terms of consulting with the Aboriginal community. Her advice is attached as Annexure 1.

To overcome the impasse with DECCW regarding consultation with the Aboriginal community two actions were taken. Firstly, an advertisement was run in The Examiner, a paper which circulates throughout the Port Stephens Local Government Area, seeking Aboriginal people who had an interest or who wished to comment on the development. Secondly, letters were sent to all local groups identified by DECCW as Aboriginal stakeholder groups in the Port Stephens/Tomaree Peninsula Area. Details of the advertisement and letters to identified stakeholders are at Annexure 2.

Only Mur-Roo-Ma Inc took up the opportunity. This group requested an on site meeting. As a result of the meeting a letter was issued (Annexure 2) with the following points:

On the visit nothing of Aboriginal significance was identified however the following was considered appropriate by the group in terms of site management:

1. A qualified representative from Mur-Roo-Ma Inc and other local registered Aboriginal groups be represented on site to monitor earth works.
2. A Cultural and Heritage induction be carried out by local Aboriginal Groups before earthworks commence.
3. The establishment of a keeping place on site in the event that Aboriginal objects are discovered.
4. During construction work if any Aboriginal sites or relics are discovered whilst the Aboriginal monitor are not on site work is to stop and the relative Aboriginal groups along with DECC are to be contacted.

Conditions proposed by DECCW in its response to the exhibition will be adopted which generally cover the matters raised by the Mur-Roo-Ma group. This includes stopping work if human remains are uncovered; registration of the site if aboriginal cultural objects are unearthed; avoiding impacts to Aboriginal cultural heritage; consultation with the Aboriginal community and the need for an Aboriginal cultural heritage program.

(iii) *More detail is required of field assessment and methodology, landscape attributes previous archaeological field investigations etc*.

Mary Dallas is a well recognised archaeological consultant and her report is attached (Annexure 1). Given this area has been previously extensively sand mined and a letter has been received from the Local Aboriginal Land Council that this locality is unlikely to have been used extensively by Aboriginals further work on the site beyond what has already been done is not warranted.

Implementation of proposals put forward by Mur-Roo-Ma would appear to offer sufficient protection for any aboriginal archaeology.

(iv) *Need to commit to an Aboriginal Cultural Education Program*. This requirement appears to be excessive as the site has been heavily disturbed and indications are that the Aboriginal community do not see this site as important. Nonetheless a heritage and cultural induction program will be carried out prior to earthworks commencing.

2) Department of Environment Climate Change and Water– Threatened Species

(i) DECC considers that the Giant Dragonfly(Petalura gigantean) needs to be included in the 5A Assessment

Consultant Andrews Neil, Environmental Section, was retained to undertake further studies on the Giant Dragonfly as requested.

The report at Annexure 3 concludes that while critical habitat has not been declared for this species the development proposed will not remove any likely potential habitat of the species.

As a result no further action is proposed.

(ii) *The Environmental Assessment Report does not address offsets for clearing native vegetation*.

A meeting was held on site 9 October 2008 with DECCW and Andrews Neil to determine how offsets might be determined as proposed in the representations. A Biobanking process was proposed using the credit calculator. Field data was collected and Andrews Neil undertook further discussion with DECCW.

Andrews Neil concluded "Considering the highly disturbed nature of the proposed development area, I believe that the use of the Biobanking credit calculator did not provide a clear indication of the degraded nature of the proposed development area or the comparatively good quality vegetation in the proposed offset area….it failed to consider the koala corridor" (Dr Kristy McQueen - Andrew Neil)

DECCW has sought 12 hectares of vegetation off sets for development of the 4.5 ha sand mined site. In order to resolve the matter it is proposed to exclude the remaining remnant vegetation on site (0.2ha) and include it in the open space corridor. This approach means that this application is only looking at a previously sand mined site with all significant vegetation retained. This does cause a significant change in the subdivision pattern with the loop road being terminated and a long cul de sac resulting. With a review of the lots and narrowing them it was possible to still achieve 33 residential lots with sufficient frontage to enable construction of project homes.

This change however did require further work to be undertaken on bushfire and water management as well as amendments to the subdivision design. The issues are discussed in the Post Exhibition Section of this report.

3) Department of Education and Training

No matters identified.

4) Department of Water and Energy

Given the proximity of a former waste disposal site the Department considered management of ground water could be an issue.

A ground water monitoring plan is proposed to be included as a condition of consent.

5) Rural Fire Service

While the development provisions were considered adequate other provisions were proposed as follows:

(i) All lots, except lot 34, to be managed as inner protection area in accordance with Planning for Bushfire Protection 2006.

(ii) The dead end road requires 12m turning circle and be posted as a dead end.

As a result of the amended subdivision pattern, with additional park area, it is considered that the above requirements still apply and that a no through road sign be placed at the subdivision entry point.

6) Port Stephens Council Planning Branch

Councils Planning Department engaged Strategy Hunter to independently review the proposal. A key concern was the width of the koala corridor.

The following changes to the proposal were agreed:

(i) Mitigating actions to take place to reinforce the corridors viability – remove exotic vegetation, underground 11kv power lines, plant suitable vegetation, reduce vehicle speeds to 40km/hr

(ii) Remove areas proposed to hold water adjacent to Old Soldiers Point Road and run water to detention ponds adjacent to the playing fields.

(iii) Amend the plan to show Old Soldiers Point Road closed directly north of the proposed development and allow for its revegetation. Redirect pedestrians and cyclists through the proposed subdivision linking back with Old Soldiers Point Road west of the subdivision.

(iv) Fencing within the subdivision should not impede fauna movement.

(v) Signage and appropriate fencing should be used to reinforce the koala corridor.

All but one of the above can form part of the subdivision approval. Given the proposed new subdivision layout a pedestrian/cycleway will need to be constructed through the treed area generally running from proposed lot 16 through to Road 2 adjoining lot 8 to enable revegetation of Old Soldiers Point Road.

It is understood water from the subdivision cannot be accommodated in the ponds used to irrigate the playing fields. Therefore the detention areas originally proposed on site will remain. Further

consideration at Construction Certificate stage is proposed to ameliorate the impact of these temporary water detention areas on the wildlife corridor.

7) Public Submissions

(i) *Access – A driveway to the rear of a property facing Soldiers Point Road has been constructed on Council land providing access from Tarrant Road to the rear of the property*.

Verbal advice from Council officers is that the access has been developed without consent. As this is an illegal access it will need to be removed. An alternate access may be possible with Council consent from the side of the property direct to Tarrant Road.

(ii) *Reporting – The Environmental Assessment report does not reflect current conditions.*

Given the time taken to process this application it is likely some things will have changed. The changes would largely relate to scrubby regrowth which has occurred on the site together with the establishment of adjacent playing fields and new access via Tarrant Road. Where appropriate changes on site would be included in any final approval.

(iii) *Environment – Effectiveness of the wildlife corridor. Concern was expressed about habitat fragmentation and some loss of significant wildlife habitat.*

This has been addressed in consultation with Councils Environmental Manager with the koala corridor adjacent to the development site being some 50 metres wide.

This is a former sand mining site with minimal vegetation. Significant vegetation and habitat does exist around the *Leporina* swamp and that is to be retained. A small stand of mature trees (0.2ha) as a result of amendments to the plan also will be retained.

(iv) *No compensation measures for habitat loss in construction of sports field road*.

The sporting field area is not part of this application, however the revegetation of the 50 metre corridor along the northern boundary of the site should go some way to providing the compensatory vegetation but more importantly will reinforce a very fragmented koala corridor.

(v) *Lack of any rehabilitation plan or ongoing monitoring of wildlife corridor.*

Rehabilitation of the wildlife corridor is an integral part of the proposal. The corridor will be managed by Council into the future and it would be anticipated Councils Environmental Manager would undertake monitoring from time to time.

(vi) *Wider corridor and reduction in developable area, restrict activities permitted in the wildlife corridor, control domestic animals, minimise traffic impact*

A wider corridor is proposed without loss of developable area. Controlling traffic speed and signage is also part of the proposal.

(vii) *Development task schedule required to protect habitat during construction*. This would form part of any construction approval for the site.

(viii) *Development will jeopardise the "last" vegetated fauna corridor.*

The subject site has been zoned residential for many years. Its development is possible while revegetating and therefore reinforcing the fauna corridor.

(ix) Port Stephens Koala Management Plan indicates development will sever koala movement across the site.

Meeting have occurred with Council officers responsible for the Koala Management Plan. It was agreed the corridor is being reinforced rather than severed.

(x) Councils Strategic Overview is in direct conflict with development of this site.

Meetings have occurred to address issues raised by various sections of Council administration. The views expressed at these meetings have generally been incorporated in the proposal. At no time have officers expressed a concern that the proposal is in direct conflict with Councils Strategic Overview. The mere fact that this site has been zoned residential for a number of years would clearly suggest it is not.

(xi) The site should be an off set area and should not be developed.

The site is much degraded as a result of sand mining leaving very little in the way of mature vegetation to be used as off sets. Development of the site is focussed on achieving balance between residential development and habitat retention. The area proposed for development is only that area which was subject to sand mining.

(xii) The Environmental Assessment is not accurate in regard to koala habitat, detrimental impacts on adjoining residents including the loss of wind screening vegetation.

A small amount of potential koala habitat is on the site and it will all be retained. Additional plantings are to occur along Old Soldiers Point Road to reinforce the wildlife corridor. Impact of the development on adjoining areas will be minimal as Kanimbla Drive, the residential area south of the subject site, has separate access, lots proposed are large enough to ensure overlooking or overshadowing should be minimised.

Consideration of Climate Change

The Department of Planning has requested further advice on the impacts of climate change on the site and in particular the impacts of sea level rises. This issue was directed to Port Stephens Councils Engineering Department. Advice is as follows:

"Councils current Flood Planning Level at the subdivision location, No 3 Tarrant Rd Salamander Bay, requires a minimum habitable floor level for residential development of 2.5mAHD RL (as established by the Port Stephens Foreshore (Floodplain) Management Study and Plan April 2002) which does not include sea level rise to the year 2100.

Recent predictions of the overall range of sea level rise towards the end of this century indicate a likely, predicted maximum sea level rise of 0.91m by the year 2100. Council has therefore adopted a planning benchmark for sea level rise of 0.91m for the year 2100 with an assumed linear increase from present day levels as the basis for Council staff to proceed with risk assessment, policy development, and planning and development decisions. Council notes that the 1% flood level at the Port entrance with sea level rise is RL2.4 Metres AHD, excluding freeboard.

The 0.91m sea level rise applies at the ocean and entrance to Port Stephens and will not be the same over the whole of the Port Stephens embayment. The Port narrows significantly at Soldiers Point between the site and the ocean, reducing the effect of sea level rise at Cromarty Bay. The Port Stephens Foreshore (Floodplain) Management Study indicates that the Karuah River has an influence on the flood gradient within the Port and provides a current 1% Flood level of 1.75 metres at the foreshore of Cromarty Bay some 500 metres from the site of the development. While a study of the extent of sea level rise within the Port is well beyond the capabilities of any single development and will be undertaken by Council in the future, Council advises an estimation for future Flood Planning Level for habitable floors, at this site, would be of the order of RL 2.7mAHD, including sea level rise, the influence of the Karuah River and freeboard. The existing minimum ground level of the proposed subdivision is RL 3.5 (assess from Lidar data) and as such is at or above the future Flood Planning level and above the 1% AEP flood including sea level rise and freeboard."

Post Exhibition Plan Amendments

The site plan has been amended primarily as a result of the decision to retain a 0.2ha. stand of remnant vegetation on site. This change resulted in an additional bushfire assessment and a revised water management report being prepared. These reports were used to inform the revised subdivision plan.

a) New Water Management Plan

At Annexure 4 is a new report by Cardno assessing water management given the retention of the remnant vegetation and subsequent change in subdivision pattern. The report assesses stormwater flows on site using "Music software" and proposes a management plan which includes vegetated swales, rock weirs and an infiltration basin at the end of road No 2 opposite Lots 7 and 8.

The conceptual shape of the infiltration basin shown in the Cardno report, when designed in detail, will be shaped to the road configuration and when built will have a capacity of 250 cubic metres.

b) New Bushfire Report

At Annexure 5 is an additional bushfire report prepared by Graham Swain. The proposed changes for bushfire protection are:

1) The walking/cycling path through the bushland area adjacent to Lots 8 and 9 has been aligned so that a housing setback of 20m APZ is achieved.
2) The T head for Road No.2 has been extended and will meet the pathway.
3) A building line has been established along Road No. 2 to enable a 25m APZ to be created. A building line has been set for lots 16,17,and 18 on Road No.1

4) The emergency vehicle access to Old Soldiers Point Road will be from an access way at the corner of Road No.2 adjacent to Lot 4.

The new report was referred to Rural Fire Service. It accepted the recommendations.

c) New Subdivision Plan (Annexure 6)

Plan amendments are as follows:

- Lots 9, 10, 11 have been deleted to enable retention of the 0.2ha of mature vegetation on site.
- Road 2 has been truncated and a Y turning bay has been included.
- Lot 33 originally shown as open space is now proposed as residential.
- A trail opposite lot 4 has been provided for pedestrian, cyclists and emergency vehicles to access Old Soldiers Point Road.
- An access trail for pedestrians and cyclists is proposed through the new open space area abutting new lots 8 and 9 to give alternate access to that part of Old Soldiers Point Road which has been closed to create the wildlife corridor.
- A new subdivision pattern has been created to allow for the new open space area which allows for the same number of lots on smaller lot areas.

Other Considerations

(a) Battering of Slopes

The subject site has been sand mined and an "extraction face" currently exists on site. In development of the site this face will be removed as the site is contoured suitable for residential development.

The site is not steep and it can be anticipated slopes will not exceed an appropriate standard of 2H: 1V.

(b) Road, Cycleway and Path Widths

The project has been referee to Port Stephens Council Town Planning Department for comment. Comments generally are about road, cycleway and path widths which are to conform to Councils DCP. These requirements have been complied with and will be clearly shown on the subdivision plan for approval.

With regard to the comment about the footpath/cycleway through the remnant vegetation area emerging at a detention area adjacent to lot 8 this will be resolved at construction stage by realigning the conceptual detention area or use of a small bridge or culvert.

(c) Revegetation of Old Soldiers Point Road

It is proposed to close that section of Old Soldiers Point Road adjacent to the subdivision and to revegetate it as part of a koala corridor. In this section the 11kv power lines will be undergrounded and it is understood these lines will be redirected through the new subdivision area providing easier access for maintenance.

A plan showing the area to be revegetated is at Annexure 7.

Commitments

Throughout the development of the plan commitments have been made regarding environmental, Aboriginal Archaeology and Urban Infrastructure. These commitments have been brought together under Special Conditions contained at Annexure 8.

Conclusion

The above project, with special conditions, can be approved under Part 3A of the Environment and Planning Act 1979.

- The plan of subdivision is at Annexure 9 marked Salamander Project - February 2010
- The proposed special conditions based on commitments made are at Annexure 8.

Kevin Alker
HillPDA
February 2010

Annexure 1

Aboriginal Archaeology advice – Mary Dallas

RESPONSE TO DECCW REPRESENTATIONS

MARY DALLAS
CONSULTING
ARCHAEOLOGISTS

CULTURAL RESOURCE ASSESSMENT, PLANNING AND MANAGEMENT

Mr Kevin Alker,
Project Manager
Hill PDA Consulting
3rd Floor
234 George Street,
Sydney NSW 2000

Dear Mr Alker,

Re: PROPOSED RESIDENTIAL SUBDIVISION AT 360 SOLDIERS POINT ROAD, SALMANDER BAY – MAJOR PROJECT 05-002 – ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

I refer to the Department of Environment and Climate Change [DECC] correspondence to Ms Lisa Pemberton of the Department of Planning, dated April 2008 and signed by Mr Bill George, A/Head Regional Operations Unit, North East Branch concerning the Andrews Neil Pty Limited Environmental Assessment for the above project. Aboriginal Heritage issues are discussed on Pages 8-10 of Attachment 1. I have outlined below a reasonable response to the DECC comments and have suggested a course of action to resolve the issue.

Statement of Commitments [p8]

It is agreed that SoCs relating to Aboriginal Cultural Heritage values should be included. The following are suggested:

1. if any items of Aboriginal cultural heritage are uncovered during the course of the construction phase of the development the proponent will engage an archaeologist who will consult with the local Aboriginal community through the Worimi Local Aboriginal Land Council, record the item on the DECC AHIMS and collaboratively recommend a management strategy for the item.
2. if human remains are located during the course of the project the proponent will engage a suitably qualified forensic Anthropologist to determine whether the remains are European or Aboriginal and probable age. Any human remains which are determined to be relatively recent will be dealt with under the terms of the Coroners Act and NSW Police notified. In the event any old Aboriginal remains are identified, both the Worimi LALC and the DECC will be consulted and an appropriate management outcome determined.

Aboriginal Community Consultation [p8]

This was undertaken consistently throughout the course of the cultural heritage assessment and is detailed in each of the 1998 assessment report and the 2004 supplementary report [see also comments below].

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mdallas@intercoast.com.au

1998 Aboriginal Cultural Heritage Assessment [p9]

It is unfortunate that our 1998 assessment report was not included in the Andrews Neil Environment Assessment. The 2004 report was supplementary to the 1998 report in that it reviewed the Stage 1 lands in the northern portion of the site to determine whether our conclusions and assessment of the lands in 1998 remained valid. The 2004 report relied heavily on the background data and detail supplied in the 1998 report[1]. The 2004 survey replicated the fully comprehensive ground survey done in 1998. It is not surprising, however, that the DECC could not accept the 2004 conclusions in the absence of the 1998 report.

The 1998 assessment report and the supplementary 2004 survey were undertaken in accordance with the *DRAFT 1997 NSW NPWS Aboriginal Cultural Heritage Standards and Guidelines Kit* and as such contain the information the requested by the DECC. The 1998 report included review of a series historic aerial photography showing progressive timber clearance and sand mining on the northern portion of the site. A series of geotechnical test pits were also monitored to determine the presence or absence of cultural material and to assist in the determination of the likelihood of buried archaeological deposit in the southern portion of the site. [Stage 2 lands].

Both stages of the assessment were undertaken prior to the introduction of the DECC *INTERIM Community Consultation Requirements for Applicants [Dec 2004].* It should be noted that these *INTERIM guidelines* apply to applicants seeking approval under Part 6 of the National Parks and Wildlife Act 1974 [as amended]. It is also noted that the DECC has formally advised that the guidelines would not be applied retrospectively to a project which commenced prior to December 2004.

The archaeological assessment commenced in 1998 and the Worimi LALC has been consistently consulted throughout the course of this project. The Aboriginal cultural heritage assessment found there was no requirement for approval under Part 6 of the Act. Specifically that Stage 1 lands were severely impacted upon by previous sand mining and the land retained no potential archaeological deposit or any dispersed remnants of sites which might have been resident on the land prior to the sand mining. Further archaeological investigation under a DEC s87 AHIP was not required. In the absence of any cultural material on the land a DEC s90 AHIP was not required. Mitigation strategies are not applicable. The Worimi LALC concurred with these results. In addition, the Worimi LALC which represents Mrs Iris Russell, the only current native title claimant and knowledge holder for the area, did not specify any particular historic cultural association with the particular land or that the land had any particular traditional importance to the Worimi.

Aboriginal Cultural Education Program [p9]

Such a program would be necessary or applicable only in the event there was a likelihood of buried archaeological deposit being located on the Stage 1 lands. It has already been noted that the Stage 1 lands have been extensively sand mined. The likelihood of cultural material surviving in this land is negligible. Monitoring of initial earthworks was discussed with the Worimi LALC but they did not recommend or require it.

In Conclusion

Had the DECC been given the opportunity to review the 1998 assessment report in conjunction with the supplementary 2004 report, it is unlikely the 'Conditions of Approval for Aboriginal Cultural Heritage Values' [p10] would have been proposed by the DECC.

[1] A copy of this report was lodged with the DECC catalogue of archaeological reports in 1998.

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I recommend a copy of this letter, the 1998 Assessment report and the 2004 supplementary report be forwarded to the DECC for reconsideration in respect to this project.

Yours sincerely,

Mary Dallas
Mary Dallas Consulting Archaeologists.
6.8.08

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ORIGINAL MARI DALLAS REPORT.

Mr Kevin Alker,
Project Manager
Hill PDA Consulting
3rd Floor
234 George Street,
Sydney NSW 2000

Dear Mr Alker,

Re: Salamander Waters Estate – Aboriginal Archaeological Assessment

This report documents a recent archaeological reconnaissance of an area of land at Salamander Bay, which had been the subject of an Aboriginal Heritage Assessment in 1998. The purpose of the reconnaissance was to determine whether the previous assessment remains current and whether any updated information is required to support a DA and Masterplan for the northern portion of the site.

Background

I refer to our 1998 report, titled "Archaeological Survey of the Proposed Residential Subdivision of Lot 59 DP 831253, Salamander Bay, NSW." It is understood this project area is now known on the Salamander Waters Estate. Port Stephens Shire Council proposes to develop the site in two stages and HillPDA is currently preparing a DA and Masterplan for stage 1. The stage 1 area is the northern portion of the site and the stage 2 area is the southern portion of the site. These areas are separated by an existing wetland/detention basin [see **Figures 1** and **2**].

The 1998 report documented an archaeological survey and Aboriginal consultation for the entire site and included subsurface assessment of the southern portion of the site through the observation of geotechnical test pit excavations.

The study found that a substantial part of the northern portion of the site [stage 1 area] had been disturbed by previous sand extraction and that a previously recorded Aboriginal midden NPWS Site # 38-5-33, located opposite the T intersection of the old Salamander Road and Muller Road, had been destroyed by the sand extraction and subsequent housing development. No other Aboriginal sites were known to be located in or near the project site.

The study found that there was little or no likelihood that any Aboriginal site as may have been located in the northern portion of the site [stage 1 area], would have survived the previous sand extraction works [see **Figures 3 – 5**].

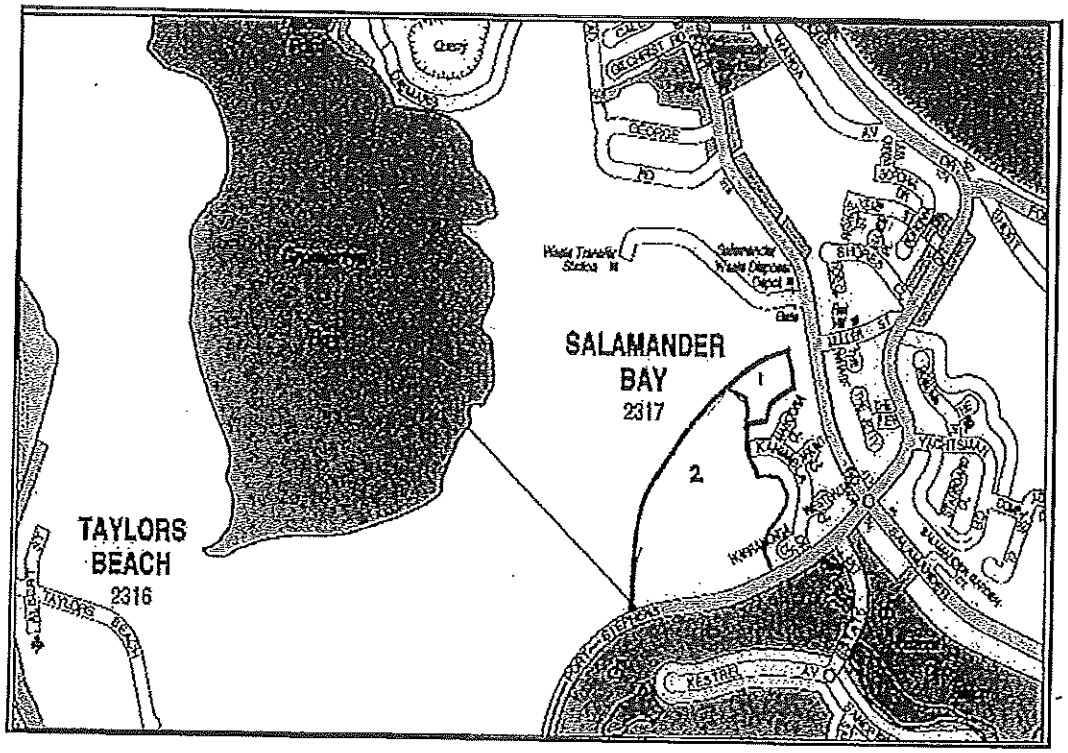

Figure 1 : Salamander Waters Estate [stage 1 and stage 2]

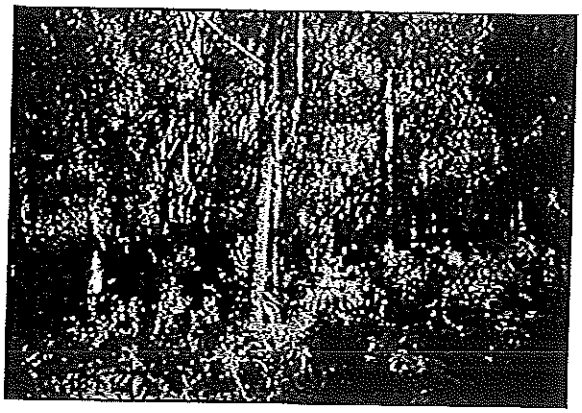

Figure 2 : View to south over wetland area from the southern portion of stage 1 lands

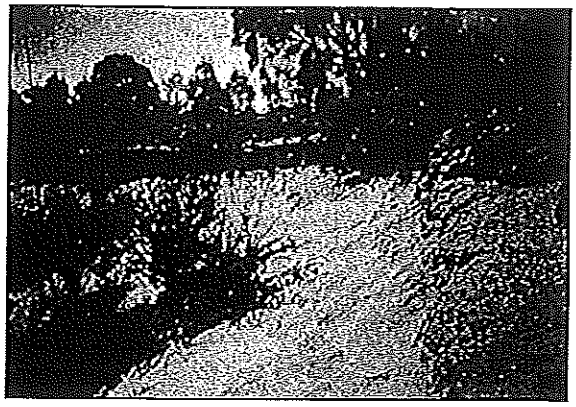

Figure 3 : View to northeast showing sand extraction cut face in stage 1 area

Figure 4 : View to east over disused mining road in stage 1 area

The 1998 study also investigated the southern portion of the site [stage 2 area]. The survey of this portion included observations on subsurface deposits afforded by geotechnical test pit excavations. This area also contained a network of dirt roads which afforded good surface visibility over dune crests and slopes, areas considered to be likely site locations. It was concluded that the surface survey and subsurface observations of the geotechnical excavations in the southern portion provided an adequate sample of likely Aboriginal site locations and areas retaining archaeological potential. No evidence of Aboriginal occupation of the southern portion [stage 2 area] was identified. It was concluded that although Aboriginal people were highly likely to have utilised the resources of the adjacent wetlands and swamps in the past, they are likely to have been characterised by short duration forays from large or complex base camps closer to the foreshores of Port Stephens.

The Aboriginal community consultation undertaken as part of the 1998 study included the participation of two representatives of the Worimi Local Aboriginal Land Council [LALC], Len Anderson and Jamie Merrick, in the field survey. They were commissioned to prepare a report on their interest in the lands and the development proposal, but did not do so at the time.

Site Reconnaissance

On the 30th November 2004, Mary Dallas Consulting Archaeologists undertook an additional inspection of the site. The inspection was undertaken in consultation with the Worimi LALC. The Worimi LALC Chairperson, Mr Len Anderson, who had taken part in the 1998 survey, was contacted prior to the reconnaissance and advised on the current development proposal. Joel Henderson, Aboriginal Sites Officer of the Worimi LALC assisted in the reconnaissance. The Worimi LALC report on the project is attached to the current report.

The site inspection focussed on the northern portion of the site [stage 1 area]. The inspection found slightly lower surface visibility conditions over the mined portions of the area than that encountered by the previous survey due to pockets of regenerating shrubs and ground cover. Other areas, along adjacent property boundary fences had been more recently cleared as fire breaks. No new evidence of Aboriginal occupation was located.

Observations about the disturbance caused by previous land use were confirmed. The evidence of the European use of the land remains limited to excavation cuts and an associated access road. None of these features constitute significant European heritage items.

The conclusions of the 1998 archaeological study remain current. There are no Aboriginal heritage constraints to the proposed development of the stage 1 area. No further Aboriginal heritage assessment is required. The current Worimi LALC report **[see Attachment]** supports these conclusions.

The 1998 study was conducted and reported on according to the *Draft NSW NPWS Aboriginal Cultural Heritage Standards & Guidelines Kit* (September 1997). No new evidence has been found that would require an amendment to the 1998 study. However it should be noted that the stage 2 area retains relatively undisturbed bushland and the Worimi LALC may wish to revisit this area as part of any future development proposal.

The Worimi LALC routinely require an Aboriginal monitor of initial earthworks or ground disturbing works in such areas. The Worimi LALC should be notified of any future development proposal in the stage 2 area.

Yours sincerely,

Mary Dallas

Mary Dallas Consulting Archaeologists

1.12.04

Attachment : Worimi LALC correspondence
dated 30th November 2004

WORIMI LOCAL ABORIGINAL LAND COUNCIL

ABN: 51 352 201 603
P.O Box 56 Tanilba Bay 2319 NSW
173 Nelson Bay Road, Williamtown NSW 2318
PHONE: (02) 4965 1500 FAX: (02) 4965 1799
E-Mail: worimi@bigpond.com

30th November 2004,

To Whom It May Concern,

In November 1998 Mary Dallas and Lennie Anderson had surveyed the proposed site, Lot 59 DP 831253, Salamander Bay, NSW.

On the 30th of November 2004, a second site survey was undertaken by myself Joel Henderson and Mary Dallas at Lot 59 DP 831253, Salamander Bay, NSW to confirm the results of the survey undertaken in 1998.

The site was surveyed with nothing of any Aboriginal Significance being found on site.

Therefore all works to be carried out can be done. If at any time you should uncover anything that would be of Aboriginal significance please contact myself Joel Henderson on the above number so that a qualified Cultural and Heritage Sites Officer can be present on site to monitor construction works.

Kind Regards,

Joel Henderson.
Cultural and Heritage Sites Officer.

Annexure 2

Aboriginal Community Consultation

STANDARD LETTER TO STAKEHOLDERS BELOW

Mur-Roo-Ma Inc.
9 Vardon Road,
Fern Bay
NSW 2295

Dear Sir/Madam

Aboriginal Stakeholder Consultation
Proposed development of 4.5 ha of land at Salamander, Port Stephens

HillPDA has been retained by Port Stephens Council to assist in obtaining approval for the proposed development of 33 residential lots on a 4.5 hectare parcel of land (360 Port Stephens Road) to the north of Kanimbla Place and south of the new playing fields at Salamander. The site is zoned for residential use and has been largely sand mined.

The site falls within an area considered coastal lands and as a consequence the application is being dealt with through the Department of Planning under Part 3A of the Environmental Assessment Act. All information relating to the project can be found on the Departments web site under major projects.

Environmental studies have been undertaken including a report prepared by Mary Dallas on Aboriginal Archaeology in which she has consulted with the Local Aboriginal Land Council. However, the Department of Conservation and Climate Change has asked that we consult more widely with the Aboriginal community to ensure a full consideration of the cultural significance for the site has occurred and potential impacts have been identified, including ways to mitigate such impacts.

I have attached a copy of the Mary Dallas reports (1998, 2004) and the proposed lot layout to assist. A response is requested within 21 days from the date of the letter to enable any matters raised to be considered.

If further information is required or you wish to discuss the proposal further, please call Kevin Alker at HillPDA on 9252 8777.

Yours sincerely

Stakeholder Identified by DECC

Kevin Alker
HilPDA

Mrs Viola Brown 22 Salamander Place RAYMOND TERRACE NSW 2324	Mur-Roo-Ma Inc. 9 Vardon Road, FERN BAY NSW 2295
Nur-Run-Gee Pty Ltd 22Popplewell Road, FERN BAY NSW 2295	Worimi Aboriginal Traditional Elders and Owners Group Inc C/- 22Popplewell Road, FERN BAY NSW 2295
Mrs Carol Ridgeway-Bissett Maaiangal Aboriginal Heritage 5 Ondine Close NELSON BAY NSW 2315	Worimi Local Aboriginal Land Council PO box 56 WILLIAMTOWN NSW 2318

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~~2163~~
~~173~~ Nelson Bay Rd
~~Williamtown~~
NSW ~~2314~~ 2318

P.O Box 56
Tanilba Bay
NSW 2319

..ilba Bay

STAKEHOLDER RESPONSES

Nur-Run-Gee Pty Ltd
ABN 37 096 307 701

1st June 2009

Hill PDA Consulting
Attention Kevin Alker
GPO Box 2748
Sydney NSW 2001

Re; Aboriginal Stakeholder Consultation Proposed Development of 4.5 ha of land at Salamander, Port Stephens

Dear Kevin

Thank you for the opportunity to comment on Mary Dallas's report of the Aboriginal Stakeholder Consultation Proposed Development of 4.5 ha of land at Salamander, Port Stephens,.

After reading the report, Nur-Run-Gee P/L feels that as we were not involved in the actual inspection of the site at Salamander, it is not appropriate that we comment with out seeing the site. As far as the report shows the only Aboriginal community invited for an onsite assessment was the Worimi Local Aboriginal Land Council.

A considerable amount of time has passed since the previous consultations in 1998 and 2004. Therefore Nur-Run-Gee Pty Ltd feels that further consultation is required with registered Worimi community stakeholders.

As Nur-Run-Gee Pty Ltd was not at the previous consultations no issues have been raised by us as we have not seen the site in question.

Please do not hesitate to contact us if further clarification is required.

Yours Sincerely

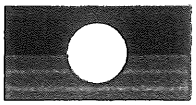
Leanne Anderson
Aboriginal Sites Officer
Director
Nur-Run-Gee Pty Ltd

CULTURAL AND HERITAGE
CONSULTANT
LICENCED BUILDER

22 Popplewell Road
Fern Bay 2295

Phone: 02 49 201578
Mobile: 0408 618 874 Leanne
Mobile: 0431 334 365 Lennie
Email:
goodman@kooee.com.au

STAKEHOLDER RESPONSE



MUR-ROO-MA INCORPORATED

Phone/Fax:
02 4928 1910

9 Varden road
Fern Bay
N.S.W 2295
Australia

Mobile:
0402827482

Email:
murroomainc1@hotmail.com

ABN
978 077 194 84

MUR-ROO-MA INC

4/6/2009

To Kevin Alker

Subject

Proposed development of 4.5 ha of land at Salamander, Port Stephens

Thank you for the opportunity to have an input into this project. Mur-roo-ma Inc was not involved in the previous Assessments and due to the length of time since the last survey was conducted although we are familiar with the project we request an onsite field study. As a Worimi Traditional Owner with 20 years experience in sites identification I strive to provide a true and authentic assessment to create the best outcome for all. Please don't hesitate to contact me if you need any further info

Kind regards
Anthony J Anderson
CEO Mur-roo-ma Inc

RESPONSE TO SITE MEETING

MUR - ROO - MA INC

INCORPORATED

Phone/Fax:
02 4928 1910

9 Vardon Road
Fern Bay
2295 NSW

Mobile:
0402827482

Email:
murroomainc1@hotmail.com

ABN
978 077 194 84

Monday 24/8/09

To Carmel Foster
Commercial Property Manager
Port Stephens Council

SUBJECT Proposed Residential Subdivision of Lot 59 DP 831253
Salamander Bay

Dear Carmel

Thank you for the opportunity to be consulted on this project

After reviewing the past two surveys done in 1998 and 2004 by Mary Dallas and Worimi LALC and taking part in the onsite Aboriginal Culture & Heritage survey on Monday 24/8/09 I found that nothing of Aboriginal Significance was discovered on the above site.

Taking into consideration that the NSW National Parks & Wildlife Act 1974 states it is illegal to deface , destroy or damage an Aboriginal object or Relic without the consent of the Director of Service

Therefore work to be carried out on this site can proceed with the following recommendations.

1. A qualified representative from Mur-roo-ma inc and other local registered Aboriginal groups be present on site to monitor earthworks
2. A Culture & Heritage induction be carried out by local Aboriginal Groups before earthworks commence.
3. The establishment of a keeping place on the site in the event that Aboriginal objects are discovered.

4. During construction work if any Aboriginal sites or relics are discover whilst the Aboriginal monitor are not on site work is to stop and the relative Aboriginal groups along with DECC are to be contacted

Kind Regards,

Anthony J Anderson
CEO Mur-roo-ma Inc

Port Stephens COUNCIL

Public Notices

www.portstephens.nsw.gov.au

Development Approvals

BOAT HARBOUR			
3 Vantage PL	LOT: 100 DP: 875131	Patio Cover	304/2009
CORLETTE			
55 Corrie PDE	LOT: 44 DP: 245168	Deck on upper storey	278/2009
28 Bonito ST	LOT: 23 DP: 818151	Addition to Dwelling & Studio	314/2009
EAST SEAHAM			
606 Italia RD	LOT: 112 DP: 622713	Storage Shed	325/2009
FERN BAY			
9 Wingen ST	LOT: 33 DP: 280008	Single Storey Dwelling	329/2009
KARUAH			
19 Carlisle CR	LOT: 732 DP: 11741	Garage and Carport	303/2009
MEDOWIE			
71 Sylvan AVE	LOT: 607 DP: 1018962	Garage & Carport attached	289/2009
12 Cypress CL	LOT: 30 DP: 812979	Patio Cover and Carport	290/2009
15 Evans RD	LOT: 1 DP: 835872	Garage	292/2009
20A Fairlands RD	LOT: 2 DP: 1116987	Carport and Patio Cover	297/2009
66 Sassin CR	LOT: 55 DP: 1080976	Single Storey Dwelling	301/2009
3 Kapalua CR	LOT: 58 DP: 280007	Single Storey Dwelling	313/2009
13 Windeyer CL	LOT: 77 DP: 248738	Patio Cover	316/2009
79 Kula RD	LOT: 33 DP: 262344	Screened Enclosure for Pool	320/2009
43 Brush Box AVE	LOT: 62 DP: 264064	Patio Cover	326/2009
NELSON BAY			
8 Azure Avenue PRIV	LOT: 27 DP: 270430	Two Storey Dwelling	205/2009
34 Kerrigan ST	LOT: 147 DP: 20293	Addition to Dwelling & Extend Garage	307/2009
RAYMOND TERRACE			
15 Henning RD	LOT: 199 DP: 255588	Two Lot Subdivision - ST	242/2009
26 Manning AVE	LOT: 74 DP: 1083412	Single Storey Dwelling	269/2009
12 Kent ST	LOT: 117 DP: 705546	Carport	299/2009
SOLDIERS POINT			
57 Vista AVE	LOT: 33 DP: 222604	Swimming Pool & Retaining Wall	264/2009
38 Soldiers Point RD	LOT: 7 DP: 218835	Alterations & Additions to Dwelling	268/2009
WALLALONG			
6 Elizabeth ST	LOT: 9 SEC: 1 DP: 59002	Single Storey Dwelling with Loft	274/2009
WILLIAMTOWN			
55 Slades RD	LOT: 43 DP: 1045602	Fuel Storage Facility	216/2009

Note: The above consents are available for public inspection, without charge, at the Customer Service Counter.

Development Applications

ANNA BAY			
133 Gan Gan RD	LOT: 1 DP: 857399	Addition to Service Station, Modification to workshop	343/2009*
CORLETTE			
24 Corrie PDE	LOT: 84 DP: 245168	Addition of Second Storey & Swimming Pool	342/2009
RAYMOND TERRACE			
83 Mount Hall RD	LOT: 1 DP: 195426	Four Lot Subdivision - TT	340/2009
87 Mount Hall RD	LOT: 2 DP: 195426		
SALT ASH			
1 Janet PDE	LOT: 401 DP: 580924	Garage (demolish existing) -Variation to Building Line	338/2009

Please Note: *The Freedom of Information Act applies to Council. Under this Act, information held by Council may be released upon application by members of the public. Council will not consider your submission confidential, and may reproduce it in part or in whole.*

For more information: *Site and elevation plans may be viewed at Council's Customer Service Counter between 8.30am - 5pm weekdays. General Access to Planners and Building Surveyors is between 9am - 12 noon. Alternatively, an appointment at a mutually convenient time can be made with either the duty officer or assessing officer outside these access hours by phoning 4980 0115. *Denotes development applications on exhibition at the Tomaree Library & Community Centre (Town Centre Circuit) during operating hours.*

To Have Your Say: *If you consider your interests would be detrimentally affected by the approval and construction of a building, you may put your case, in writing, addressed to the General Manager to reach Council prior to* **5pm, 24 June 2009.** *Please note the Freedom of Information Act applies to Council. Under this Act, information held by Council may be released upon application by members of the public. Council will not consider your submission confidential, and may reproduce it in part or in whole.*

Public Notices

Do You Own a Swimming Pool?

When do you need to Fence your Pool?

If your swimming pool is able to hold 300mm or more of water and is not emptied after each use, then it must be surrounded by a child resistant barrier. This means a fence is required if you have:

a) an in ground pool
b) above ground pool
c) inflatable pool
d) spa pool
e) wading pool
f) or any other pool that contains water to a depth greater than 300mm.

Note: You must obtain development consent to install a swimming pool that requires a child resistant barrier. Contact Council on 49800255 for more information.

Ensure that:

a) The height of the fence around the perimeter of the pool is a minimum of 1200mm
b) The gap between the bottom of the fence and ground is less than 100mm
c) The horizontal fence rails are more than 900mm apart
d) The spacing between the vertical rails are to be no greater than 100mm apart
e) The gate release mechanism is 1500mm above the ground or located inside the gate at 1200mm and covered by an approved shield.

Public Notices

Public Announcement

Registrations of Interest are invited from Aboriginal persons or groups who would like to be consulted regarding the

archaeological assessment

of a proposed 33 lot subdivision on a former sand mining site at Salamander, Port Stephens.

The subdivision site has been under investigation since 2004 and the results of the work can be made available to interested parties. Registration can be made in writing to HillPDA Consulting, GPO Box 2748, Sydney NSW 2001 or by email to sydney@hillpda.com

Registration closes on the 26th June 2009

Notice of Exhibition

Amended Sportsground Generic Plan of Management

At its Ordinary Meeting 19th May 2009, (Minute No. 150) Council resolved to place on public exhibition the Draft Amended Sportsgrounds Generic Plan of Management.

Copies of the Draft Amended Plan of Management may be viewed at:

- Port Stephens Council - Customer Service Counter between 8.30am and 5.00pm Monday to Friday and
- Nelson Bay and Raymond Terrace Libraries during normal operating hours.

Telephone enquiries may be referred to Catherine McClintock on 4980 0252 between the hours 9.00am to 4.00pm Monday to Friday.

If you wish to make comment on the Draft Amended Plan of Management please do so in writing and address such to General Manager,
Port Stephens Council,
PO Box 42, Raymond Terrace, 2324.

The exhibition period closes on Friday 26th June 2009 with the final date for submissions being 5.00pm on Friday 10th July 2009.

Council will consider all submissions when assessing the Draft Plan of Management.

PORT STEPHENS TOURISM STUDY

Business Port Stephens (Council's economic development unit) in association with **Port Stephens Tourism** and supported by **the NSW Department of State and Regional Development** is undertaking a strategic review of tourism in Port Stephens.

A copy of the Terms of Reference for the Tourism Study can be downloaded from www.businessportstephens.com.au "News & Events" page.

As part of the consultation phase of the study, a series of meetings are planned for the consultant with interested members of the Port Stephens community. If you are interested in participating in one of these consultation sessions, please email your expression of interest to admin@businessportstephens.com.au or phone 4987 3785.

www.businessportstephens.com.au

Road Works

11 June to 18 June 2009

Please be advised that the following works will be taking place in the specified areas listed below between 11thJune to 18thJune and may result in minor delays.

• Clemenceau Cr Tanilba Bay	Road and drainage work
• Dixon st Seaham	Road and drainage work
• Swan and Port Stephens st R/T	Road rehabilitation and sealing
• Dowling st Nelson Bay	Foot path construction
• Lemon Tree Passage road	Roadside mowing
• East Seaham rd	Roadside mowing
• Medowie area	Heavy patch road repair
• Watt and Banks st R/T	Foot Path maintenance
• Swan Bay area	Gravel road maintenance
• Swan Bay	Drainage maintenance
• Raymond Terrace area	Foot path repair
• Richardson road Salt Ash	Roadside mowing
• One Mile area	Drainage maintenance

For further information please contact Paul Wood on 4980 0132.
Please note; the above programmed works are subject to change at any time.

Say NO to plastic bags

P.G. Gesling, General Manager
PO Box 42, Raymond Terrace NSW 2324
Ph: 4980 0255 Fax: 4987 3612
Website: www.portstephens.nsw.gov.au

Annexure 3

Giant Dragon Fly Assessment

Port Stephens Council

ADDENDUM: Giant Dragonfly *Petalura gigantea* 7 PART ASSESSMENT

PART LOT 59 DP 831253
360 SOLDIERS POINT ROAD
SALAMANDER BAY

ANDREWS.NEIL PTY LTD
ARCHITECTS PLANNERS LANDSCAPE ENVIRONMENT URBAN DESIGN

OCTOBER 2007

	GIANT DRAGONFLY - *Petalura gigantea*
a	Particular aspects of the life cycle that are important to the survival of the population include the ability of the species to reproduce, grow, develop and age in a natural manner. The availability of good quality habitat can impact upon these factors, and as such may influence the local survival of the species. **Distribution:** The Giant Dragonfly is found along the east coast of NSW east of the Great Dividing Range between the Victorian border and northern NSW. The species is known to occur in the Blue Mountains and Southern Highlands, in the Clarence River catchment, and on a few coastal swamps from north of Grafton to Nadgee in the south. (DECC, 2005b) **Habitat:** The dragonfly is known to live around permanent swamps and bogs that possess some free water and open vegetation. (DECC, 2005b) **Lifecycle:** The dragonfly spends most of its life in larvae form and will emerge for a short period of time as an adult dragonfly. The larvae are slow growing with the larval stage lasting up to 10 years. At this stage they live within long branching burrows under the swamp. The adults are short-lived emerging in October and surviving for only one summer. Once emerged the dragonfly spends most of its time settled on low vegetation on or adjacent to the swamp. (DECC, 2005b) **Feeding:** The dragonfly feeds on flying insects and will fly over the swamp and along its margins to hunting for prey. The larvae will leave their burrows at night to feed on insects and other invertebrates on the surface of the water. They will also use the benthic environment (bottom of the swamp) and have been noted to hunt for food within the aquatic vegetation through underwater entrances. (DECC, 2005b) **Reproduction:** During breeding the males have been observed waiting in groups for females to mate with. Once fertilisation has occurred the females will lay the eggs into moss or other soft vegetation bordering swamps. When the dragonflies emerge from the larvae, they leave behind characteristics shells (exuviae). (DECC, 2005b) There is currently no evidence that the Giant Dragonfly *Petalura gigantea* utilises the swamp environment within the lots proposed for the development. According to the DECC Wildlife Atlas (DECC, 2005b) the species was detected to the north of the study site on the 20th of November 2006. Despite no evidence that the dragonfly utilises the study site, there is 0.1 ha of Swamp Mahogany Paperbark Forest within the proposed development site. The area was inspected on the 08/10/08 and was found to be marginal habitat for this species (no open water – poor foraging habitat for this species, and no low mossy banks - breeding habitat not optimal). Considering the size and scale of the development and the retention of 0.3 ha of Lepironia Swamp area as an offset, the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
d *i*	The Stage One development will not remove any likely potential habitat of the species. Where appropriate land management actions are followed modification of land adjacent to the habitat is unlikely to have a significant impact on the species.
ii	Given the proposed development is adjacent to existing residential land the development would not further fragment potential habitat of the species.
iii	There is little importance of the removed vegetation to habitat of the species and therefore it is unlikely that there will be a significant impact on its long-term survival. The 0.1 ha of Swamp Forest EEC and the Leporinia Swamp area is considered marginal habitat for this species.
e	Critical habitat has not been declared for this species.
f	16 priority recovery actions have been identified for this species in NSW (DECC 2005b). The following recovery actions are most appropriate to the study site and should be considered by Port Stephen's Council in relation to the development: - Prepare and distribute ID guide of potential habitat and to assist the survey actions. - Prepare and implement a species Fire Management Plan. - Restrict public access to wetland sites to prevent erosion/damage. - Maintain hydrological regimes of swamp habitats (and prevent runoff in to Leporinia swamp area) - Identify and map potential swamp habitat. - Survey previously known and potential new habitat for presence.

g	The following threats have been identified for this species in NSW (DECC, 2005a). - Loss or modification of natural swamps - Changes in natural water flows. - Decreasing water quality of swamps through pollution and siltation. - Application of pesticides on or adjacent to swamps. 32 KTP have been declared to date (DECC, 2005b). Of these the following may be related to the proposed action: - Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands - Clearing of native vegetation If the above recovery actions *(f)* are followed then the development is unlikely to contribute to the threatening processes and KTPs identified for the species.

References

DECC (2005a) *Key Threatening Processes*. Available at: http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_threats.aspx (Accessed August 2008)

DECC (2005b) *Threatened Species profile - Petalura gigantea.* Available at: http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10600 (Accessed August 2008)

TABLE 1: VEGETATION REMOVAL AND RETENTION ANALYSIS FOR STAGE 1 ONLY

COMMUNITY	AREA (hectares)
*VEGETATION THAT FALLS **WITHIN** THE DEVELOPMENT FOOTPRINT:*	
Disturbed Re-growth	2.2950
Swamp Mahogany Paperbark Forest	0.1171
Coastal Sand Apple/Blackbutt Forest	0.4516
TOTAL AREA	2.8637
*VEGETATION THAT FALLS **OUTSIDE** THE DEVELOPMENT FOOTPRINT:*	
Disturbed Re-growth	0.3534
Swamp Mahogany Paperbark Forest	0.0820
Coastal Sand Apple/Blackbutt Forest	0.7115
Lepironia Swamp	0.3051
TOTAL AREA	1.452

FIGURE 1: VEGETATION REMOVAL AND RETENTION ANALYSIS

LEGEND

Development Footprint

Area outside Development Footprint

Vegetation within the Development Footprint (12.5 ha)

Coastal Sand Apple/Blackbutt Forest (10 ha)
Disturbed Re-growth (2.3 ha)
Swamp Forest (0.1 ha)
Swamp Mahogany Paperbark Forest (0.1 ha)

Vegetation outside the Development Footprint (8.2 ha)

Coastal Sand Apple/Blackbutt Forest (5.8 ha)
Disturbed Re-growth (0.4 ha)
Lepironia Swamp (0.3 ha)
Swamp Forest (1.7 ha)
Swamp Mahogany Paperbark Forest (0.1 ha)

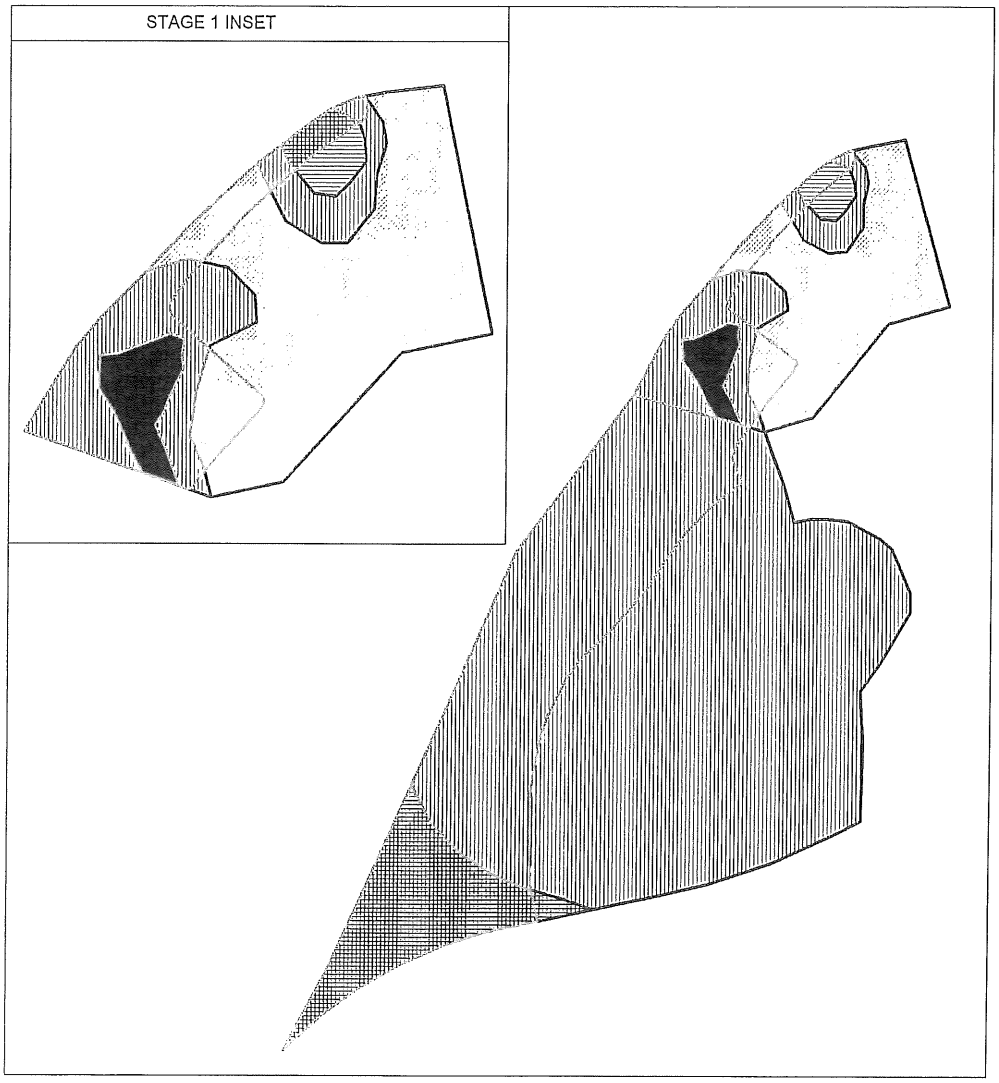
LEGEND OF INSET (STAGE 1)

Vegetation within the Development Footprint (2.9 ha)

Coastal Sand Apple/Blackbutt Forest (0.5 ha)
Disturbed Re-growth (2.3 ha)
Swamp Mahogany Paperbark Forest (0.1 ha)

Vegetation outside the Development Footprint (1.5 ha)

Coastal Sand Apple/Blackbutt Forest (0.7 ha)
Disturbed Re-growth (0.4 ha)
Lepironia Swamp (0.3 ha)
Swamp Mahogany Paperbark Forest (0.1 ha)



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ARCHITECTS PLANNERS LANDSCAPE ENVIRONMENT URBAN DESIGN

OCTOBER 2007

Annexure 4

Water Management Plan
Dec 2009

Cardno
Shaping the Future

Integrated Water Cycle Management Plan

Salamander Waters Estate, Stage 1
Salamander Bay

Job Number W4830

Prepared for Hill PDA

December 2009

Cardno (NSW) Pty Ltd
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Document Control

Version	Status	Date	Author		Reviewer	
1	Final	1 December 2009	Nathan Evans	NE	John Tilley	JRT

As of 1 July 2009 Cardno Willing (NSW) Pty Ltd merged into Cardno (NSW) Pty Ltd. Any reference to Cardno Willing is to be read as a reference to Cardno.

Cover Image: An aerial view of Salamander Waters Estate

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Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff (1999 edition)
ARQ	Australian Runoff Quality (2005 edition)
DECCW	Department of Environment Climate Change and Water
ML	Mega litre (one million litres)
MUSIC	Water Quality program
OSD	On-Site Detention
TSS	Total suspended solids
TN	Total nitrogen
TP	Total Phosphorus
xprafts	Rainfall/runoff program
xpswmm	Unsteady one dimensional (1D) flood routing program

1. Introduction

Port Stephens Council is the owner of the proposed subdivision known as Salamander Waters Estate at Part Lot 59 DP 8312563, 360 Soldiers Point Road, Salamander Bay, NSW. This report refers to Stage 1 of the site as shown in **Figure 1**.

The site is surrounded by residential development to the east, a golf course and residential development to the south, a strip of woodlands and a newly established sporting complex and playing field to the north (former Salamander Bay Waste Disposal Centre), and wetlands listed under SEPP 14 to the north west.

The Director General's Requirements (dated 6/07/06) in relation to Water Cycle Management for Stage 1 are detailed below:

- Assess direct and indirect impacts of the development on the adjoining SEPP 14 wetland areas. This must illustrate that no additional storm water runoff is to be directed to any SEPP 14 or unmapped wetland areas.
- Address the requirements of the relevant flooding data in relation to minimum floor levels.
- Provide an Integrated Water Cycle Management (IWCM) Plan based upon Water Sensitive Urban Design Principles.

This IWCM Plan has been prepared to ensure that the drainage, flooding and stormwater quality objectives are met as defined by Port Stephens Council and the Director Generals Requirements.

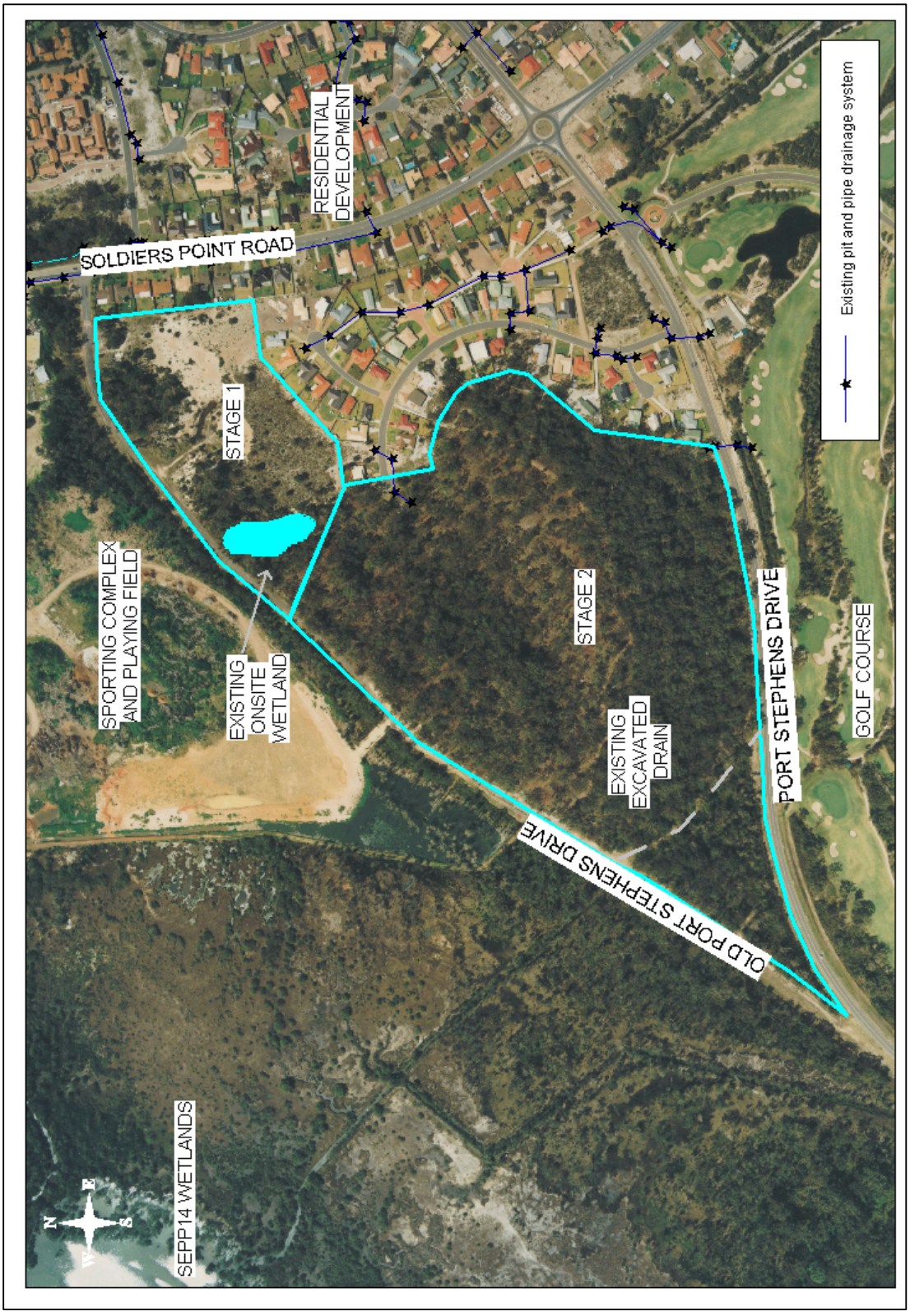

Figure 1
Site Location and Proposed Development Stages

2. Available Information

2.1 Previous Study

In July 2007, Cardno prepared an IWCM Plan Concept for the Stage 1 and 2 of the development.

The treatment systems proposed in this study were designed to reduce post development pollutant loads to predevelopment levels. The predevelopment water quality and quantity levels were analysed using a MUSIC water quality model and XP_RAFTS hydrological model to assess the scenarios.

In this report the stormwater management concepts have been revised to suit the updated lot layout for Stage 1, Option 2 as provided by Monteath and Powys P/L, 05/055.

2.2 Rainfall

Rainfall Intensity-Frequency-Duration (IFD) data was generated based on the method outlined in Australian Rainfall and Runoff (Engineers Australia, 1999) (see **Table 1**).

Six minute rainfall data was obtained from the Bureau of Meteorology Office for the Williamtown rainfall gauge (Station No 061078) located approximately 30 km southwest of the site.

Table 1

Estimated IFD Data for Salamander Bay

Duration	ARI (years)						
(mins)	1	2	5	10	20	50	100
5	89	114	145	163	187	218	241
10	68	88	112	126	144	169	187
15	57	73	94	106	121	142	157
20	49.7	64	82	92	106	124	138
25	44.5	57	73	83	95	111	124
30	40.4	52	67	75	87	102	113
540	6.51	8.45	11.1	12.7	14.7	17.4	19.5
720	5.39	7.00	9.22	10.5	12.2	14.5	16.2

2.3 Concept Development Layout

The adopted lot layout for this report was provided by Hill PDA on 18/09/09. This layout is presented in **Figure 2.**

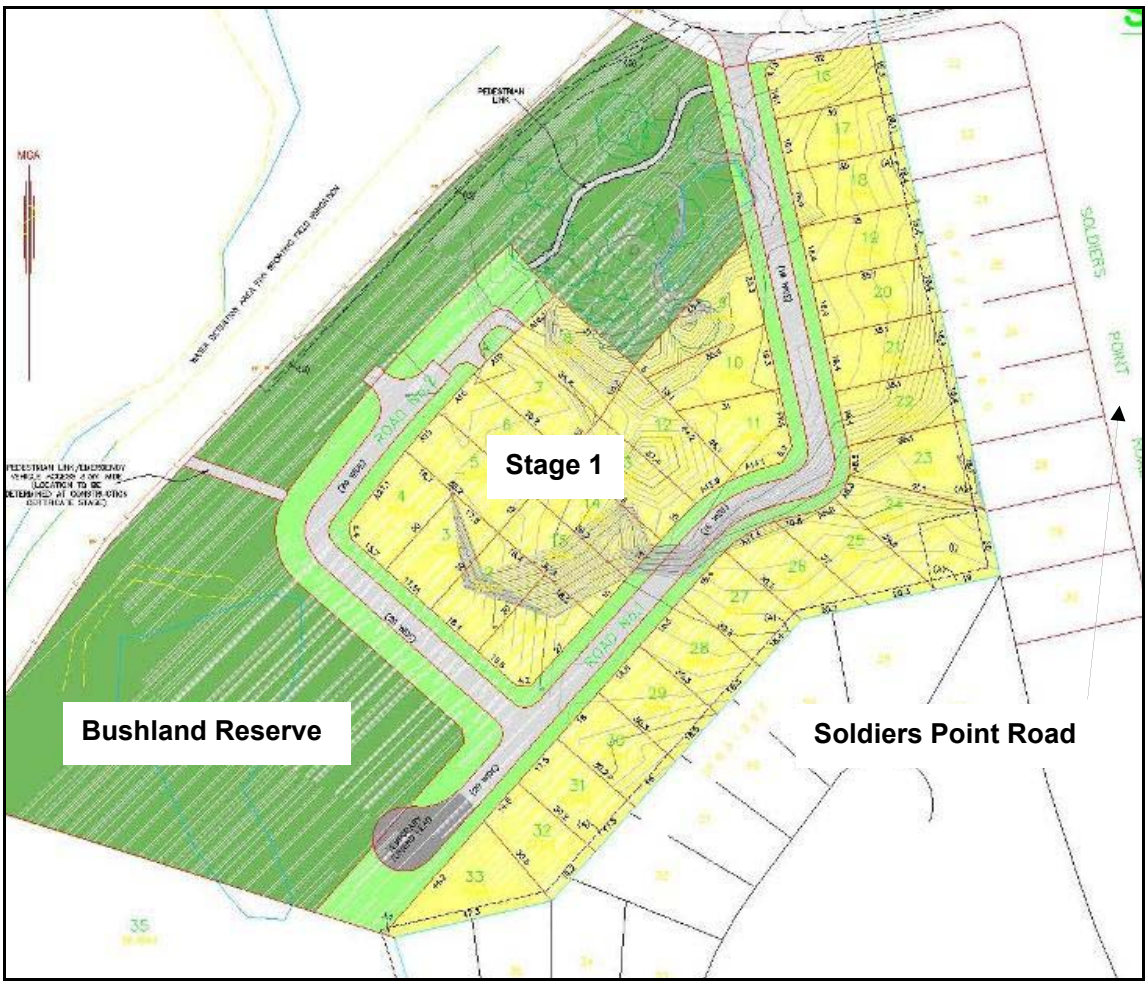

Figure 2 Development Layout

3. Site Characteristics

3.1 Site Details

The proposed subdivision applies to land that forms Stage 1 of Salamander Waters Estate located to the west of Soldiers Point Road, Salamander Bay. The subject site is bounded by the old Port Stephens Drive to the north and Port Stephens Drive to the south (see **Figure 2**).

The proposed indicative development area for Stage 1 is 2.8 ha. The site is surrounded by residential development to the east, a golf course and residential development to the south, a strip of woodlands and a newly established sporting complex and playing field to the north (former Salamander Bay Waste Disposal Centre), and wetlands listed under SEPP 14 to the north west.

Stage 1 has a mixture of native and exotic plants. Much of Stage 1 has been disturbed due to previous sand mining activities. A small wetland currently exists in Stage 1 (see **Figure 1**) known as a Lepironia Swamp, Sydney Freshwater Wetland. This wetland is likely to be connected to the groundwater.

The site is zoned 2(a) residential under Port Stephens Local Environmental Plan 2000.

The land in Stage 1 falls from the southern portion (12m AHD) of the site to the north western boundary (4m AHD).

Geotechnical assessments were prepared by Douglas and Partners (Douglas and Partners, 2005a and 2005b). The following findings were reported:

> *"The ground conditions typically comprise of a thin silty sand topsoil layer, overlying loose sand.*
>
> *It appears that Stage 1 has been subject to uncontrolled filling subject to sand mining. Council suggested that the fill was material excavated during construction of the Salamander Shopping Centre.*
>
> *The site is expected to be underlain by an unconfined sand aquifer*
>
> *From a geotechnical perspective the site is considered suitable for residential development subject to appropriate engineering design and construction".*

3.2 Site Opportunities and Constraints

The site opportunities and constraints to the implementation of WSUD are:

C*onstraints*:

- Existing SEPP 14 wetlands to the north west of the site
- Proposed conservation zone must exclude water quality controls;
- Limited opportunity for some lots to access drainage corridors;
- Steep surface grades that may lead to excessive erosion if not appropriately managed; and
- High groundwater table that may interact with potential water quality ponds. Detailed assessment of the depth to groundwater is recommended prior to construction.

Opportunities:

- Highly permeable sandy soils suitable for local disposal of excess runoff;
- Adequate area within the Asset Protection Zone (APZ) for the construction of swales and water quality ponds;
- Sloping terrain that provides adequate grade for the design of stormwater drainage systems; and
- Many lots and roads border the APZ that can easily drain to proposed WSUD measures located within the APZ zone.

4. Water Management Objectives

4.1 Drainage and Flooding

The objectives for drainage and flooding include:

- All building development is to be at least 0.5 m above the 100 Year ARI flood level;
- Nuisance flooding of roads and dwellings is to be avoided;
- Depths and velocities of overland flows are to be kept to safe levels in accordance with normally adopted industry/SES safety criteria; and
- Peak flow rates up to the 100 year ARI flood event to be no greater than existing conditions in order to protect the downstream ecosystem.
- The additional volume of runoff generated by the development and flowing onto neighbouring areas is to be minimised were practical.

4.2 Water Quality

Stormwater treatment objectives were established by the Department of Environment Climate Change and Water (DECCW). These objectives include:

- 85% retention of the average annual load of TSS;
- 65% retention of the average annual load of TP;
- 45% retention of the average annual load of TN;

The stormwater quality objective for this site is to reduce post-development pollutant exports to loads that are no greater than existing conditions. This objective resulted in greater reductions than the DECCW targets as demonstrated in **Table 4**.

4.3 Water Reuse

The objective for water re-use is to achieve significant savings of potable water in accordance with the BASIX requirements.

The NSW Government introduced BASIX in 2004 to ensure that designs for new dwellings meet targeted reductions in potable water and greenhouse emissions. A potable water savings of up to 40% (depending on the location in NSW) is required for all new developments. BASIX generally requires the inclusion of an alternative water supply source such as rainwater, stormwater or groundwater.

Potable water can be conserved by incorporating measures listed in **Section 8**.

5. Proposed Development

The site is proposed to be redeveloped for residential use. Stage 1 development comprises:

- 33 residential dwellings on individual lots;
- access roads;
- community spaces;
- infiltration / detention systems;
- APZ for bushfire protection;
- vegetated swales; and
- preservation of the existing on-site wetland and habitat corridor.

All building development is to be at least 0.5 m above the 100 Year ARI flood

The indicative layout of the proposed development is given in **Figure 2**.

6. Water Management Plan

A strategy has been developed to minimise impacts on the downstream receiving waters.

The strategy for Stage 1 was assessed using hydrological, hydraulic and water quality models. Sub-catchments were delineated based on existing topographic information available from the site survey. Sub-catchments will drain either to the existing natural wetland or to the open water storage facility that is part of the existing stormwater harvesting system for the playing field to the north. A summary of the catchments is provided in **Table 2**.

Table 2 Sub-catchment details

ID	Comments	Impervious (ha)	Pervious (ha)	Total Area (ha)
S1	Lots 16-31 along the spine road	0.538	0.612	1.15
S2	Lots 32-33 draining to the existing on-site wetland	0.094	0.154	0.248
S3	Lots9-11 along the spine road	0.148	0.203	0.351
S4	Lots 5-8 and 12-15 draining to the infiltration basin	0.264	0.309	0.573
S5	Lots 1-4 draining to the perimeter road	0.197	0.28	0.477
	Total			2.8

The strategy includes incorporating measures to remove metals and pathogens as well as sediment. Removal of these pollutants is critical in protecting the downstream wetland ecosystem and supplying stormwater of an appropriate quality to the existing stormwater harvesting system downstream.

Both phosphorous and metals from residential development are mostly in particulate form and may be trapped by swales and infiltration systems of the type proposed to be incorporated at the Site for Stage 1. Due to the sandy nature of the soils present the preferred system is maximise the infiltration of stormwater, and to filter the excess surface flows through native vegetation. The vegetation improves the sedimentation rate, protects the surfaces from erosion, increases evapotranspiration and maintains soil porosity.

The removal of soluble pollutants will occur at the highly biologically active plant root zone.

Stormwater runoff from Stage 1 is proposed to be directed into a system of infiltration trenches and swales which allow stormwater to recharge the underground aquifer and filter nutrients and organic matter from the storm water.

Sustainable strategies for Stage 1 include:

- Incorporation of a stormwater system which recharges the local aquifer.
- Design of swale systems in the road reserve that treat stormwater in conveyance through infiltration to the sub-surface soils, and filtration through vegetation on the surface.
- Rock weirs along swales to attenuate flows leaving the site thus helping to protect the downstream environment.
- Rainwater tanks to capture and reuse rainwater for each lot.
- Incorporation of native plant species with water requirements appropriate to the local coastal environment.

7. Stage 1 Water Quality Assessment

7.1 Objectives for Stage 1

For Stage 1 the water quality was assessed using MUSIC water quality modelling software.

The aims of the modelling were to assess the:

- impacts of the proposed Stage 1 development on stormwater quality; and
- estimate the size of water quality treatment measures to reduce post-development pollutant loads to levels no greater than existing conditions.

The various adopted MUSIC and model parameters are outlined in **Appendix B**. **Drawing W4681** shows the sub catchments used in the MUSIC modelling.

7.1.1 Water Quality Elements for Stage 1

The WSUD elements for Stage 1 are summarised in **Table 3** and consist of the following design elements (see **Drawing W4681**):

1. Two Constructed infiltration basins, one opposite Lot 33 (35m^2) and another opposite Lots 6-8 (150m^2). This element provides:
   - Emulation of existing site hydrogeology,
   - Infiltration of low flows into existing sandy soils to replenish the aquifer and reduce volumes of surface run-off, and
   - Detention of higher flows in a bunded basin above the infiltration area to limit the impact on downstream environments due to high energy flow.
2. Vegetated swale 5m wide, 250m long with 10 rock weirs, each 0.4m high. This element provides:
   - Detention of stormwater upstream of rock weirs,
   - Improved water quality by filtering out sediments and a reduction in dissolved nutrients via plant uptake,
   - A reduction in overland flows by allowing infiltration to the sub-soil. ie low flows are encouraged to seep into the surrounding soils, and
   - A low maintenance planting regime.
3. Vegetated swale 3m wide, 150m long. This element provides:
   - Improved water quality by filtering out sediments and a reduction in dissolved nutrients via plant uptake,
   - A reduction in overland flows by allowing infiltration to the sub-soil. ie low flows are encouraged to seep into the surrounding soils, and
   - A low maintenance planting regime.

4. Rainwater Tanks with a minimum volume of 1500L for outdoor and toilet use. Assumed water usage rates were approximately 150L/lot/day. Larger tanks would further reduce the dependency on "town water" and have a lower capital cost/Litre of storage. Slimline tanks suitable for narrow spaces and with capacities of 3000L are commonly available. Rainwater tanks:

   - reduce total potable water demand and should be used in conjunction with water efficient appliances and fixtures. Typically the tank supply is for outdoor, toilet and laundry use. Captured stormwater can also be use for hot water systems.
   - assist in reducing the volume of stormwater runoff leaving the site; and
   - comply with BASIX requirements.

Table 3 WSUD Elements

WSUD Element	Sub-Catchment*	Details
Infiltration Basin	S2	Infiltration Area 150m^2, Infiltration rate 100mm/hr Depth 1.2m.
Vegetated Swale/Rock Weir	S1 & S3	Area 1250m^2, Depth 0.5m
Infiltration Basin	S4 & S5	Area 35m^2 , Infiltration rate 100mm/hr Depth 0.3m
Vegetated Swale	S4	Area 531m^2, Depth 0.3m

7.1.2 Assessment of Measures for Stage 1

Water quality treatment systems have been designed to minimise pollutant loads leaving the site to below estimated pre-development levels. The proposed water quality elements are detailed in **Section 8.1.1** and include infiltration basins with extended detention and vegetated swales. The treatment system was modelled using a MUSIC water quality model. The average annual loading of the site for pre and post development scenarios are shown in **Table 4.**

Table 4
Average Annual Pollutant Exports to the for Existing and Proposed Scenarios

Parameter	Existing Loads	Future Loads without Controls	Future Loads with Controls	Reduction to Future without Controls	Reduction to Existing Conditions
TSS (kg/yr)	906	1100	44.6	96%	95%
TP (kg/yr)	0.368	3.24	0.25	92.5%	32%
TN (kg/yr)	4.5	25.4	2.74	89.2%	39%
Gross Pollutants (kg/yr)	59.8	331	0	100%	100%

The results of the modelling indicate that the post development exports are lower than pre development levels at the outlet of the Site.

The existing on-site wetland is not classified under SEPP 14, and therefore the SEPP 14 provisions do not apply.

8. Stage 1 Water Quantity Assessment

8.1 Hydrological and Hydraulic Modelling

Estimates of runoff from Stage 1 of the site under design storms were obtained using XP_RAFTS rainfall/runoff model. Estimates of peak flood levels and peak flows were obtained using the XP_SWMM flood routing program.

8.1.1 Hydrology

The aim of the current hydrological analysis was to determine the 1, 5 and 100 year ARI event flood hydrographs under existing and future conditions (without controls) using **xprafts**.

8.1.2 Hydraulics

The aims of the hydraulic analyses were to:

- Construct a hydraulic (**xpswmm)** model of the proposed Stage 1 detention basins, and to
- Estimate flows and water levels for the 1, 5, and 100 year ARI events under existing and future conditions.

8.1.3 Stage 1 Results

Future detention systems are proposed as extended detention above infiltration systems and within the vegetated swale of S1 by rock weirs.

Drawing W4681 shows the layout of the proposed stormwater drainage system. A summary of the estimated peak discharges for the 1, 5 and 100 year ARI events at the outlet to the natural wetland ("Nout") and the remaining site ("Wout") under existing and developed conditions is shown in **Table 5**.

The results indicate that the peak flows downstream of the site are less than existing conditions thus the detention controls are adequate.

Table 6 shows the volume of proposed detention storages and the estimated 100 year ARI water level.

All buildings should have a freeboard of 0.5m above the 100 year ARI flood level, consistent with the NSW Floodplain Development Manual.

Table 5
Summary of Peak Discharges for Stage 1

Node*	Existing (m^3/s)	Critical Duration (hrs)	Future (m^3/s)	Critical Duration (hrs)	Future (m^3/s)	Critical Duration (hrs)
100 year ARI						
			No Treatment		**With Treatment**	
Wout	0.1	2hr	0.1	2hr	0.06	2hr
Nout	0.82	2hr	0.96	2hr	0.655	2hr
5 year ARI						
			No Treatment		**With Treatment**	
Wout	0.035	2hr	0.043	2hr	0.02	2hr
Nout	0.29	2hr	0.45	2hr	0.09	2hr
1 year ARI						
			No Treatment		**With Treatment**	
Wout	0.013	1.5hr	0.014	1.5hr	0.01	1.5hr
Nout	0.125	1.5hr	0.141	1.5hr	0.12	1.5hr

Node Nout = northern site outlet
Node Wout = western outlet to natural onsite wetland

Table 6
Proposed Detention Storage During a 100 year ARI Storm Event

Sub catchment	Detention Area (m^2)	Proposed Depth for Detention (m)	100yr ARI Water Level (m AHD)	Proposed Volume of Detention (m^3)
S1	400	0.4	3.98	160
S4	150	1.2	5.0*	180
S2	35	0.3	11.03	10.5
	Total			**350.5**

*Note in order to contain this flood level a small bund maybe required on the downstream side of the basin.

9. Potable Water

9.1 Potable Water Conservation

Potable water actions provided below are designed with the intent of creating a sustainable development to comply with the requirements of BASIX.

Reduction in potable water demand is encouraged through four mechanisms. The four major sources of reducing potable water demand include:

- Rainwater tanks utilised for;
  - Toilet flushing;
  - Laundry use;
  - Outdoor needs; and if acceptable
  - Hot water.

- Water reducing fixtures;
  - Shower heads and flow reducers in taps; and
  - Encouragement to install high quality water efficient appliances.

- Directing runoff across vegetated areas;
  - Stormwater across lawns;
  - Stormwater runoff into swales; and
  - Stormwater runoff across the APZ to reduce watering requirements by using discontinuous kerbing.

- Reduced outdoor use;
  - Best gardening practices;
  - Native landscaping; and
  - Appropriate irrigation measures can be incorporated to reduce the reliance on potable water.

10. Erosion and Sediment Control

During the construction period, an Erosion and Sediment Control Plan would be required as part of the overall Environmental Management Plan prepared for the construction phase.

The erosion and sediment control plan for the site should be prepared in accordance with the NSW Department of Housing 'Managing Urban Stormwater' 4th ed (2004) manual, NSW EPA 'Managing Urban Stormwater: Treatment Techniques' (1998) and NSW EPA's guidelines on 'Bunding and Spill Management'.

A construction management plan has been prepared for Stage 1 and ensures protection of the natural wetland located on Stage 1.

11. Qualifications

It is important to recognise that any modelling studies provide only an estimate of the predicted flood levels, flows and water quality. The estimates given in the report are based on the best data available at the time of writing and the level of analysis commissioned. New data obtained in the future and/or more detailed modelling assessments may lead to a revision of the estimates.

12. References

Australian and New Zealand Environment and Conservation Council (1992) *Australian Water Quality Guidelines for Fresh and Marine Waters*.

Australian and New Zealand Environment and Conservation Council (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Cardno Wiling (2005), *Water Sensitive Urban Design Concepts for Salamander Water Estate, Salamander Bay*, prepared for Hill PDA, May.

CRC for Catchment Hydrology (2005). *MUSIC User Guide (Version 3),* May.

Department of Environment and Conservation (1998) '*Managing Urban Stormwater: Treatment Techniques'*, prepared by NSW Environment Protection Authority.

Department of Environment and Conservation (2004) *Managing Urban Stormwater* Manual, 4th Edition.

Douglas Partners Pty Ltd (2005a), *Report on Preliminary Geotechnical Site Assessment, Stage 1– Salamander Waters Kanimbla Drive, Salamander Bay*, Prepared for Hill PDA Pty Ltd Port Stephens Council, February.

Douglas Partners Pty Ltd (2005b), *Report on Preliminary Geotechnical Site Assessment, Stage 2 – Salamander Waters Kanimbla Drive, Salamander Bay*, Prepared for Hill PDA Pty Ltd Port Stephens Council, February.

Institution of Engineers Australia, (1996), *Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites*, June.

Institution of Engineers Australia, (1998) *Australian Rainfall and Runoff: A Guide to Flood Estimation*.

13. Glossary

Annual exceedance probability (AEP)

The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m^3/s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a peak flood discharge of 500 m^3/s or larger occurring in any one year (see average recurrence interval).

Australian Height Datum (AHD)

A common national surface level datum approximately corresponding to mean sea level.

Average recurrence interval (ARI)

The long-term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.

Discharge

The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m3/s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).

Freeboard

A factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. It is usually expressed as the difference in height between the adopted flood planning level and the flood used to determine the flood planning level. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such and wave action, localised hydraulic behaviour and impacts that are specific event related, such as levee and embankment settlement, and other effects such as “greenhouse” and climate change. Freeboard is included in the flood planning level.

Hydrograph

A graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.

Local overland flooding

Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.

Local drainage

Are smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.

Mainstream flooding

Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.

Mathematical/computer models

The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.

Peak discharge

The maximum discharge occurring during a flood event.

Runoff

The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.

Stage

Equivalent to “water level”. Both are measured with reference to a specified datum.

Stage hydrograph

A graph that shows how the water level at a particular location changes with time during a flood. It must be referenced to a particular datum.

Appendix A

Stormwater Management Concept Plan & Model Results

Salamander Project

STORMWATER MANAGEMENT

NOTES

1. THE SURVEY IS ON MAP GRID OF AUSTRALIA (M.G.A.)
2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (A.H.D)
3. ORIGIN OF LEVELS PM 57571 RL 3.302 (A.H.D)
4. FOR DETAILS OF WATER QUALITY AND QUANTITY PERFORMANCE PLEASE REFER TO REPORT BY CARDNO DEC 2009
5. CONTOUR INTERVAL IS 1.0m.
6. SIZE AND LOCATIONS OF STORMWATER CONTROLS ARE INDICATIVE AND SUBJECT TO CHANGE DURING DETAILED DESIGN

LEGEND

- PIT AND PIPE FOR DRAINAGE OVERFLOWS
- ROCK WEIRS
- INFILTRATION BASIN
- S1 SUB-CATCHMENT LABEL
- SUB-CATCHMENT BOUNDARY
- VEGETATED SWALE

MGA

FIELD

EXISTING STORAGE FOR STORMWATER HARVESTING AND FIELD IRRIGATION

ATTENTUATED FLOWS TO SUPPLEMENT EXISTING STORMWATER HARVESTING SYSTEM

INFILTRATION BASIN P2
BASE AREA = 100m2
TOP AREA = 200m2
DEPTH = 1.2m

10 ROCK WEIRS
25m SPACINGS
HEIGHT = 0.4m

DETENTION AREA
UPSTREAM OF
ROCK WEIRS

(22 WIDE)
ROAD

SOLDIERS POINT ROAD

ROAD No 1

ROAD No 2

S1

S2

S3

S4

S5

VEGETATED SWALE
5m TOP WIDTH
1.2m BASE WIDTH
0.5m DEEP
2% AV GRADE

VEGETATED SWALE
3m TOP WIDTH
1m BASE WIDTH
0.3m DEEP

INFILTRATION BASIN S2
BASE AREA = 20m2
TOP AREA = 50m2
DEPTH = 0.3m

SWAMP

DP 831253

REV | DATE | REVISIONS | DRN | CHK

CLIENT:

APPROVED: PROJECT DIRECTOR DATE

	PREPARED	CHECKED
DESIGNED:		
DRAWN:		
REVIEWED:		

PROJECT MANAGER DATE

Cardno (NSW) Pty Ltd
ABN: 95 001 145 035
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SALAMANDER WATERS

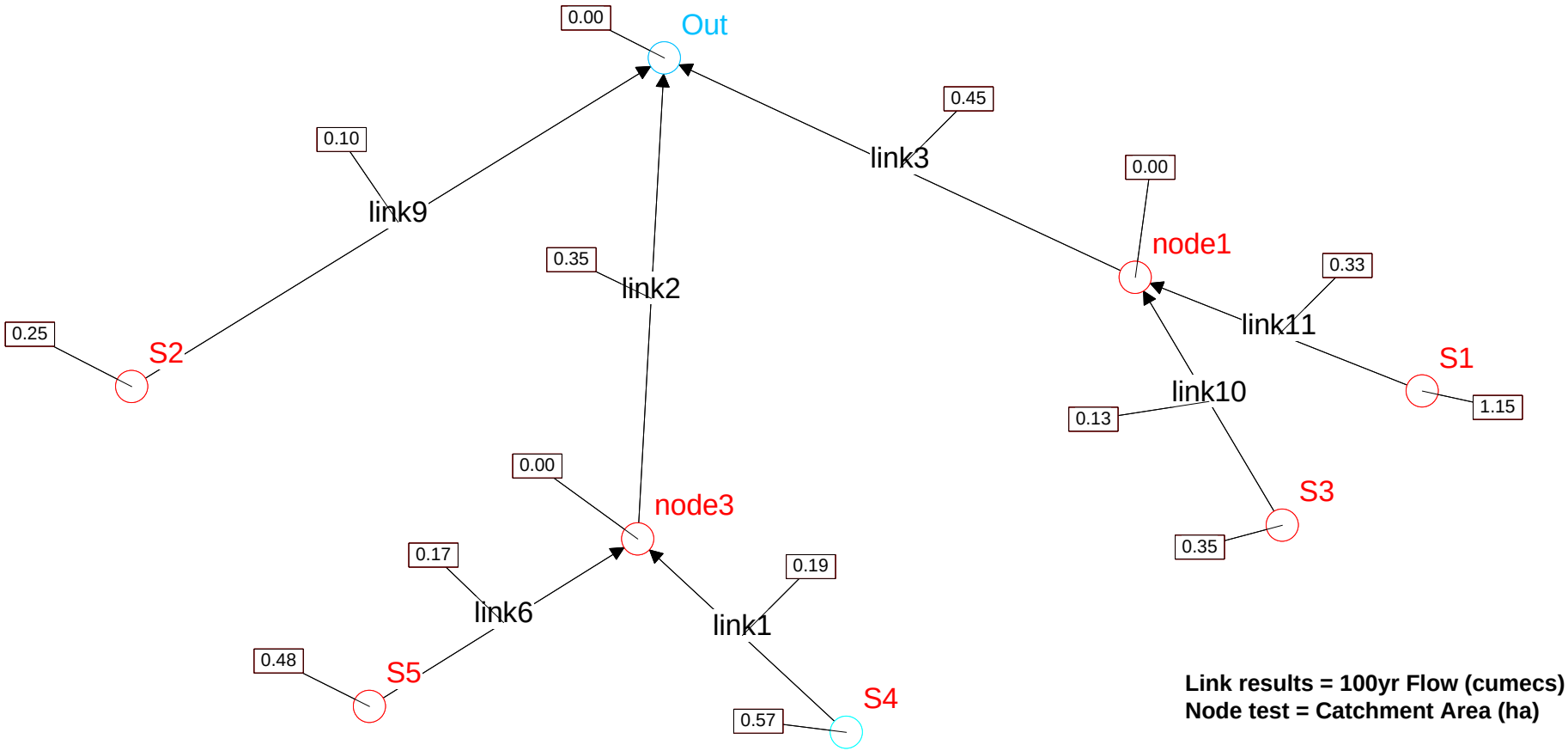
STORMWATER MANAGEMENT CONCEPT

DRAWING STATUS: FINAL

DRAWING NUMBER: W4681

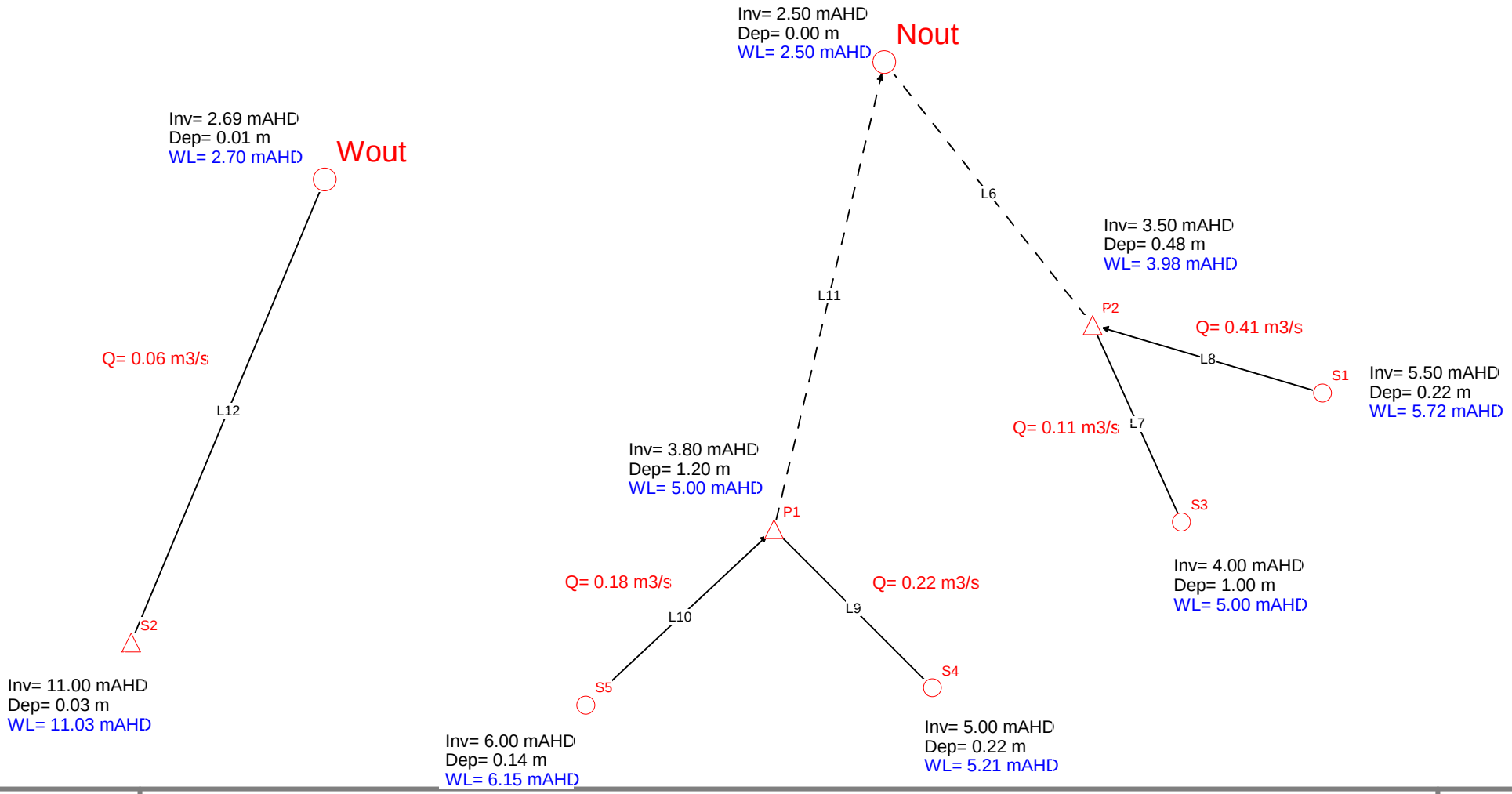
REV: A

Salamander - Existing Conditions
Nov 2009



Link results = 100yr Flow (cumecs)
Node test = Catchment Area (ha)

XP SWMM 100yr FLOW AT STORAGE OUTLET



SWMM

Version 9.50

Developed

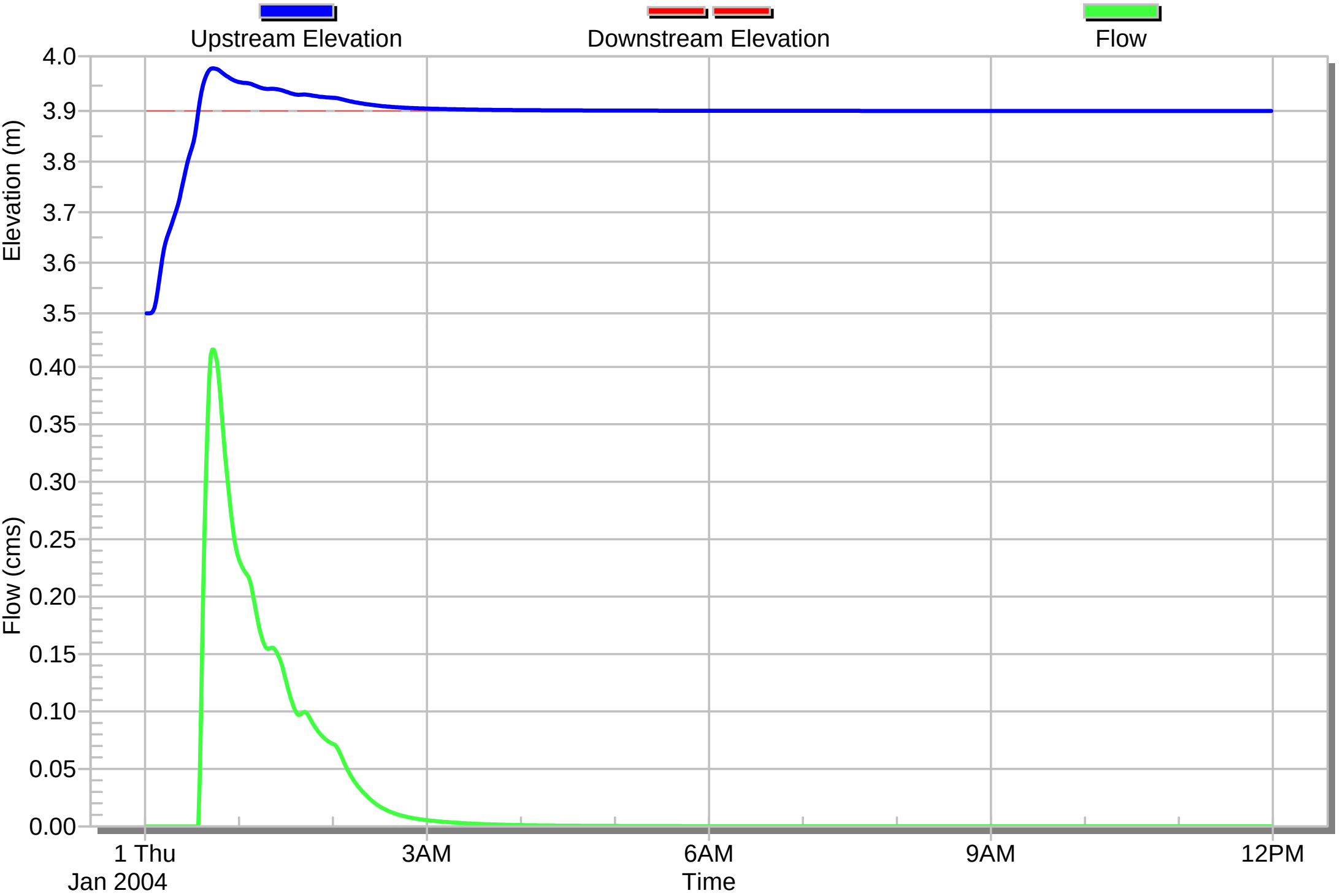
100yr 2hr

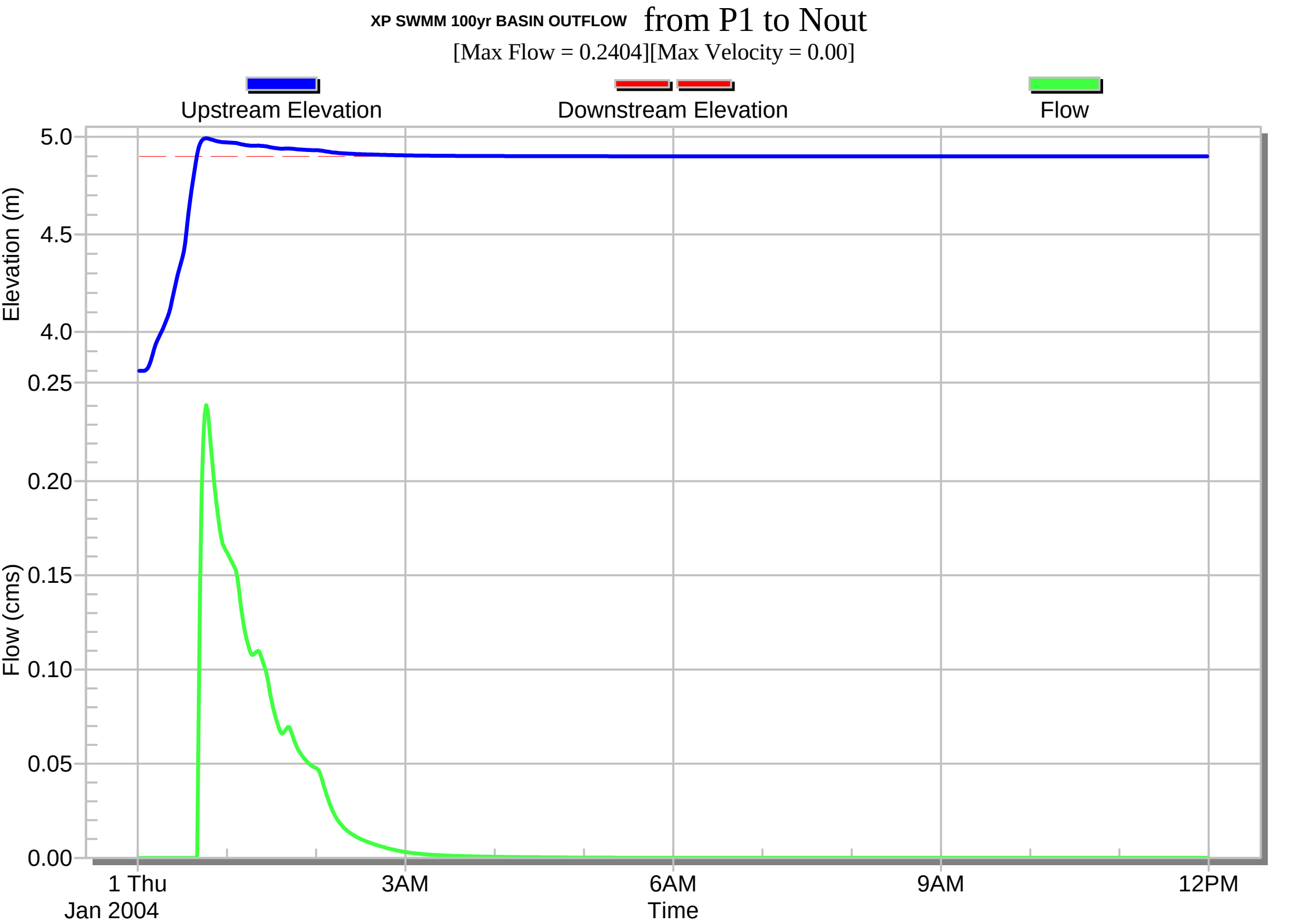
Licenced To: Cardno Willing [42-900-0676]

12/01/09

XP SWMM 100yr FLOW AT STORAGE OUTLET from P2 to Nout

[Max Flow = 0.4152][Max Velocity = 0.00]




XP SWMM 100yr BASIN OUTFLOW from P1 to Nout
[Max Flow = 0.2404][Max Velocity = 0.00]
Upstream Elevation
Downstream Elevation
Flow
Elevation (m)
Flow (cms)
5.0
4.5
4.0
0.25
0.20
0.15
0.10
0.05
0.00
1 Thu
Jan 2004
3AM
6AM
9AM
12PM
Time

Annexure 5

Bushfire Report
Dec 2009

AMENDED

BUSHFIRE PROTECTION ASSESSMENT

FOR THE

PROPOSED RESIDENTIAL SUBDIVISION

ON

PART LOT 4 in DP 1117732, No. 360

SOLDIERS POINT ROAD,
SALAMANDER BAY,

PREPARED FOR

PORT STEPHENS COUNCIL.

Australian Bushfire Protection Planners Pty Limited

Bushfire Mitigation Consultants
ACN 083 085 474
RMB 3411 Dog Trap Road
SOMERSBY 2250 NSW
Phone: (02) 43622112 Fax: (02) 43622204
Email: abpp@bigpond.net.au

AMENDED

BUSHFIRE PROTECTION ASSESSMENT

FOR THE

PROPOSED RESIDENTIAL SUBDIVISION

ON
PART LOT 4 in DP 1117732,
No. 360

SOLDIERS POINT ROAD,
SALAMANDER BAY,

PREPARED FOR

PORT STEPHENS COUNCIL.

Report Number	Document	Preparation Date	Issue Date	Directors Approval
B091155	Final	7.12.2009	7.12.2009	*G.L.Swain*

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EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited was commissioned by Andrews Neil Pty Ltd in 2007, on behalf of Port Stephens Council, to prepare a Bushfire Protection Assessment for the residential subdivision of land within Part Lot 4 in DP 1117732, No. 360 Soldiers Point Road Salamander Bay.

The 2007 report was for the residential subdivision of the central south-eastern portion of the site with a perimeter road extending from the western terminus of Kanimbla Drive, southwest to connect with Port Stephens Drive. Subsequent to the preparation of the 2007 report the development footprint has been reduced to incorporate a total of thirty three residential allotments in the northern portion of Lot 4. The residual land within Lot 4 will become proposed residual Lot 34 & 35.

The new reduced development precinct is located to the west of the existing residential development on Soldiers Point Road; northwest of the existing residential development on Manoora Close and Kanimbla Drive and is bound to the northwest by the access road/fire trail within the former Port Stephens Drive carriageway. Beyond this former road alignment a large stormwater management lake/Playing Fields and Waste Transfer Station extend to the Mangrove Swamps of Cromartys Bay.

The landform within the new development site consists of level land that extends from the former road reserve, rising to the east, beyond the former sand mining area.

The development proposal includes the construction of a new road extending to the southeast from Tarrant Road, tuning to the southwest and looping to the northwest and northeast to form the perimeter road to the proposed lots.

It is also proposed to retain a vegetated corridor to the northwest of the new lots, including re-vegetation of the former road reserve. This vegetated corridor is adjoined to the northwest by the existing playing fields and/or a large body of water held in a stormwater management lake. The vegetation to the northwest of the lake/playing fields consists of Mangrove Swamps.

The vegetation on the development site and to the northwest of the north-western boundary is mapped, on the Port Stephens Bushfire Prone Land Map, as Category 1 Bushfire Prone Vegetation. The vegetation on the existing residential development to the northeast of the site and within the Horizons Golf Course to the south of Port Stephens Drive is not bushfire prone vegetation.

The construction of residential subdivision within a designated Bushfire Prone Area, or the buffer zone to a designated Bushfire Prone Area is Integrated Development as defined by Section 91(1) of the *Environmental Planning & Assessment Act* and requires the consent of the Commissioner of the NSW Rural Fire Service, under Section 100B of the *Rural Fires Act.*

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Section 100B of the *Rural Fires Act* states that the Commissioner *"may issue a Bushfire Safety Authority for a development if the development complies with standards regarding setbacks, provision of water supply and other matters considered by the Commissioner to be necessary to protect persons, property or the environment from danger that may arise from a bushfire".*

This Bushfire Protection Assessment undertakes a review of the amended subdivision layout and assessment of the bushfire protection measures required to address the bushfire risk to the future residential subdivision [and construction of future dwellings on the lots within the subdivision], consistent with the specifications of *Planning for Bushfire Protection 2006,* the requirements of Section 44 of the Rural Fires Regulation and confirms that the development proposal complies with the objectives of *Planning for Bushfire Protection 2006.*

The characteristics of the site as discussed in this report, together with the recommendations contained in this amended assessment, provide that the proposed development is suitable in terms of its intended use, in terms of bushfire protection to the future occupants and dwellings within the subdivision of the land.

Graham Swain
Managing Director,
Australian Bushfire Protection Planners Pty Limited.

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TABLE OF CONTENTS

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SECTION 1

INTRODUCTION

1.1 Development Proposal.

This amended Bushfire Protection Assessment has been prepared on behalf of *Port Stephens Council* to examine the adequacy of the bushfire protection measures to the amended layout for the residential subdivision of Part Lot 4 in DP 1117732, No. 360 Soldiers Point Road, Salamander Bay.

The amended development proposal creates thirty three [33] residential lots in the northern portion of Lot 4 and two residual lots [Lot 34 & 35].

Access to the proposed lots will be provided by a new road constructed off Tarrant Road, forming a perimeter road to the southwest and northwest of the lots exposed to the bushfire hazard.

Figure 1 – Amended Subdivision Layout

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1.2 Documentation Reviewed.

The following documents were reviewed in the preparation of this amended assessment:

- Contour Plan of the Development Site prepared by Andrews Neil Pty Ltd;
- Subdivision Layout prepared by Monteath & Powys Pty Ltd, Reference No. 05/055, Sheet No. 2/2;
- Port Stephens Council Certified Bushfire Prone Land Map;
- *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service.

1.3 Site Inspection.

Graham Swain of *Australian Bushfire Protection Planners Pty. Limited* inspected the development property on the 15th October 2006 to assess the topography, slopes, vegetation classification and land use within and adjoining the development site. Visual assessment was undertaken to determine likely fire paths, influence of terrain on wind patterns within the bushfire prone vegetation and an assessment of access and egress to the development site. Adjoining properties were also inspected to determine the surrounding land use / land management.

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SECTION 2
DESCRIPTION OF DEVELOPMENT PRECINCT

2.1 Location & Description.

The land within the development site consists of Part Lot 4 in DP 1117732, No. 360 Soldiers Point Road, Salamander Bay.

Figure 2 – Aerial Photograph of Lot 4 in DP 1117732.

The development precinct has an irregular shape and occupies the land within the northern portion of Lot 4, northwest of the existing residential development constructed on Kanimbla Drive and Manoora Close and is bounded to the northwest by the fire trail within the former Port Stephens Drive carriageway.

Beyond this former road alignment a large stormwater management lake/Playing Fields and Waste Transfer Station extend to the Mangrove Swamps of Cromartys Bay.

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Figure 3 – Aerial Photograph showing location of subdivision precinct.

2.2 Adjoining Land Use.

The north-western boundary of the development precinct is bounded by the former carriageway of Port Stephens Drive which contains a paved and or gravel road formation that extends along the north-western boundary of the development precinct. The land use beyond the former road alignment consists of a large stormwater management lake/playing fields and Waste Transfer Station.

Residential development adjoins the north-eastern, eastern and south-eastern aspects of the development precinct.

2.3 Topography.

The landform within the development precinct consists of level undulating land which rises to the southeast to the existing residential development located on the higher dune system.

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The landform of the surrounding lands is level to the northwest and southwest is level.

2.4 Vegetation Communities on the land within the Development Site.

Appendix A2.3 (a) of *Planning for Bushfire Protection 2006* provides a methodology for determining the predominant bushfire prone vegetation within the development site and for at least 140 metres in all directions from the land within the development site.

Vegetation is classified using Table A2.1 of *Planning for Bushfire Protection 2006,* which classifies vegetation types into the following groups:

(a) Forests [wet & dry sclerophyll forests];
(b) Woodlands;
(c) Plantations – being pine plantations not native plantations;
(d) Forested Wetlands;
(e) Tall Heaths;
(f) Freshwater Heaths;
(g) Short Heaths;
(h) Alpine Complex;
(i) Semi – arid Woodlands;
(j) Arid Woodlands;
(k) Rainforests; and
(l) Grasslands.

The ridgeline within the development precinct contains Dry Sclerophyll Open Forest with a shrubby understorey. The vegetation on the level land contains Dry Sclerophyll Forest with a shrubby/heath understorey.

2.5 Vegetation Communities adjoining the Development Site.

The sports fields to the northwest of the development precinct contain managed lawns/landscaped gardens with Mangrove Swamp extending further to the northwest, beyond the lake/sports fields and Waste Transfer Station, to the foreshore of Cromartys Bay.

The Wetlands within proposed Lot 34 contain Forested Wetlands vegetation.

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SECTION 3
BUSH FIRE PROTECTION ASSESSMENT

3.1 Introduction.

Section 44 of the *Rural Fires Regulation 2008* requires that an application for a *Bushfire Safety Authority* must include a bushfire assessment for the proposed development (including the methodology used in the assessment) that addresses the extent to which the development provides:

- *asset protection zones;*
- *the siting and adequacy of water supplies for fire fighting operations;*
- *capacity of public roads to handle increased volumes of traffic during a bushfire emergency;*
- *whether or not public roads link with the fire trail network and have two way access;*
- *the adequacy of access and egress for the purposes of emergency response;*
- *the adequacy of bushfire maintenance plans and fire emergency procedures and;*
- *the construction standards to be used for building elements.*

Planning for Bushfire Protection 2006 provides a methodology to determine the Asset Protection Zones and Bushfire Attack / Construction Standards required for habitable buildings in development for residential purposes that are designated as bushfire prone.

Sections 3.2 and 3.3 of this report use the methodology provided by *Planning for Bushfire Protection 2006* to determine the Asset Protection Zones and construction standards required for the construction of the future dwellings on the site. The remaining items identified by Section 44 of the *Rural Fires Regulation 2008* are examined in Sections 3.4 – 3.6 of this report.

3.2 Determination of Asset Protection Zones – Future Residential Development .

Appendix 2 of *Planning for Bushfire Protection 2006* provides the following procedure for determining setback distances (Asset Protection Zones):

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(a) *Determine vegetation formations as follows:*

- Identify all vegetation in all directions from the site for a distance of 140 metres;
- Consult Table A2.1 to determine the predominant vegetation type; and
- Select the predominant vegetation formation as described in Table A2.1.

(b) *Determine the effective slope of the land under the predominant vegetation Class.*

(c) *Determine the appropriate fire [weather] area in Table A2.2.*

(d) *Consult Table A2.4 and determine the appropriate setback [Asset Protection Zone] for the assessed land use, vegetation formation and slope range.*

Table 2 provides a summary of this assessment and the resultant widths of the Asset Protection Zones for the construction of future residential dwellings on the site.

Table 2. Determination of Asset Protection Zones – Residential Development. Fire Danger Index [FDI] for the site is 100

Aspect	**Vegetation within 140m of development**	**Predominant Vegetation Formation Class *[Table A2.1 Planning for Bushfire Protection 2006]***	**Effective Slope of Land**	**Recommended Width of Asset Protection Zone *[By Calculation]***	**Compliance with Specifications of Table A2.4 *Planning for Bushfire Protection 2006***
Northwest of proposed Lot 9; west of Lots 16 - 18	70 metre wide corridor of Dry Sclerophyll Low Open Forest	Forest	Level	20 metres	Yes – 20m APZ provided by managed land on Lot 34
Northwest of Lots 4 - 8	< 40 metre wide corridor of Dry Sclerophyll Low Open Forest	Low Hazard Forest [< 50m wide corridor] reclassified to "Rainforest"	Level	9 metres for "Rainforest" vegetation	Yes – 25m APZ provided by perimeter road & building setback
Northwest of Lots 31 - 33	Dry Sclerophyll Forest & Forested Wetland	Forest/Forested Wetland	Level	20 metres for Forest vegetation; 16m for Forested Wetlands	Yes – 25m APZ provided by perimeter road & building setback
Southwest of Lots 1 - 4	Dry Sclerophyll Forest & Forested Wetlands	Forest /Forested Wetland	Level	20 metres for Forest vegetation; 16m for Forested Wetlands	Yes – 25m APZ provided by perimeter road & building setback

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Assessment Results:

The proposed subdivision layout provides Asset Protection Zones that either comply with or exceed the widths of the deemed-to-satisfy Asset Protection Zones specified by Table A2.4 of *Planning for Bushfire Protection 2006.*

3.3 Assessment of Bushfire Attack (Construction Standards).

Part 2.3.4 of the Building Code of Australia states that a Class 1 building that is constructed in a *designated bushfire prone area* must be designed and constructed to reduce the risk of ignition from a bushfire while the fire front passes.

Part GF5.1 states that a Class 2 or 3 building constructed in a *designated bushfire prone area* is to provide a resistance to bushfires in order to reduce the danger to life and minimize the risk of the loss of the building.

Australian Standard A.S. 3959 -1999 is the enabling standard that addresses the performance requirements of both Parts 2.3.4 and Part GF5.1 of the Building Code of Australia.

Appendix 3, Section A3.4 of *Planning for Bushfire Protection 2006* provides the following procedure for determining bushfire attack at construction stage for a building within a designated bushfire prone area:

(a) Determine vegetation formation types and sub-formation types around the building;

(b) Determine the separation distance between each vegetation formation and the building;

(c) Determine the effective slope of the ground for each vegetation formation;

(d) Determine the relevant FDI for the Council Area;

(e) Match the relevant FDI, appropriate vegetation formation, separation distance and effective slope to determine the category of bushfire attack and the appropriate level of construction.

Five categories of Bushfire Attack are determined. They are:

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- Low
Insignificant ember attack or is greater than 100 metres from all woody vegetation.
- Medium
Significant ember attack with radiation heat no greater than 12.5 KWm² (Level 1 Construction AS3959-1999).
- High
Significant ember attack and possible flame contact, radiation heat greater than 12.5 KWm² and no greater than 19 KWm² (Level 2 Construction AS3959-1999).
- Extreme
Significant ember attack and possible flame contact, radiation heat greater than 19 KWm² and no greater than 29 KWm² (Level 3 Construction AS3959-1999).
- Flame Zone
Within the Flame Zone and / or greater than 29 KWm² (Construction outside scope of AS3959-1999).

Table 3 provides a summary of the Bushfire Attack Assessment and provides recommendations on the resultant construction standards for the future dwellings within the proposed subdivision.

Table 3. Bushfire Attack Assessment – Construction Standards
Fire Danger Index [FDI] = 100

Aspect	**Vegetation within 140m of development**	**Predominant Vegetation Class *[Table A2.1 Planning for Bushfire Protection 2006]***	**Effective Slope of Land**	**Minimum Width of Asset Protection Zone provided**	**Level of Bushfire Attack. Construction in accordance with Australian Standard A.S 3959 – 1999**
Northwest of Lots 4 – 9; west of Lots 16 – 18 and Lots 31 – 33	Dry Sclerophyll Forest varying in width from 40 – 70m	Forest	Level	Lot 9: 20m; Lots 4 – 8: 25m; Lots 16 – 18: 21m	Extreme Attack – Level 3 Bushfire Construction standards.
Southwest of Lots 1 – 4	Dry Sclerophyll Forest / Forested Wetland	Forest	Level	25 metres provided as an Inner Protection Area [Road + setback]	Extreme Attack – Level 3 Bushfire Construction standards.

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Assessment Recommendations:

- The assessment of bushfire attack has identified that the future dwellings constructed adjacent to the bushfire prone vegetation on the south-western and north-western aspects of the subdivision require the implementation of Level 3 construction standards in accordance with Australian Standard A.S 3959 -1999 *"Construction of Buildings in Bushfire Prone Areas".*

- Buildings constructed beyond the first row of dwellings on the south-western and north-western perimeter of the subdivision and within 100 metres of the bushfire prone vegetation, shall be constructed to comply with Level 1 specifications of A.S. 3959 -1999.

- All of the future dwellings in the proposed subdivision shall have a protection device installed that minimizes the accumulation of combustible materials in the roof gutters and valleys. Such protection device shall have a flammability index rating of zero [non-combustible].

3.4 Access Standards for Firefighting Operations.

3.4.1 Adequacy of Public Roads.

The proposed internal road links to the existing access road to the Sports Fields/Waste Transfer Station. This road has recently been reconstructed and provides two-way access for heavy garbage trucks – therefore providing suitable emergency access to the new estate for firefighting vehicles.

3.4.2 Fire Trail Access to two-way Public Roads.

The existing formed fire trail constructed within the former Port Stephens Drive carriageway will be retained and maintained, south from the proposed subdivision. The northeastern section of the existing fire trail will be closed and the land within the former road corridor re-vegetated.

A new sealed 4.0 metre wide fire trail link is to be provided from the existing trail to proposed Road No. 2 and shall be located in a 6.0 wide x 4.0 high easement maintained free of shrubs and over-hanging branches. The fire trail shall be fitted with bollards in order to prevent unauthorized access. The bollards shall be locked using NSW Rural Fire Service compatible padlocks.

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3.4.3 Emergency Response Access / Egress.

Section 4.1.3 of *Planning for Bushfire Protection 2006* provides specifications on the design and construction of Public Roads, including the perimeter and internal roads, within a residential development which is deemed to be bushfire prone.

The minimum carriageway width of the perimeter Road No. 2 and that portion of Road No. 1 which forms the perimeter road to Lots 31 - 33 shall be 8.0 metres, kerb to kerb with shoulders on each side to allow traffic to pass and shall locate services outside parking reserves to ensure accessibility to the reticulated water supply.

The capacity of road surfaces shall be 15 tonnes and curves of roads shall have a minimum inner radius of 6 metres and a minimum outer radius of 12 metres. Vertical clearance above the road surface shall be 4.0 metres.

The minimum width of the internal public road shall be 6.5 metres in width and shall be “No Parking” on one side with services (hydrants) located on the “No Parking” side of the carriageway.

The cul-de-sac head to Road No. 1 shall have a minimum diameter of 24.0 metres, kerb to kerb.

3.5 Water Supplies for Firefighting Operations.

A reticulated water supply is available to the site from a service provided by Hunter Water. This service shall be extended into the development site with hydrants installed in accordance with A.S. 2419.1 – 1994.

Fire hydrants shall be accessible and located such that a tanker can park within a maximum distance of 20 metres from the hydrant and the habitable building must be located such that a fire at the furthest extremity can be attacked by firefighters using two 30 metre hose lines and a 10 metre water jet. A clear unobstructed path between the hydrant and the most distant point of the building cannot exceed 90 metres.

An additional firefighting water resource is available within the stormwater management ponds to the Playing Fields. This resource can be safely accessed by fire appliances if the mains supply fails during major bushfire events. Therefore it is considered that additional static water supplies [tanks] are not necessary within the subdivision.

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3.6 Emergency Management for Fire Protection.

The south-western aspect of the subdivision will be subject to impact from fires burning within the Dry Sclerophyll Forest / Forested Wetlands and Heath vegetation on the vacant land within proposed Lots 34 & 35 which form the residual land to the southwest of the development precinct. With the widths of Asset Protection Zones as recommended, the potential impact is likely to be radiant heat levels of up to 29kW/m^2 on the perimeter dwellings, ember attack and smoke on all of the dwellings in the proposed subdivision.

The fuel management of the residual vegetation on Lots 34 & 35 will be necessary to reduce the potential bushfire threat to the future residential development and to address the provisions of Section 63 of the *Rural Fires Act 1997.*

It is therefore recommended that a Fire Management Plan shall be prepared for the management of the vegetation on Lots 34 & 35, including the maintenance of the Asset Protection Zone to the northwest of Lot 9.

3.7 Bushfire Hazard Management.

The intention of bushfire hazard management is to prevent flame contact with a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimize the potential for wind driven embers to cause ignition and to reduce the effects of smoke on residents and firefighters.

Careful attention shall be given to species selection of landscaping within the Asset Protection Zone, their location relative to their flammability, avoidance of continuity of vegetation [separation horizontally and vertically] and ongoing maintenance to remove flammable fuels. Methods of bushfire hazard management include mowing of lawns and manual removal of combustible material, particularly within the landscaped areas.

3.7.1 Fuel Management.

A diligent approach to the management of bushfire fuel levels is required to the land within the subdivision. Management of the Asset Protection Zones shall comply with the recommendations of Appendix A5.4 & Appendix A5.5 of *Planning for Bushfire Protection 2006* and the Rural Fire Service *"Standards for Asset Protection Zones"*.

Management of the Asset Protection Zone shall comply with the following:

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- Maintain a clear area of low cut lawn or pavement adjacent to the buildings;

- Keep areas under fences, fence posts, gates & trees raked and clear of combustible fuels;

- Utilise non-combustible fencing and retaining wall structures;

- Separate the tree canopy and shrub connectivity with defined landscaped garden beds;

- Maintain tree canopies and shrubs so that they are clear of the building by at least five metres;

- Utilise non-flammable materials such as Scoria, pebbles and recycled crushed bricks as ground cover to landscaped gardens in close proximity to buildings;

- Maintain minimal fine fuel loading at ground level within the Inner Protection Area and landscaped area (nominally 3 tonnes / hectare);

- Trees and shrubs are acceptable provided that they are spread out and do not form a continuous canopy, are not species that retain dead material and are located away from the buildings to minimize radiant heat and direct flame attack;

- Landscape species selection shall be drawn from those that are considered to be species which are *"fire retardant"* and do not promulgate the spread of fire;

3.7.2 Management Responsibilities.

Section 63(2) of the *Rural Fires Act* states that *'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'.*

The responsibility for the implementation of the Fire Management Plan and of the management of the Asset Protection Zone to Lot 9 shall remain with Port Stephens Council.

The owners of the future lots in the subdivision will be responsible for the maintenance of the Asset Protection Zones in accordance with the specifications of *Planning for Bushfire Protection 2006.*

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To ensure that the Asset Protection Zone is maintained, it is recommended that a Section 88b Instrument, under the Conveyancing Act of 1919, be created on the title of the proposed lots so burdened.

3.8 Adequacy of Sprinkler Systems & other Fire Protection Measures.

There are no sprinkler systems required or recommended.

3.9 Evacuation.

Safe evacuation from the subdivision can be undertaken utilizing the internal road network.

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SECTION 4
BUSHFIRE MANAGEMENT STRATEGIES

Strategies to mitigate the potential bushfire risk to the future dwellings in the subdivision of the land are as follows:

4.1 Strategy 1 – Provision of Asset Protection Zones.

Asset Protection Zones shall be provided in accordance with Table 4.

Table 4. Asset Protection Zones to the future Dwellings on the north-western & south-western perimeter of the subdivision.

Aspect	**Vegetation within 140m of development**	**Predominant Vegetation Formation Class** ***[Table A2.1 Planning for Bushfire Protection 2006]***	**Effective Slope of Land**	**Recommended Width of Asset Protection Zone** ***[By Calculation]***	**Compliance with Specifications of Table A2.4** ***Planning for Bushfire Protection 2006***
Northwest of proposed Lot 9; west of Lots 16 - 18	70 metre wide corridor of Dry Sclerophyll Low Open Forest	Forest	Level	20 metres	Yes – 20m APZ provided by managed land on Lot 34
Northwest of Lots 4 - 8	< 40 metre wide corridor of Dry Sclerophyll Low Open Forest	Low Hazard Forest [< 50m wide corridor] reclassified to "Rainforest"	Level	9 metres for "Rainforest" vegetation	Yes – 25m APZ provided by perimeter road & building setback
Northwest of Lots 31 - 33	Dry Sclerophyll Forest & Forested Wetland	Forest/Forested Wetland	Level	20 metres for Forest vegetation; 16m for Forested Wetlands	Yes – 25m APZ provided by perimeter road & building setback
Southwest of Lots 1 - 4	Dry Sclerophyll Forest & Forested Wetlands	Forest /Forested Wetland	Level	20 metres for Forest vegetation; 16m for Forested Wetlands	Yes – 25m APZ provided by perimeter road & building setback

4.2 Strategy 2 – Management of Asset Protection Zones.

The Asset Protection Zones shall be maintained in accordance with the specifications of Appendix 5 of *Planning for Bushfire Protection 2006* and the Rural Fire Service *"Specifications for Asset Protection Zones".*

4.3 Strategy 3 – Fire Management Plan.

A Fire Management Plan shall be prepared that establishes the management protocols for the fuel management of the residual land within Lots 34 & 35. The fuel management of the residual land, including the Asset Protection Zone to Lot 9, shall remain the responsibility of Port Stephens Council.

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4.4 Strategy 4 – Covenant for the Management of the Asset Protection Zones and Bushfire Protection Measures.

It is recommended that a Section 88b Instrument, under the Conveyancing Act of 1919, be created on the title of the proposed lots burdened by the provision of the Asset Protection Zone to ensure that the management of the Asset Protection Zones is in accordance with the specifications of *Planning for Bushfire Protection 2006*.

4.5 Strategy 5 – Access for Firefighting Operations & Emergency Evacuation.

The access provisions to the subdivision shall comply with the specifications of Chapter 4, Section 4.1.3(1) [Public Access] of *Planning for Bushfire Protection 2006.*

The perimeter road shall be constructed to a minimum width of eight (8.0) metres. The internal road network shall be constructed to a minimum width of 6.5 metres with "No Parking" to one side of the carriageway with the hydrants located on the "No Parking" side of the carriageway.

The road formation shall be constructed to carry a fully laden Category 1 Rural Fire Service Tanker of 15 tonne GVM.

4.6 Strategy 6 – Fire Trail Link

A new sealed 4.0 metre wide fire trail link shall be provided from the existing trail to proposed Road No. 2 and shall be located within a 6.0 wide x 4.0 high easement maintained free of shrubs and over-hanging branches. The fire trail shall be fitted with bollards in order to prevent unauthorized access. The bollards shall be locked using NSW Rural Fire Service compatible padlocks.

4.7 Strategy 7 – Water Supplies for Firefighting Operations.

The existing HunterWater reticulated service shall be extended into the development site with hydrants installed in accordance with A.S. 2419.1 – 1994. Hydrants shall have guaranteed a flow rate of 10 litres/second.

Fire hydrants shall be accessible and located such that a fire appliance can park within a maximum distance of 20 metres from the hydrant and the habitable building must be located such that a fire at the furthest extremity can be attacked by firefighters using two 30 metre hose lines and a 10 metre water jet.

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A clear unobstructed path between the hydrant and the most distant point of the building cannot exceed 90 metres.

It is also recommended that a fast fill access point be provided to the Lake, allowing for filling of Rural Fire Service Tankers.

4.8 Strategy 8 – Building Construction.

The following bushfire construction standards shall apply to the future dwellings in the proposed subdivision:

- The future dwellings constructed adjacent to the bushfire prone vegetation on the south-western and north-western aspects of the subdivision shall be constructed to the specifications of Level 3 construction standards in accordance with Australian Standard A.S 3959 -1999 *"Construction of Buildings in Bushfire Prone Areas".*

- Buildings constructed beyond the first row of dwellings on the south-western and north-western perimeter of the subdivision and within 100 metres of the bushfire prone vegetation, shall be constructed to comply with Level 1 specifications of A.S. 3959 -1999.

- All of the future dwellings in the proposed subdivision shall have a protection device installed that minimizes the accumulation of combustible materials in the roof gutters and valleys. Such protection device shall have a flammability index rating of zero [non-combustible].

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SECTION 5

CONCLUSION

This report has been prepared, on behalf of Port Stephens Council, for the residential subdivision of Part Lot 4 in DP 1117732, No. 360 Soldiers Point Road, Salamander Bay.

The development site is impacted by the Port Stephens Bushfire Prone Land Map and the proposed residential subdivision is Integrated Development under the provisions of Section 91 (1) of the *Environmental Planning & Assessment Act.* The amended development proposal is for the subdivision of the land in the northern portion of the development site to create a total of thirty three [33] residential lots plus two residual lots [Lots 34 & 35].

The development includes the provision of a perimeter road and Asset Protection Zones to the north-western and south-western aspects of the future residential lots so as to address the requirements of the NSW Rural Fire Service and to mitigate the potential threat of exposure to the impact of bushfires burning in the bushfire prone vegetation to the southwest of the development precinct.

All other aspects of the development site adjoin non-bushfire prone land and therefore do not necessitate the provision of Asset Protection Zones.

The recommendations provided in this report address the deemed-to-comply specifications of *Planning for Bushfire Protection 2006* in regard to the provision of Asset Protection Zones, access and water supplies for firefighting operations and construction standards to the future dwellings within the subdivision. These measures address the aims and objectives of *Planning for Bushfire Protection 2006* and mitigate the potential impact of a bushfire burning in the adjacent bushfire prone vegetation.

The recommendations contained within this report also address requirements of Section 44 of the *Rural Fires Regulation 2008* as a prerequisite for the issue of a Bushfire Safety Authority under Section 100B (4) of the *Rural Fires Act - 1997* for the subdivision application. The following table summarises the extent to which the amended subdivision layout conforms with, or deviates from, the requirements of Section 44 of the *Rural Fires Regulation 2008*.

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Table 5. Compliance with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* & Section 44 of the Rural Fires Regulation 2008.

Bushfire Protection Measure	**Compliance with deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006.***
Asset Protection Zone setbacks	YES – widths of Asset Protection Zones comply with or exceed the minimum widths required by Table A2.4 of *Planning for Bushfire Protection 2006.*
The siting and adequacy of water supplies for fire fighting	YES – Hydrant supply to be provided plus Static Water Supply available from the existing detention ponds at the Playing Fields.
Design of Public Roads	YES – Proposed public roads comply with the specifications of Section 4.1.3(1) of *Planning for Bushfire Protection 2006* and provide two-way access for fire-fighting vehicles
Design of Fire Trail network	YES – New Fire Trail to be provided to link existing trail into the new perimeter road network.
Adequacy of emergency response access and egress	YES – Public road access to the front of each allotment.
Adequacy of bushfire maintenance plans and fire emergency procedures	Fire Management Plan to be prepared for the management of the Asset Protection Zones [managed curtilage] and retained vegetation within proposed Lots 34 & 25.
Building construction standards	YES – Minimum Level 3 bushfire construction standard recommended to the future dwelling on lots directly exposed to the bushfire hazard. Remainder of dwellings constructed to Level 1 plus gutter protection to all dwellings.
Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	Not applicable

The amended subdivision as represented by the Plan of Proposed Subdivision prepared by Monteath & Powys Pty Ltd, Ref. 05/055, Sheet 2/2 exceeds the "Deemed-to-Satisfy" specifications set out in Chapter 4 (Performance Based Control) and the aim and objectives of *Planning for Bushfire Protection 2006.*

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REFERENCES:

- N.S.W Rural Fire Service – *Planning for Bushfire Protection 2006*;
- N.S.W Rural Fire Service – Draft Threatened Species Hazard Reduction List for the Bushfire Environmental Code (2003);
- *Environmental Planning & Assessment Act – 1979;*
- *Rural Fires Act – 1997;*
- *Rural Fires and Environmental Assessment Legislation Amendment Act 2002;*
- *Rural Fires Regulation 2008;*
- NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping 2002;*
- *Threatened Species Conservation Act 1995;*
- *Native Vegetation Act;*
- *Bushfire Environmental Assessment Code 2003;*
- Building Code of Australia;
- Australian Standard A.S 3959-1999 "*Construction of Buildings in Bushfire Prone Areas".*
- *Port Stephens Bushfire Prone Land Map.*

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SECTION 6 – Plan of Asset Protection Zones

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Annexure 6

Subdivision Plan

Salamander Project

FEBRUARY 2010

MGA

TARRANT ROAD (22 WIDE & VARIABLE)

SOLDIERS POINT ROAD

D P 7 1 2 6 8 0

ROAD No.1

ROAD No.2

MANOORA CLOSE

DP 8 3 1 2 5 3

WATER DETENTION AREA FOR SPORTING FIELD IRRIGATION

AREA TO BE REVEGETATED ALONG EXISTING OLD SOLDIERS POINT ROAD

VEGETATION ON LEVEL LAND

WALKING PATH \ CYCLEWAY LINK

PEDESTRIAN LINK/EMERGENCY VEHICLE ACCESS 3.5m WIDE (LOCATION TO BE DETERMINED AT CONSTRUCTION CERTIFICATE STAGE)

FIRE TRAIL

BOLLARDS

TEMPORARY TURNING HEAD

SWAMP

34
18300m²

35
59.39ha

1 550m² | 2 555m² | 3 525m² | 4 530m² | 5 545m² | 6 545m² | 7 535m² | 8 600m² | 9 595m² | 10 535m² | 11 530m² | 12 635m² | 13 555m² | 14 550m² | 15 550m² | 16 560m² | 17 565m² | 18 575m² | 19 575m² | 20 575m² | 21 575m² | 22 575m² | 23 630m² | 24 890m² | 25 615m² | 26 565m² | 27 555m² | 28 560m² | 29 560m² | 30 545m² | 31 525m² | 32 515m² | 33 705m²

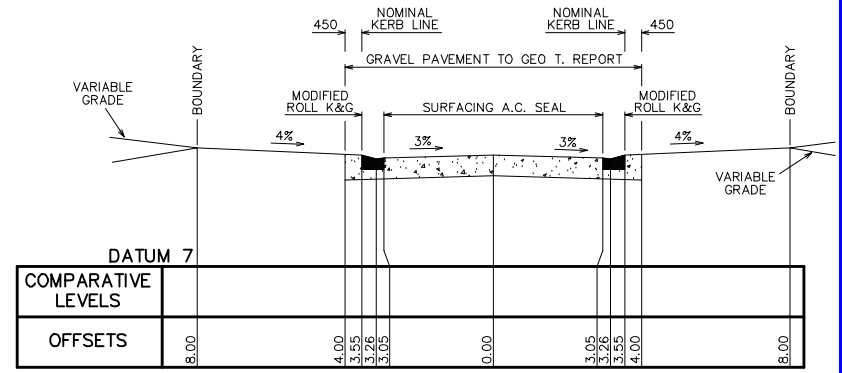
NOTES

1. THE SURVEY IS ON MAP GRID OF AUSTRALIA (M.G.A.)
2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (A.H.D)
3. ORIGIN OF LEVELS PM 57571 RL 3.302 (A.H.D)
4. ONLY VISIBLE SERVICES HAVE BEEN LOCATED BY SURVEY. THE POSITION OF UNDERGROUND SERVICES IS APPROXIMATE ONLY AND HAVE BEEN SCALED FROM THE RELEVANT AUTHORITIES SERVICES PLANS.
5. CONTOUR INTERVAL IS 1.0m.
6. T3 DENOTES TREE WITH TRUNK GREATER THAN 1.6m DIAMETER

(A) – EASEMENT FOR TELECOMMUNICATIONS MAINS AND ACCESS 3 WIDE (DP 831253)
(G) – EASEMENT FOR SERVICES 3 WIDE (DP 1117732)
(I) – EASEMENT TO DRAIN WATER 20 WIDE (DP 1117732)

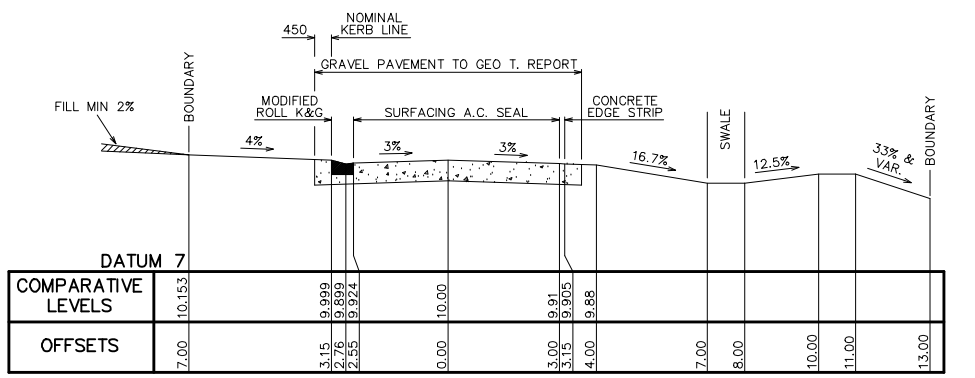
ASSET PROTECTION ZONE DETAILS

1. VEGETATION CLASSIFICATION: FOREST
2. GRADIENT OF LAND: LEVEL
3. FDI: 100
4. REQUIRED MINIMUM WIDTH OF APZ BY CALCULATION: 20m
5. MANAGEMENT OF APZ TO THE WEST OF LOT 9 WILL RETAIN TREE CROWNS AND MAINTAIN UNDERSTOREY TO INNER PROTECTION AREA (IPA) STANDARDS.



LONGITUDINAL SECTION – ROAD 1

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100



LONGITUDINAL SECTION – ROAD 2

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100

REVISIONS

No	Revision	Drawn	Date

Monteath & Powys Pty Ltd
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Surveyed		Drafted	SS
Drawn	AJM	Checked	NOT
REGISTERED SURVEYOR			
Scale @A1 : 1:500 @A3 : 1:1200		Original Size	A1
DO NOT SCALE			

Client: PORT STEPHENS COUNCIL

Title: FIRE PROTECTION MEASURES FOR THE PLAN OF PROPOSED SUBDIVISION OF LOT 4 DP 1117732 AT SALAMANDER BAY

CAD File: 05055O.dwg | Ref No: 05/055 | Date: 09/02/2010

Sheet No. 1/1

Revision -

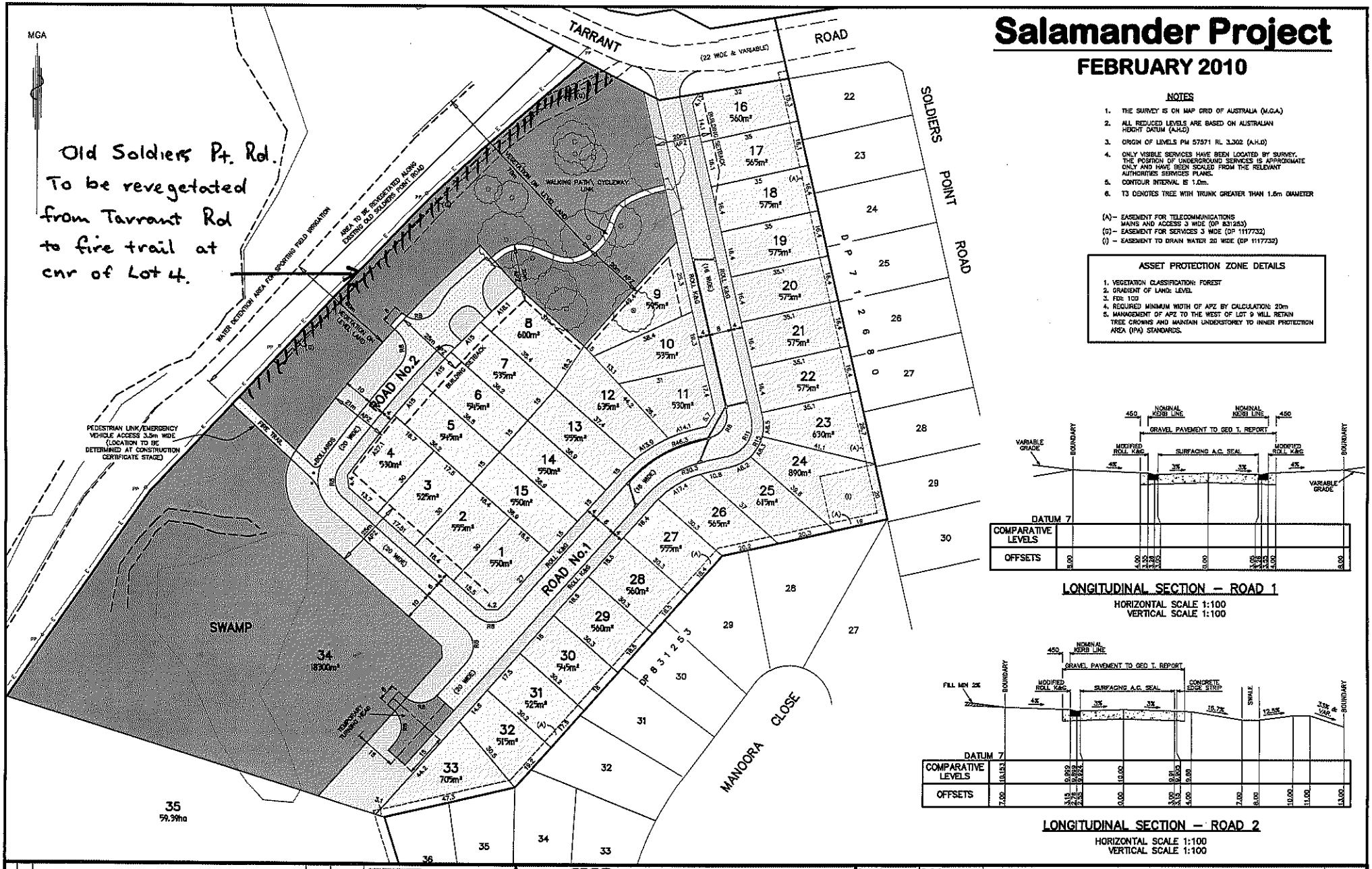
Last Plot:

Annexure 7

Plan of area for Revegetation

Salamander Project

FEBRUARY 2010



NOTES

1. THE SURVEY IS ON MAP GRID OF AUSTRALIA (M.G.A.)
2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (A.H.D)
3. ORIGIN OF LEVELS PM 57571 RL 3.302 (A.H.D)
4. ONLY VISIBLE SERVICES HAVE BEEN LOCATED BY SURVEY. THE POSITION OF UNDERGROUND SERVICES IS APPROXIMATE ONLY AND HAVE BEEN SCALED FROM THE RELEVANT AUTHORITIES SERVICES PLANS.
5. CONTOUR INTERVAL IS 1.0m.
6. T3 DENOTES TREE WITH TRUNK GREATER THAN 1.6m DIAMETER

(A)– EASEMENT FOR TELECOMMUNICATIONS MAINS AND ACCESS 3 WIDE (DP 831253)
(B)– EASEMENT FOR SERVICES 3 WIDE (DP 1117732)
(I) – EASEMENT TO DRAIN WATER 20 WIDE (DP 1117732)

ASSET PROTECTION ZONE DETAILS

1. VEGETATION CLASSIFICATION: FOREST
2. GRADIENT OF LAND: LEVEL
3. FDI: 100
4. REQUIRED MINIMUM WIDTH OF APZ BY CALCULATION: 20m
5. MANAGEMENT OF APZ TO THE WEST OF LOT 9 WILL RETAIN TREE CROWNS AND MAINTAIN UNDERSTOREY TO INNER PROTECTION AREA (IPA) STANDARDS.

LONGITUDINAL SECTION – ROAD 1

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100

LONGITUDINAL SECTION – ROAD 2

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100

REVISIONS

No	Revision	Drawn	Date

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Surveyed		Drafted	BS
Drawn	AJM	Checked	NOT
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DO NOT SCALE			

Client: PORT STEPHENS COUNCIL

Title: FIRE PROTECTION MEASURES FOR THE PLAN OF PROPOSED SUBDIVISION OF LOT 4 DP 1117732 AT SALAMANDER BAY

CAD File: 060650.dwg | Ref No: 06/065 | Date: 09/02/2010

Sheet No. 1/1

Revision -

Annexure 8

Statement of Commitments

Statement of Commitments

Environmental Commitments

- Comply with the Port Stephens Council Koala Management Plan.
- Strengthening the koala corridor by rehabilitation of the section of Old Soldiers Point Road for an approximate distance of 150 metres from the junction with Tarrant Road to a point that intersects with the Pedestrian link/Emergency vehicle access connecting to Road No. 2.
- Underground the 11kv power lines in the section to be rehabilitated for the koala corridor.
- External lighting to be designed to limit the light wash to adjacent bushland.
- Educational signage to be erected to depict the wildlife corridor.

Aboriginal Archaeology

- A cultural and heritage induction be carried out by local Aboriginal groups before earthworks commence.
- Establish a keeping place on site in the event that Aboriginal objects are discovered.
- During construction work if any Aboriginal sites or relics are discovered, work is to stop and the relative Aboriginal groups along with DECCW are to be contacted.

Urban Infrastructure

- Undertake further geotechnical investigation to establish compaction requirements, pavement thicknesses and foundation requirements, during construction.
- A “No Through Road” sign be placed at the entry to the subdivision.