

KEY FISH HABITAT ASSESSMENT

Kings Hill Development



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Key Fish Habitat Assessment
1
22 May 2019

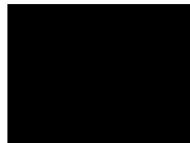
REPORT

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22 May 2019

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1 INTRODUCTION

RPS has been commissioned by APP Corporation on behalf of Kings Hill Developments (KHD) to assess the developments potential impacts under the *Fisheries Management Act 1994* (FM Act). This assessment is a response to the below directions from Port Stephens Council (PSC) addressed within a 'Request for Further Information' (RFI) letter:

"NSW Department of Primary Industries Key Fish Habitat Map identifies an area of key fish habitat mapped in the south eastern corner of the subject site. The Williams River and wetland adjacent to Newline Road are also mapped as key fish habitat and a small area central to the Irrawang Swamp to which the development drains. Within the development application however there has been no consideration of the NSW FM Act 1994. The SEE (2018) in Section 4.2.1 must address the requirements of Part 7A of the NSW FM Act 1994; or justification must be provided as to why of Part 7A of the NSW FM Act 1994 does not apply."

The following report has addressed the potential impacts of the proposed action upon the FM Act and provides avoidance and mitigation measures.

1.1 Study Area

The study area used to assess the proposals impact on Key Fish Habitat Assessment is shown in **Figure 1**. Newline Road to the west, Six Mile Road and private rural landscape lots to the north and Irrawang Wetland in the south. The subject site is situated within the Hunter-Central Rivers major catchment area and NSW North Coast IBRA region near its southern boundary with the Sydney Basin Bioregion. The subject site is located within the Karuah Manning IBRA subregion and directly adjacent to the Hunter and Upper Hunter IBRA subregions.

1.2 The Proposal

The Proposal is described as a 'Concept Development Application' for future Residential Subdivision and Stage 1 Subdivision Works (Initial Site Preparation Works). Any and all direct impacts as a result of the proposed action are to be wholly contained within the area shown in **Figure 1** as indicated by the subject site boundary.

1.3 Purpose of this Report

The purpose of this report is to assess relevant matters specified under the *Fisheries Management Act 1994*, specifically being impacts on:

- Threatened species, populations and ecological communities listed under the FM Act; and
- Mapped Key Fish Habitat.

The following section outlines the regulatory context for this assessment.

1.4 Regulatory Context

1.4.1 Fisheries Management Act 1994

NSW Department of Primary Industries (NSW DPI) is responsible for conserving the State's fishery resources and protecting and conserving fish habitat and threatened aquatic species in NSW waters (including permanent and intermittent, marine, estuarine and freshwater waterways). The Department issues permits for several types of activities that may harm fish habitats and for aquaculture development that are included in the Integrated Development Assessment process. Developments works and activities (other than aquaculture) within or adjacent to waterways mapped or defined as Key Fish Habitat require permits and are captured by the integrated development assessment provisions.

NSW DPI is an “approval body” for development that requires one or more of the following permits under the FM Act:

- Section 144 - aquaculture permit (i.e. cultivating fish or marine vegetation for sale or commercial purposes).
- Section 201 - permit to carry out works of dredging or reclamation.
- Section 205 - permit to harm (cut, remove, damage, destroy etc) marine vegetation on public water land or the foreshore of such land or on an aquaculture lease.
- Section 219 - permit to obstruct the free passage of fish

Separate licencing requirements outside of the integrated development provisions may also be required under the FM Act under section 220ZW - if an action is likely to result in:

- harm to a threatened species, population or ecological community;
- damage to critical habitat; or
- damage to the habitat of a threatened species, population or ecological community.

A 7 Part assessment of significance is conducted in order to assess the potential impacts on threatened species.

1.4.2 Policy definition of Key Fish Habitats

One of the objectives of the FM Act is to ‘... conserve key fish habitats ...’. Key Fish habitat includes “*all marine and estuarine habitats up to highest astronomical tide level (that reached by 'king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank*”.

In understanding this definition, it is important to remember that the term 'fish' includes all aquatic invertebrates such as yabbies, shrimps, oysters, mussels, insect larvae, beach worms, sea stars, jellyfish etc. However, there is a proviso that habitats that might otherwise be excluded but are known or likely to be habitat for listed threatened species, populations or communities are always included.

Key fish habitat has been assessed in this report through the key fish habitat mapping DPI (2007) and field investigations to confirm and characterise mapped areas.

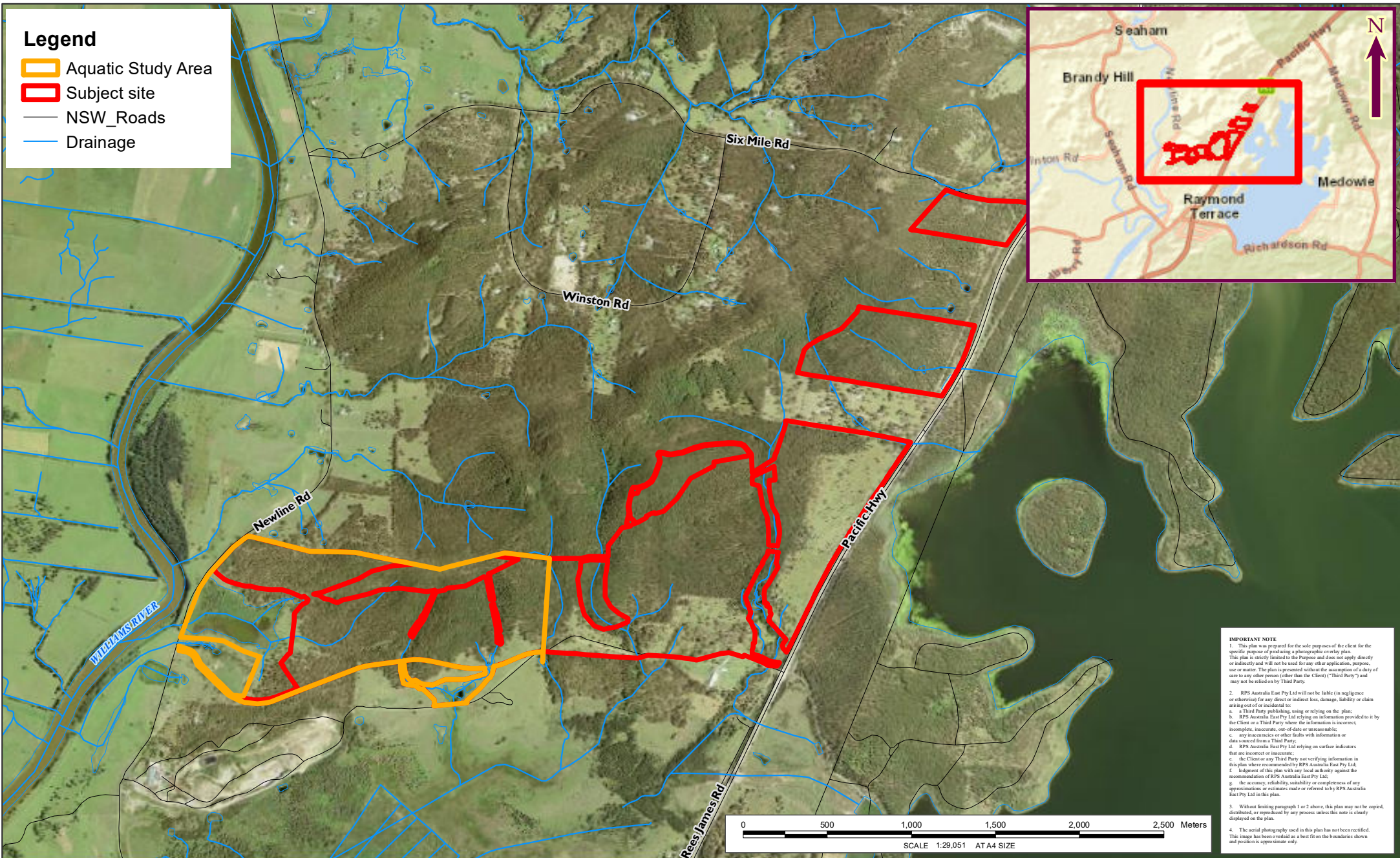


Figure 1: Project Area

LOCATION: KINGS HILL	Path: J:\JOBS\130k\130430 Raymond Terrace\10 - Drafting\Arcgis Map Documents\Eco\Report\5. Aquatic\130430_12_Figure 1_Subject	DATUM: GDA94 PROJECTION: MGA Zone 56
PURPOSE: AQUATIC ECOLOGY Technician: kieran.marshall Date: 17/05/2019	VERSION (PLAN BY):	Data Sources: RPS Land and Property 2015

CLIENT: APP
JOB REF: PR 130430 - 12

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2 SITE CHARACTERISATION

Two investigation areas were identified for the assessment of Key Fish habitat during the field investigation performed on 24 April 2019 and are illustrated in **Figure 2**. These investigation areas are characterised as having permanent water in association or adjacent to mapped coastal wetlands. A brief description of each investigation area is provided in the following sections.

2.1 Wetland Investigation Summary (Alluvium 2019)

The following is a summary of the wetland investigation performed by Alluvium (Alluvium 2019) for the mapped wetlands 803 and 804.

The average annual runoff volume from the Kings Hill east catchment that drains to Irrawang Swamp is estimated to increase by approximately 1500 ML/yr from existing conditions when planned development of this catchment is completed. The majority of this estimated increased volume (approximately 60%) is due to diversion of runoff from Grahamstown Dam. During annual high flow period, it is estimated that high flows from Kings Hill East would typically increase by approximately 40 ML/day compared to existing conditions. During high flow periods it is expected that flow would spill over the Pennington Drain banks into the adjacent vegetated areas, this increased flow represents an increased depth of 65 mm over the total Irrawang swamp area. Although the high flows would increase, the increase is estimated to be a maximum of 10% of the average annual spillway flow from Grahamstown Dam.

Increases in runoff volumes from the Kings Hill south catchment are estimated to be much lower than the eastern catchment. Although, runoff from Kings Hill south catchment will be less constrained by drainage channels and will disperse more through the wetland vegetation. The average increase in flow depth over the northern part of Irrawang Swamp is expected to be less than 10 mm and within the range of variations in summer rainfall across the wetland. Although, localised increased in water depth are likely to occur due to subtle variations in the terrain leading to additional localised pockets of perennial swamp meadow. Increased annual high flow volumes from the Kings Hill south catchment are estimated to be minor and have an insignificant impact on increasing water levels in Irrawang Swamp during these periods.

A detailed analysis of Coastal Wetland 803 in Kings Hill west catchment has not been completed due to limitations in available ecological data. Notwithstanding, it is recommended that the maximum inundation depth in this wetland be lowered to more natural water level. Separate to the potential future impacts of the Proposal, the existing wetland has suffered from increased water retention due to construction of a weir across its outlet adjacent to New Line Road. Increased runoff arising from the Proposal into this wetland is likely to exacerbate impacts on the remnant wetland vegetation. Modification of the existing outlet is recommended to enable water levels to be controlled seasonally thus mitigate this impact.

On-going monitoring of vegetation in Irrawang Swamp during high flow periods following commencement of development should be a fundamental consideration.

2.2 Investigation Area One

Investigation Area One located on the western boundary of the study area and can be characterised as a mapped Coastal wetland associated with the Williams River (i.e. Wetland 803). The wetted area of the wetland has approximate dimensions of 600 m east to west and 330 m north to south. The wetting and drying phases of this wetland along with the historical land management practices has resulted in functional seasonal mud flats between the maximum wetted extent and the permanent ponding areas.

The wetland is generally characterised by mosaicking deep pooling permanent water and vegetation communities including Swamp Oak Woodland, Paperbark Swamp Woodland and Swamp Meadow Complex (Alluvium 2019). This wetland and the vegetation communities are commensurate with the general characteristics of a Coastal Wetland under the “SEPP Coastal Management” and are also identified spatially under associated SEPP mapping (DEP, 2018). The Coastal wetland is commensurate with the DPI (2019) definition for key fish habitat as a “wetland associated with other permanent fish habitats (e.g. permanent

ivers)". Furthermore, investigation area one is positively identified (**Figure 2**) under the Key Fish Habitat mapping for Port Stephens LGA (DPI) 2007.

2.3 Investigation Area Two

Investigation Area Two is located on the southern boundary of the Proposal and is bordered to the south by the Irrawang wetland. This area is located on a south facing slope within the drainage line at the confluences of two first order streams. The area has been historically impounded by rock wall and road as an agricultural dam. The dam has been heavily modified and is currently open on all side for stock access. Aerial imagery indicates that the dam is associated with the southern wetland by its position in the landscape and potentially has a shared ground water regime as indicated by a historically present shared wetted boundary despite the influence for the dam.

The vegetation surrounding the dam is characterised by mixed native and exotic pastures with the dam itself currently dominated by a heavy infestation of water hyacinth (*Eichhornia crassipes*) which is listed as a weed of national significance (WoNS). Other species identified within the dam include isolated individuals of Cape Waterlily (*Nymphaea capensis*) and *Juncus* spp. This area is part of the Key Fish Habitat mapping (Port Stephens LGA Key Fish Habitat (DPI) 2007) despite the current condition of this water body and its low value for aquatic species.

2.4 Threatened Species Habitat

Investigation area one potentially provides habitat for the threatened species Southern Purple Spotted Gudgeon (*Mugenda asperse*). This freshwater benthic species occupies a variety of habitat types such as rivers, creeks and billabongs with slow-moving or still waters or in streams with low turbidity. This species is also a structure dependant preferring areas with good cover such as aquatic vegetation, overhanging vegetation from riverbanks, leaf litter, rocks or snags are important for the species. The key threats to this species locally are predation by introduced fish such as Eastern Gambusia (*Gambusia holbrooki*); Loss of favourable habitat; particularly aquatic plants; thermal pollution; increased turbidity and damage of stream banks by livestock access; and decreased water quality due to agricultural runoff and siltation.

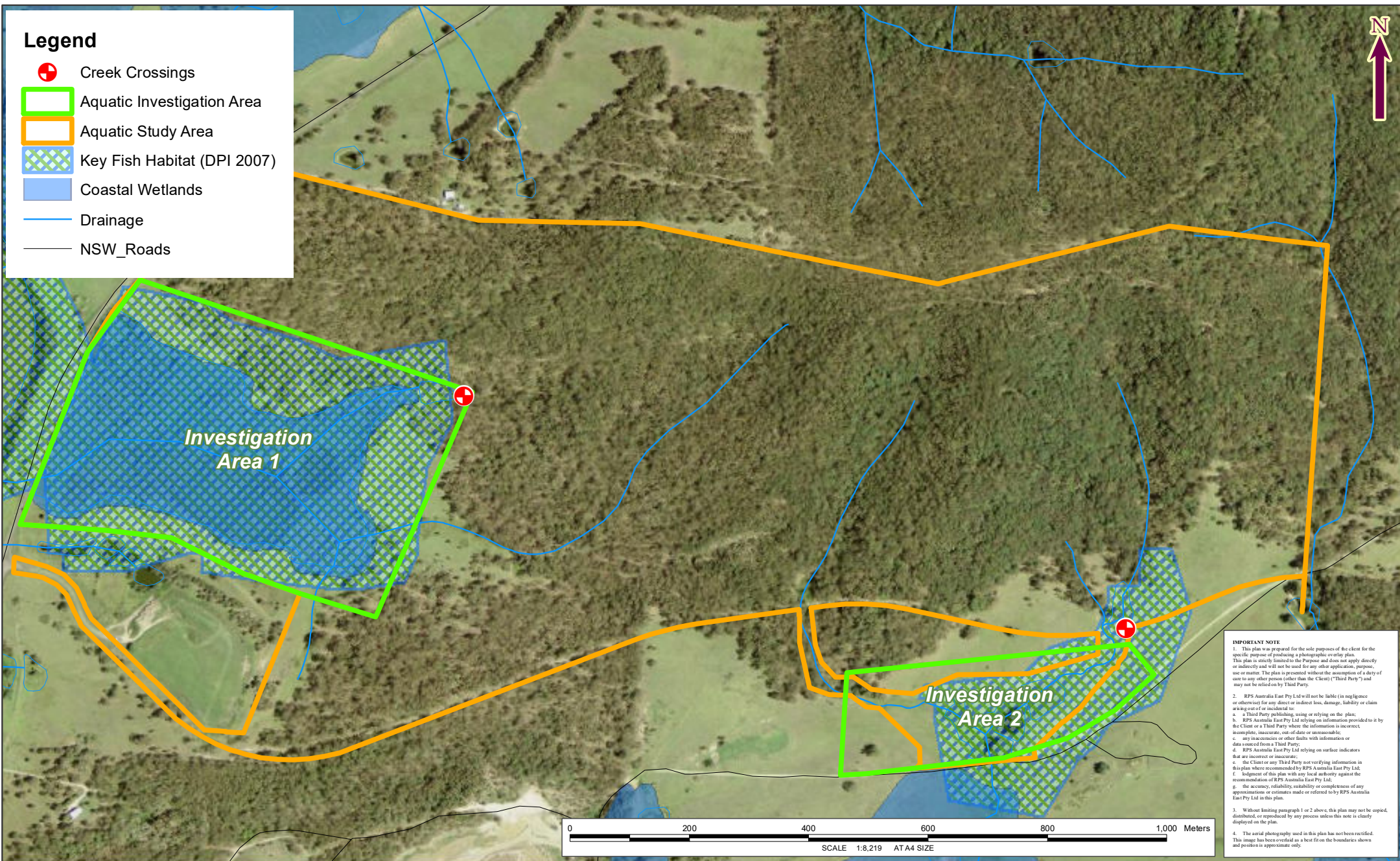


Figure 2: Key Fish Habitat

Figure 2: Key Fish Habitat	LOCATION: KINGS HILL		Path: J:\JOBS\130k\130430 Raymond Terrace\10 - Drafting\Arcgis Map Documents\Eco\Report\5. Aquatic\130430_12_Figure 2_Key fish	DATUM: GDA94 PROJECTION: MGA Zone 56
	PURPOSE: AQUATIC ECOLOGY			
	Technician: kieran.marshall Date: 20/05/2019		VERSION (PLAN BY):	Data Sources: RPS Land and Property 2015

3 IMPACT AVOIDANCE

3.1 Integrated Development

The following information outlines primarily avoidance measures required to avoid licencing requirements and or the integrated development provisions as outlined in **Section 1.4** of this report.

Table 1 Integrated Development Avoidance

Proposal Impact	Potential Licencing Trigger	Avoidance Measure
Investigation Area One		
Construction of roadway through areas mapped as Key fish Habitat or Coastal Wetlands (Proposed Creek Crossing A, (Northrop 2019))	Section 201	Do not carry out any excavation works within or adjacent to “water land” (Appendix A) including groundwater dependant vegetation communities
	Section 219	Do not temporarily inhibit or alter the flow of water in this locality
Investigation Area Two		
Clearing of Dam and drainage lines vegetation for the purpose of increasing the capacity of the retention basin	Section 201	Do not carry out any excavation works within or adjacent to “water land” (Appendix A)
Repair and improvement of Impoundment structure (Proposed Creek Crossing D, (Northrop 2019))	Section 201	Do not carry out any excavation works within or adjacent to “water land” (Appendix A)

3.2 Threatened Species

The southern purple spotted gudgeon (*Mogurnda adspersa*) is the only threatened species listed under the FM Act which is predicted to occur and may be potentially impacted by the Proposal. The swamp located in Investigation Area One potentially provides key habitat for this species. A 7-part test of significance as listed under section 220ZZ of the FM has been conducted for this species and is located in **Appendix B**. This assessment determined that the Proposed action is unlikely to have a significant impact on this species under the assumption that appropriate design principles are applied in the management of water quality (e.g. sediment control plans are adequate to ensure no significant change in water quality occurs as a result of the development). It is not expected that the changes in water level proposed in Alluvium (2019) will adversely impact the survival of this species.

4 RECOMMENDATIONS

The following table outline the specific recommendations for the Proposal in relation to the FM Act.

Table 2 Impact avoidance recommendations

Potential Impact	Recommendations
Investigation Area One	
Construction of roadway through areas mapped as Key fish Habitat or Coastal Wetlands (Proposed Creek Crossing A, (Northrop 2019))	It is recommended that the proponent seek concurrence from the DPI regarding these actions. A licence under “ <i>Section 201 - permit to carry out works of dredging or reclamation</i> ” and “ <i>Section 219 - permit to obstruct the free passage of fish</i> ” of the FM Act may be required.
Investigation Area Two	
Clearing of Dam and drainage lines vegetation for the purpose of increasing the capacity of the retention basin	It is recommended that the proponent seek concurrence from the DPI regarding these actions. A licence under “ <i>Section 201 - permit to carry out works of dredging or reclamation</i> ” of the FM Act may be required.
Repair and improvement of Impoundment structure (Proposed Creek Crossing D, (Northrop 2019))	It is recommended that the proponent seek concurrence from the DPI regarding these actions. A licence under “ <i>Section 201 - permit to carry out works of dredging or reclamation</i> ” of the FM Act may be required.

5 CONCLUSION

The Proposal (**Table 1**) will impact upon Key Fish Habitat for works associated with proposed creek crossings 'A' and 'D' (**Figure 2**) as well as works associated with the dam and impoundment located within in Investigation Area Two. It is recommended that any actions outlined above or any additional actions to be undertaken within "water land" located within or adjacent to Key Fish Habitat will trigger a requirement to seek concurrence and licencing under the FM Act as identified in **Table 1**.

6 REFERENCE

Alluvium (2019). Preliminary assessment of the Kings Hill development impacts on Irrawang Swamp ecology (Draft Report). Unpublished report prepared for Northrop Engineering, Alluvium Consulting Australia Pty Ltd, Newcastle.

DPE (2018). SEPP Coastal Management -Coastal Wetlands, State Government of NSW and Department of Planning and Environment.

DPI (2019). Policy definition, key fish habitat, New South Wales State Government, Department of Primary Industries (DPI), Accessed (16/05/2019) <https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps>

DPI (2019 b). Priorities Action Statement - Actions for the Southern Purple Spotted Gudgeon, New South Wales State Government, Department of Primary Industries (DPI), Accessed (17/05/2019) <https://www.dpi.nsw.gov.au/fishing/species-protection/what-current/endangered-species/purple-spotted-gudgeon/priorities-action-statement-actions-for-the-purple-spotted-gudgeon>

DPI (2007). Key Fish Habitat Map - Port Stephens LGA, New South Wales State Government, Department of Primary Industries (DPI), Accessed (16/05/2019) <https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps#Policy>

Northrop (2019). Engineering Report, Kings Hill Development, Northrop Consulting Engineers Pty Ltd.

Appendix A

Definitions

Term	Definition
Dredging	any work that involves excavating water land (see definition below).
Fish	finned fish and other aquatic invertebrates at any stage of their life cycle including oysters and other molluscs, crustaceans, echinoderms, beachworms, (but not including whales, seals, turtles, frogs).
Marine vegetation	any species of plant that at any time in its life must inhabit marine or estuarine waters (eg mangroves, seagrasses and seaweeds).
Reclamation	any work that involves the placement of any material (sand, soil, gravel, rocks etc) to fill in or for constructing anything over water land, or draining water from water land for the purpose of its reclamation (see definition below).
Water land	means land that is intermittently or permanently submerged by water (either naturally or artificially) and includes wetlands

Appendix B

Assessment of Significance (FM Act NSW 1994) Southern Purple Spotted Gudgeon

Assessment of Significance (FM Act) Southern Purple Spotted Gudgeon

(a) in the case of a threatened species, whether the action proposed is 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

The Proposal is likely to result in an increased water loading within an area of potential habitat for the southern purple spotted gudgeon. This increased water volume is predicted to result in more permanent standing water within the wetland which may increase the habitat range for this species. Some thermal impacts may eventuate as a consequence of the developed landscape, although this impact would be buffered by the slowed rate of water ingress through detention. The removal of cattle from the wetland is likely to increase the vegetation cover which is likely to return the wetland to a more natural state.

If this species is present within or adjacent to the Subject Site it is possible that any increase in turbidity and siltation as a result of clearing works or the final development design could have an adverse impact on this threatened species. These potential impacts if managed correctly could be mitigated through the implementation of sediment control plans and water discharge licencing requirements under the EPA. Given the above, this Proposal 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

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

N/A

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

N/A

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

N/A

d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

No habitat is proposed to be removed or modified as a result of the Proposal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No potential existing habitat linkages are proposed to be modified in any way as a result of the proposed action.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

No potential habitat is proposed to be removed, fragmented or isolated as result of the proposed actions. However, the proposed action will results in modification of the existing habitat. This modification is likely to result in higher water levels within the swamp and an increase in vegetation around the fringes of the permanent water bodies.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

There is no area of mapped critical habitat published for the Southern Purple-Spotted Gudgeon.

Assessment of Significance (FM Act) Southern Purple Spotted Gudgeon

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

The proposal is generally consistent with the objectives of the priority action statement (DPI 2019 b)

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The Proposal may have actions consistent with the key threatening process "Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams" as identified by within the FM Act.
