



## **NSW North Coast Sustainable Aquaculture Strategy-Land Based Aquaculture**

### **Readers' Note**

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# Project Profile Analysis

NSW North Coast Sustainable Aquaculture Strategy  
Land Based Aquaculture  
August 2000

A NSW Government Initiative

## North Coast Sustainable Aquaculture Strategy

A NSW Government initiative of NSW Fisheries, Department of Urban Affairs and Planning, Department of State and Regional Development, Environment Protection Authority, Department of Land and Water Conservation, National Parks and Wildlife Service and NSW Agriculture to encourage sustainable aquaculture in New South Wales

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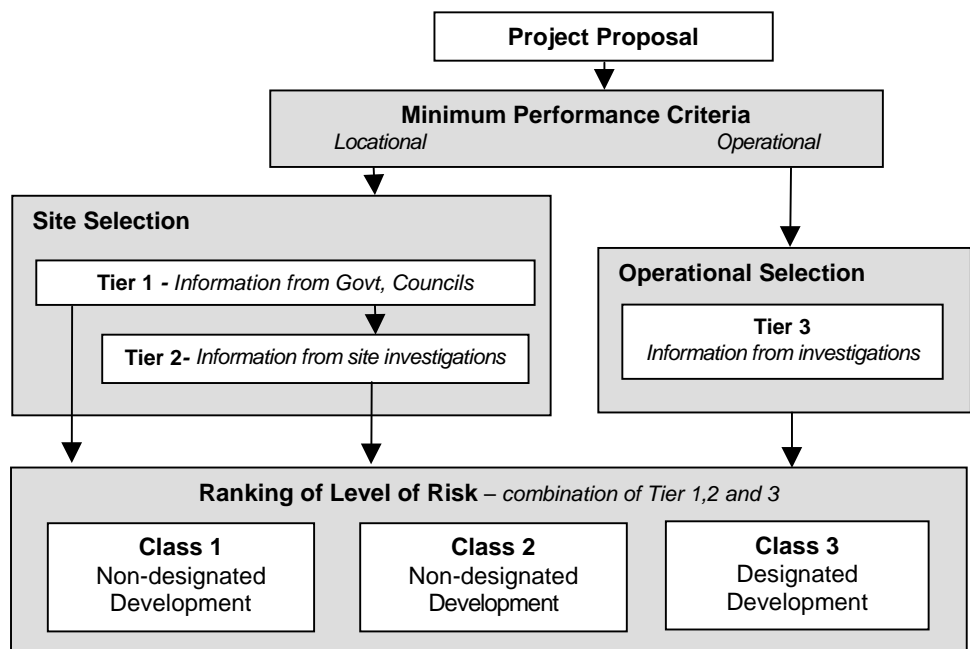
## 1. Overview of Project Profile Analysis

The Aquaculture Industry Development Plan (AIDP) sets out best practice for the establishment and operation of land based aquaculture projects. Based on this information, a Project Profile Analysis has been developed to enable a preliminary evaluation of the risks associated with site selection, species, design and planning and operational criteria. These criteria allow the applicant and the consent authority to evaluate the likely risks associated with a project and to establish the level of assessment to match the likely risks to the environment.

The Project Profile Analysis provides three “sieves” to evaluate options.

- The **Minimum Performance Criteria** provides the first environmental sieve for selecting sites and project characteristics. These must be met in order for the project to proceed.
- The **Site Selection Criteria** (Tier 1 and Tier 2) provide the next two environmental sieves to determine the acceptability of risks. Tier 1 information is available from Government or Council sources. Tier 2 information will need to be obtained from site investigation or studies.
- Following the selection of a site, **Operational Selection Criteria** (Tier 3) provide the next “sieve” to evaluate various options including species, layout and operation factors. The Tier 3 evaluation can serve as a cost-effective device to determine the relative risk associated with species, design and operational options and to assist in deciding if certain options should be excluded from further consideration.

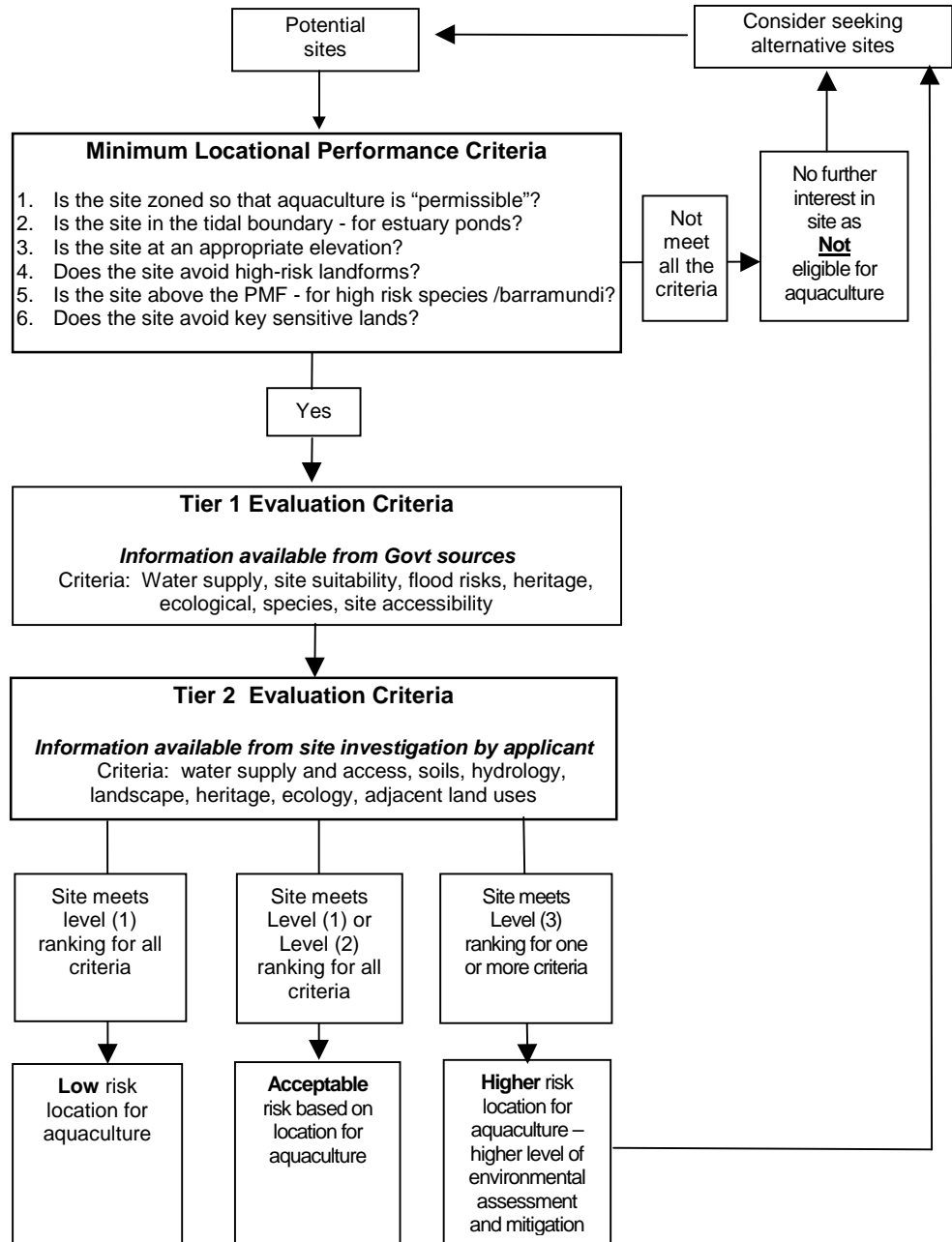
Figure 9. “Sieves” in Project Profile Analysis



## 2. Site evaluation criteria

The Site Selection Section of the AIDP has identified environmental and other factors that should be considered when selecting a site for aquaculture. These factors can be used to rank the likely risks associated with establishing an aquaculture facility in a particular location, eg. as representing a Level 1, 2 or 3 risk.

Figure 10. Site Selection



## 2.1 Minimum Site Performance Criteria

It is essential at the outset, that the **Minimum Performance Criteria for Land-based Aquaculture in the North Coast Region** (see Project Profile Analysis) is considered as aquaculture projects that cannot meet these minimum performance criteria, are not permissible on the North Coast. Information regarding the minimum locational performance criteria is readily available from Council or DLWC maps. For estuarine sites, the **Estuarine Aquaculture Maps** for each estuary provide a quick evaluation to determine if a potential site meets these minimum locational criteria.

## 2.2 Tier 1 Evaluation

For sites that meet the Minimum Locational Performance Criteria, the Tier 1 information should be sourced to determine the relative acceptability of the site for aquaculture. The Tier 1 criteria can be sourced from information held by Council, NSW Fisheries, NPWS and DLWC. The ranking of Level 1, 2 or 3 for individual criteria will begin to provide a picture of the potential hurdles in developing a site and the likely level of environmental assessment and regulation which could apply – the lower the level of risk, the lower the level of assessment and regulation required. Whenever possible, higher risk sites should be avoided at the Tier 1 evaluation level.

## 2.3 Tier 2 Evaluation

For sites that are not eliminated as a result of Tier 1 evaluation, the next layer of information should be sourced. Tier 2 investigations may involve significant expenditure with site investigations by technical experts, and in some cases, laboratory analysis. For example, investigations by consultants may be required

- to confirming the levels of acid sulfate soils or soil contamination and develop management options
- to determine soil suitability for dam construction,
- to identify threatened species, populations or ecological communities or their habitat
- to locate any Aboriginal sites and establish their significance
- to assess of potential water supply quality and security of supply.

It should be noted that the level of analysis at this stage need not be as detailed as would be required once the site has been selected and the detailed project design is being undertaken. However, it should provide sufficient information for an informed decision to be made so that there will be no unpleasant surprises later, resulting in costly management options.

The level of risks associated with the location along with the risks levels associated with operational constraints (see Section 3) will decide the assessment regime for the project. The lower the risks, the lesser the level of assessment complexity, the lower the costs in assessment and mitigation, and the lower the level of environmental supervision by Councils and government agencies.

### 3. Estuarine Aquaculture Maps

Sound site selection is particularly important in estuarine areas where problems related to suitable water quality, drainage and acid sulfate soils could impose costly constraints on the long-term aquaculture viability in those areas.

**Estuarine Aquaculture Maps** have been developed for the ten North Coast Region estuaries from Tweed River to the Manning River:

- > Tweed
- > Brunswick
- > Richmond
- > Clarence
- > Bellinger and Kalang
- > Nambucca
- > Macleay
- > Hasting
- > Camden Haven
- > Manning.

These maps will play a pivotal role in identifying sites that meet the minimum locational performance criteria for prawn and other estuarine pond aquaculture. The maps have been developed using GIS information and identify potential locations based on attributes including

- elevation above Australian Height Datum,
- spatial salinity for the estuary and bathymetry assessment,
- acid sulfate soil profile,
- land use zoning, and
- Conservation exclusion zones.

These maps identify land which meet the Minimum Locational Performance Criteria for estuarine aquaculture. Other evaluation criteria must still be considered in assessing the suitability of a particular site for aquaculture. The Tier 1 and Tier 2 selection criteria are in the Project Profile Analysis provides details of the site selection factors.

While A4 versions of the Estuarine Aquaculture Maps are included in the AIDP, the North Coast Office of the Department of State and Regional Development and the Aquaculture Division of NSW Fisheries can provide access to full scale Estuarine Aquaculture Maps for all estuaries on the North Coast from Manning to the Tweed which identify potentially suitable areas as well as in some cases, specific sites with potential for estuarine aquaculture.

Because of the extent of locational possibilities for freshwater tank and ponds, a mapping approach to identify land that meets the Minimum Locational Performance Criteria is not being taken. The criteria should be applied at the preliminary stage to eliminate any sites that do not meet these criteria.

The site selection factors are discussed in more detail in the Site Selection Section of the AIDP.

**(a) Tweed River Estuary**

**(b) Brunswick River Estuary**

**(c) Richmond River Estuary**

**(d) Clarence River Estuary**

**(e) Bellinger and Kalang River Estuaries**

**(f) Nambucca River Estuary**

**(g) Macleay River Estuary**

**(h) Hasting River Estuary**

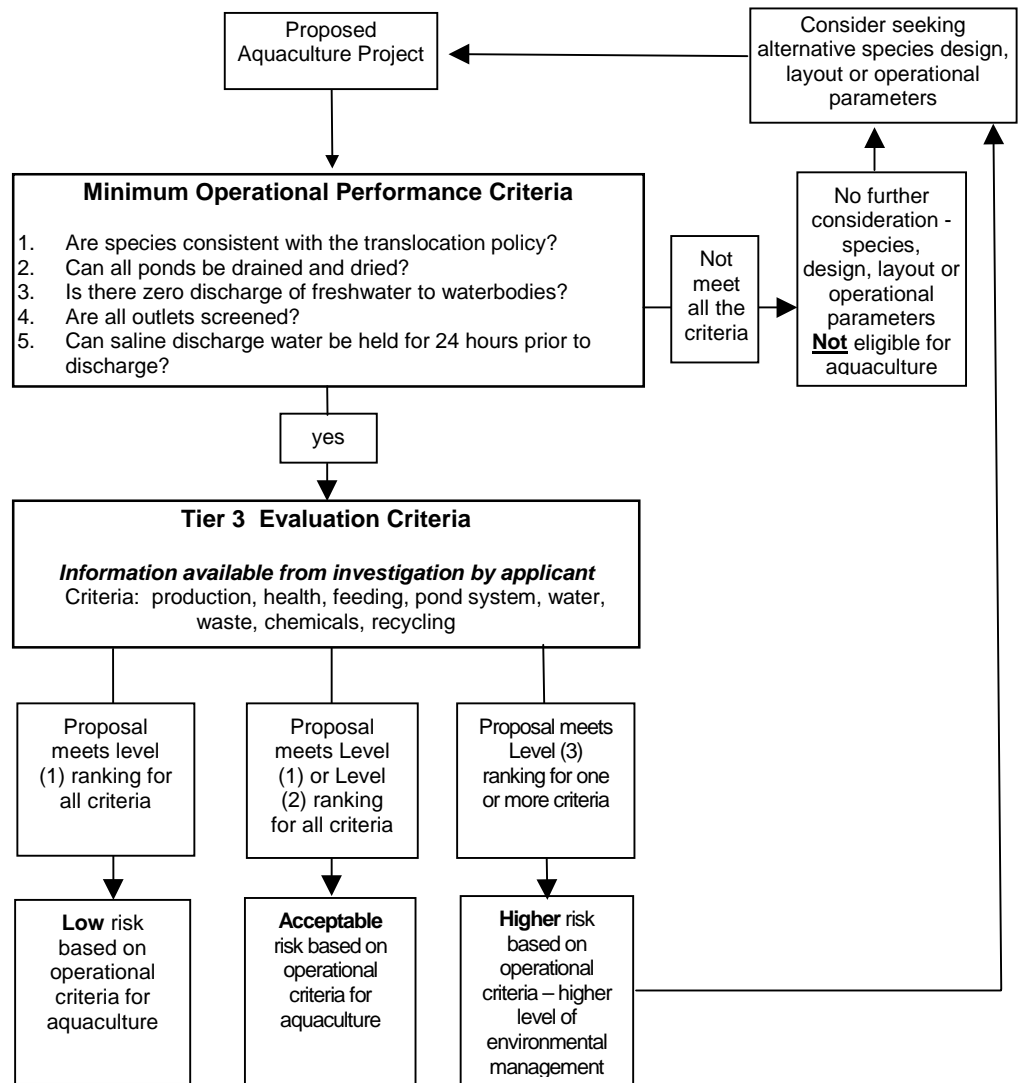
**(i) Camden Haven River Estuary**

**(j) Manning. River Estuary**

#### 4. Operational Evaluation Criteria

While Tier 1 and Tier 2 Site Selection Criteria provide guidance in the selection of a preferred site, the Tier 3 evaluation criteria aim to provide guidance on the evaluation of alternative operational regimes. Information from planning and design investigations will lead to a project profile ranking which will assist in identifying the likely risks to the environment of various operational alternatives.

Figure 11. Operational Selection



**4.1 Minimum Operational Performance Criteria**

It is essential at the outset, that the Minimum Performance Criteria for Aquaculture in the North Coast Region be considered as aquaculture which cannot meet these minimum performance criteria, are not permissible on the North Coast.

**4.2 Tier 3 Operational Evaluation**

Following the selection of a site, and confirmation that the proposed design and planning parameters meet the Minimum Operational Performance Criteria, Tier 3 evaluation criteria provides the next “sieve” to determine the relative level of risk associated with the aquaculture proposal.

The Tier 3 evaluation can serve as a cost-effective device to determine if any of the proposed operational parameters are likely to lead to longer term costs associated with expensive mitigation measures and should be excluded from further consideration. The ranking of Level 1, 2 and 3 operational criteria will begin to provide a picture of the potential hurdles and the likely level of environmental assessment and regulation which could apply – the lower the level of risk, the lower the level of assessment and regulation required.

**5. Interpreting the rankings**

**5.1 The Rankings**

The tables associated with Tier 1, 2 and 3 provide a ranking in relation to the criteria and the level of risk associated with the project characteristics. These rankings assist in evaluating individual sites and operational options as well as providing for a comparison between alternative options. The values are not to be added up and should result in an aggregate reading of the acceptability of the site for aquaculture.

**Table 30. Interpreting the Rankings**

<b>Aggregation of levels based on the Project Profile Analysis</b>	<b>Class based on Project Profile Analysis</b>	<b>Development Assessment</b>	<b>Assessment document</b>
If all the levels associated with all the criteria are Level (1)	Class 1	Non-designated Development	SEE
If the levels are Level (1) and (2)	Class 2	Non-designated Development	SEE
If any of the levels are Level (3)	Class 3	Designated Development	EIS

It must be reinforced that for aquaculture projects to be undertaken on the North Coast, they must meet the Minimum Locational and Operational Performance Criteria.

### 5.2 Who makes the decision

It is essential that the consent authority (the local council or the Minister for Urban Affairs and Planning) and NSW Fisheries are consulted prior to lodging the development application.

The applicant should submit sufficient information to the consent authority so that the consent authority can decide whether the project meets the Minimum Performance Criteria and on the level of assessment based on the level of risk according to the Project Profile Analysis required for the proposal. This must be done prior to submitting the development application. It is the responsibility of the consent authority to determine if a proposal is a Class 1, 2 or 3 development.

### 5.3 Transitional Provisions

Where there is an existing aquaculture enterprise or a site of an abandoned aquaculture enterprise (eg such as abandoned prawn farms in Maclean) and there is a proposal to upgrade or re-establish an aquaculture operation on that site, the North Coast Sustainable Aquaculture Strategy will apply.

For proposals that do not comply with the best practice in the AIDP and do not meet the Minimum Performance Criteria, the applicant must formally seek and obtain agreement of the Minister for Urban Affairs and Planning to be exempted from the Minimum Performance Criteria that would have otherwise made the proposal not permissible.

In making a decision for an exemption from the Minimum Performance Criteria, the Minister shall take into consideration whether the proposal will lead to:

- improved environmental outcomes despite non or partial compliance with the Site Location Minimum Performance Criteria; and
- total compliance with the Operational Minimum Performance Criteria.

# Project Profile Analysis for Ponds and Tanks

## Minimum Performance Criteria

The following are Minimum Performance Criteria which proposals must meet to be permissible development within the North Coast Region.

### Information available from Government Sources

Locational Criteria	Minimum Performance
1. LEP zones for ponds	Within Rural (1) zones
2. LEP zones for tanks	Within Rural (1) or Industrial (4) Zones
3. Tidal boundary for estuarine ponds	Within 1 Km from tidal stream (defined as 1km upstream of the upper tidal limit of the NSW Coastal Policy)
4. Elevation Australian Height Datum (AHD) for estuarine ponds	> 1 and < 10 metres AHD as sourced in ASS Risk Maps <sup>1</sup>
5. Elevation Australian Height Datum (AHD) for freshwater ponds and tanks and saline tanks	> 1 metre AHD as sourced in ASS Risk Maps <sup>1</sup>
6. Landform exclusion zones (high acid sulfate soils risk areas)	Not within ASS risk codes EsO, EcO, EuO, Em in ASS Risk Maps <sup>1</sup>
7. Flood liability	> Probable Maximum Flood if high security species, eg. barramundi
8. Conservation exclusion zones <sup>2</sup>	NPWS protected areas (eg national parks, nature reserves, Aboriginal areas, historic sites, karst conservation reserves) Marine Reserves or Marine Parks (excluding general use zones) Vacant Crown land
<b>Operational Criteria</b>	
9. Species	Species selection must be consistent with the NSW Fisheries Policy on Translocation of Live Aquaculture organisms. No non-indigenous species shall be cultured in saline pond culture.
10. Pond design	Capable of draining or pumping and completely drying ponds
11. Freshwater culture	Zero discharge of pond water to a natural water bodies or wetlands
12. Outlets from ponds	All outlets must be screened to avoid escape of stock
13. Outlet from estuarine farms	All saline discharge water must be held in a sedimentation system for a minimum of 24 hours prior to discharge and must be returned to saline tidal reaches of the waterway

<sup>1</sup> Sourced from the Acid Sulphate Soil (ASS) Risk Maps (landform elevation codes 1, 2 or 4).

<sup>2</sup> This provision will not apply to the use of such land required for gaining access to water that will be subject an assessment by the appropriate authority for each situation on its merits.

# Project Profile Analysis for Ponds

## Tier 1 - Site Evaluation for Ponds

As a first step in the site evaluation process, a “desk top” study should be undertaken of potential sites using readily available information in maps and other data sources held by Councils, DLWC and government agencies. This desk top study will provide a quick and efficient approach to weeding out unsuitable sites and for focusing in on those sites which would justify a more intensive site evaluation. Tier 1 Evaluation Criteria are used to as a first “sieve” to identify areas that are likely to be suitable for aquaculture.

### Information available from Government Sources

SITE EVALUATION CRITERIA FOR PONDS	TIER 1 LEVEL OF ASSESSMENT FOR PONDS		
	Level 1	Level 2	Level 3
<b>1. Water Supply</b> <i>based on DLWC information</i>			
(a) Estuarine - Tidal amplitude	> 600 mm	100 - 600 mm	< 100 mm
(b) Fresh - Water availability	<ul style="list-style-type: none"> <li>Existing irrigation license approved for bore or river extraction, or</li> <li>Irrigation license available for purchase.</li> </ul>	<ul style="list-style-type: none"> <li>New licence required for bore or river extraction, or</li> <li>Reliant upon on-farm dam and 10% run-off</li> </ul>	
<b>2. Site Elevation</b> Estuarine ponds (AHD)	2-10m AHD <sup>3</sup>	1-2m AHD <sup>3</sup> if less than 5 ha of pond area	1-2m AHD <sup>3</sup> if more than 5 ha of pond area
<b>3. Acid Sulfate Soils</b> If site is < 2 metres AHD: Acid Sulfate Soil Risk profile based on ASS Risk Maps <sup>1</sup>	ASS Landform Process <sup>3</sup> Class A with Landform Element Class b, l, t, p, y or w	ASS Landform Process <sup>3</sup> Classes A,W, B, E, L, S with other Landform Element than b, l, t, p, y or w	
<b>4. Heritage issues</b>			
(a) Heritage sites based on LEP or REP maps and State Heritage Inventory	No listings on the proposed site	Listings on-site	
(b) Aboriginal heritage based on NPWS Aboriginal Sites Register	No recorded sites or places	Sites or places recorded on the land	
<b>5. Conservation issues</b>			
(a) NPWS protected areas, RAMSAR Wetlands, Critical habitat, Aquatic Reserves and Marine Parks (except “General Zone”)	Not located in adjacent these areas and no potential to disturb these areas	Adjacent to but no potential to drain into or extract water from these areas	Activity will result in direct disturbance of these areas
(b) SEPP 14, SEPP 26, Marine Parks (“General Zone”), World Heritage Areas	Not located in or adjacent these areas and no potential to disturb these areas	Adjacent to but no potential to drain into or extract water from these areas but may involve water pipe access across the areas	Activity located in areas or draining into these area
<b>6. Stock species</b>			
(a) Species cultivated in Estuarine ponds <i>Note: Non-indigenous species to NSW are not permissible</i>	Indigenous to NSW		
(b) Species cultivated in freshwater ponds <i>Note: Species inconsistent with translocation policy especially pest or/and noxious species are not permissible</i>	Indigenous to catchment	Species consistent with NSW Fisheries Translocation Policy	
<b>7. Site accessibility</b> Vehicle & electricity accessible based on LEP maps & power suppliers information	Existing access and services or access and services can be readily provided	Access or services limited or difficult – eg across a wetland (other than SEPP 14 wetlands dealt with above)	Access or services across SEPP 14 or SEPP 26 areas

<sup>1</sup> Sourced from the Acid Sulphate Soil (ASS) Risk Maps <sup>2</sup> This provision will not apply to the use of land required for gaining access to water

<sup>3</sup> Proposals which disturb more than 1 tonne of acid sulfate soils will be required to prepare an Acid Sulfate Soils Management Plan consistent with the ASS Manual.

## Tier 2 - Site Evaluation for Ponds

The next step in site evaluation is to undertake more detail site assessment including investigations by technical experts and in some cases, laboratory analysis. The purpose of this level of investigation is to eliminate sites that have inherent management problems that could result in increased costs during assessment and approval, construction or operation. The information gained from this investigation can provide the basis for preliminary design and operation planning.

### Information sourced from site investigations by applicant

SITE EVALUATION CRITERIA FOR PONDS	TIER 2 LEVEL OF ASSESSMENT FOR PONDS		
	Level 1	Level 2	Level 3
<b>8. Water Supply Quality</b>			
(a) Water quality risks from nearby land uses	No agricultural or horticultural activity likely to involve pesticide spraying within 1 km	Agricultural or horticultural activity likely to involve pesticide spraying within 1 km	For estuarine, inlet within 1km of sewage treatment plant outlet
(b) Potable water for processing etc	<ul style="list-style-type: none"> <li>• Mains water; or</li> <li>• Onsite existing reliable water of potable quality</li> </ul>	<ul style="list-style-type: none"> <li>• Onsite water of potable quality but may need to be supplemented during drought; or</li> <li>• No existing potable water supply on site</li> </ul>	
<b>9. Water Supply Access from rivers or estuaries</b>			
(a) Estuarine ponds - pump station site	Not require sump pit or any deepening of bed of estuary or waterway	Require sump pit in estuary or waterway or need to cross an ocean beach	
(b) Estuarine - Estuary Circulation	Flushing time < 15 days	Flushing time 15 – 30 days	Flushing time > 30 days
(c) Fresh water ponds - pump station site	Not require sump pit or any deepening of bed of river	Require sump pit in river	
(d) Freshwater – Environmental flows	No access restrictions based on flows in normal conditions	Access permitted only during high flows in normal conditions	
<b>10. Topography</b>			
(a) Estuarine ponds - slope of land	< 2% slope	>2% and < 5 % slope	> 5% slope
(b) Freshwater ponds - slope of land	<5% slope.	>5% and <10% slope.	> 10 % slope
<b>11. Soils</b>			
(a) Soil Characteristics - Suitability for Pond/ Dam Construction	Clayey with mixture of soil/sand and low erosion potential and suitable for dam construction	Sandy/ gravelly with erosion potential and/or limited water holding capacity – may need to import most pond material	
(b) Soil Characteristics - Suitability for Irrigation for freshwater ponds	Soils suitable and/or adequate land to irrigate/use recycled water on site or off-site near-by	Soils potentially unsuitable and/or inadequate land to irrigate or use recycled water	
(c) Soil Contamination based on SEPP 55 criteria	Suitable for residential use or for animal occupation	Exceed levels safe for animal or residential uses and the contaminated area is less than 3 ha	More than 3 ha of land exceed levels safe for animal or residential uses
<b>12. Hydrology issues</b>			
(a) Potential to affect groundwater	No underlying potable or high quality fresh groundwater within 3m	Underlying groundwater within 3m is not of high quality or potable.	Underlying potable water within 3m
(b) Catchment Stormwater Drainage	<ul style="list-style-type: none"> <li>• No catchment related stormwater drainage across site, or</li> <li>• If present , measures to manage across site flows not likely to affect surrounding area</li> </ul>	<ul style="list-style-type: none"> <li>• Important catchment stormwater drainage across site; or</li> <li>• Change in drainage of stormwater likely to affect surrounding properties</li> </ul>	
(c) For Fresh Water Ponds: Flood liability	Site not flood liable (above the PMF level)	Below PMF but above 1:100 year floods	Below 1:100 year floods but can construct ponds so unlikely to be inundated by 1:100 year flood
(d) For Estuarine Ponds: Flood liability	Site above 1:100 year flood	Below 1:100 year floods	

SITE EVALUATION CRITERIA FOR PONDS	TIER 2 LEVEL OF ASSESSMENT FOR PONDS		
	Level 1	Level 2	Level 3
(e) For flood liable ponds: Potential effect on passage of flood waters	Some flood management required but no potential effect to passage of flood waters	Flood flows likely to be impeded or change local flooding pattern	Flood management likely to alter the course of the river
(f) Drinking Water supply protection <sup>⊖</sup> :	Not located in a drinking water catchment	Located within a drinking water catchment	
<b>13. Ecology</b>			
(a) Type of existing vegetation on the actual development site	Cultivated land, improved pasture, or predominantly cleared – may include some regrowth or exotics	Predominantly native vegetation – trees, shrubs, grasslands	
(b) Likely disturbance of native vegetation communities	No need for a permit to clear or disturb native vegetation or habitat (under Native Vegetation Conservation Act) and no disturbance of vegetation of high conservation significance – eg riparian vegetation, or species / associations of regional or local significance	Disturbance of vegetation requires a permit (under Native Vegetation Conservation Act or Rivers and Foreshore Improvement Act)	
(c) Likely occurrence of threatened species, populations or ecological communities or their habitats	No threatened species, populations or ecological communities known or likely to occur – 8 Part Test not required	Threatened species, populations or ecological communities or their habitats known or likely to occur – 8 Part Test required	
(d) Likely impact on aquatic habitats and mangroves	No likely disturbance or impact	Disturbance or impact on aquatic habitat or mangroves – permit needed to disturb mangroves or dredge	
<b>14. Aboriginal heritage</b>			
(a) Location of Aboriginal Sites	No recorded Aboriginal site/place and NPWS advises that no archaeological assessment is required because of the characteristics of the land or the proposed works	Recorded Aboriginal site/place and/or the NPWS advises that an archaeological assessment is required	
(b) Consultation with Aboriginal community ( <i>Call NPWS for appropriate contacts</i> )	NPWS advises that no consultation with Aboriginal Communities required	Place of potential significance to the Aboriginal community identified. Agreement reached between Aboriginal community and proponent on the management of any places of significance	Place of potential regional or national significance and no agreement with Aboriginal community on the management of the site
(c) Likely impact on Aboriginal heritage	No impact on Aboriginal sites or places of significance to Aboriginal community	Site/place present and likely to impact on sites/places	Sites/places of regional or national significance present and likely to significantly impact on sites/places.
<b>15. Adjacent land use to pond culture</b>			
(a) Potential for conflict with neighbours	Neighbouring lands utilised for compatible purposes eg agriculture/industrial	Neighbouring land zoned for residential purposes or notified that it is to be rezoned residential	
(b) Potential visual impact	Site not overlooked by neighbours or from prominent sites (eg. highway)	Site overlooked by residential neighbours or from prominent sites (eg from highway)	
(c) Proximity to residences (not part of the site)	No residences within 400 m of the ponds or pumps if line of sight	Residences within 400m of the ponds or pumps if line of sight	

<sup>⊖</sup> Note: a drinking water catchment means the restricted areas prescribed by the controlling water authority

### Tier 3 - Operational Evaluation Criteria for Ponds

The next sieve in the evaluation process is to consider the operational criteria – species, design, layout and operating regime and the likely risk to the environment from various options. Avoidance of environmental impacts on the community or the environment should be paramount. Where avoidance is not possible, impact minimisation must be considered. The lower the level of environmental risk, the lower the costs of mitigation and the simpler the assessment and approval process

#### Information sourced from investigations by applicant

OPERATIONAL CRITERIA FOR POND CULTURE	TIER 3 LEVEL OF ASSESSMENT FOR PONDS		
	Level 1	Level 2	Level 3
<b>16. Location of Ponds –</b> Distance from the top of the high bank of a natural waterbody or wetland and the edge of the pond water surface.	> 50 metres		< 50 metres
<b>17. Health Management</b>			
(a) Period of total farm dryout after every production cycle for prawns	>6 weeks between crops	3-6 weeks between crops	<3 weeks between crops
(b) Arrangements for the timely identification and treatment of disease	<ul style="list-style-type: none"> <li>On site trained staff with appropriate facilities, or</li> <li>Demonstrated arrangement with accredited laboratory or veterinary practice</li> </ul>	No on-site provision for analysis of stock health problems and no backup arrangements with an accredited laboratory or veterinary practice	
(c) Predators management of fingerling ponds	All ponds screened or equivalent systems		No screening for fingerling ponds
(d) Predators management of grow out fish ponds	Combination of systems which may include screening, scare and other management systems not intending harm to predators	Only "scare" systems. May trigger need for 8 Part Test if affect threatened bird species	No control for predators
<b>18. Feeding Management</b>			
(a) Feed storage to prevent odour emissions or vermin problems	Facilities to store feed (eg enclosed shed)	Feed stored outdoors or so as not to minimise odour or other problems	
(b) Pond design includes feeding adjustment system	<ul style="list-style-type: none"> <li>System to monitor feeding and adjust feed quantities accordingly; or</li> <li>System can adjust feed via feeding guide schedule</li> </ul>	No system to monitor feeding and adjust feed quantities	
(c) Feeding system including mechanical feeders, systematic dispersal equipment and feeding program	<ul style="list-style-type: none"> <li>System to broadcast feed homogenously to prevent the creation of "dead" areas"; or</li> <li>System can broadcast feed in defined feeding strips</li> </ul>	No system to broadcast feed homogenously	
<b>19. Water Monitoring</b>			
(a) Capacity Level (1) DO & pH	Provisions for regular daily monitoring; eg with good quality hand-held meter or test kit;	No provisions for regular daily monitoring	
(b) Capacity Level (2) Water analysis eg N, P, Alkalinity, NFR, BOD	On site facilities for basic water quality analysis, or dependent on accredited laboratory for water analysis	No provision for regular water analysis	
<b>20. Pond water management</b>			
(a) Supply pipe or channel capacity	Largest growout pond can be filled in 1 day or less	Largest growout pond can be filled in 1-3 days	Largest pond can be filled in > 3 days
(b) Pond Outlet system	No pumping required to drain pond completely	Requires pumping to drain pond	

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OPERATIONAL CRITERIA FOR POND CULTURE	TIER 3 LEVEL OF ASSESSMENT FOR PONDS		
	Level 1	Level 2	Level 3
(c) Recycling System capacity for estuarine systems which discharge to waterbodies expressed in terms of: (i) Retention period of water prior to reuse or discharge; or (ii) Surface area of water in recycling pond (including drainage channels) relative to total water surface area of growing ponds	<ul style="list-style-type: none"> <li>Retention period of &gt;6 days; or</li> <li>Surface area of recycling pond &gt; 20% of total water surface area of the growing ponds</li> </ul>	<ul style="list-style-type: none"> <li>Retention period of 1-6 days; or</li> <li>Surface area of recycling pond 10-20% of total water surface area of the growing ponds</li> </ul>	<ul style="list-style-type: none"> <li>Retention period of &lt;1 days; or</li> <li>Surface area of recycling pond &lt;10% of total water surface area of the growing ponds</li> </ul>
(d) Discharge limits (averaged over the growing season when measured above the background) based on 4% daily water exchange rate	Nil discharge	< 12kg/ha/day TSS < 0.48 kg/ha/day Total N < 0.06 kg/ha/day Total P	> 12kg/ha/day TSS > 0.48 kg/ha/day Total N > 0.06 kg/ha/day Total P
(e) Storage capacity of recycling pond system (excluding growing ponds) for freshwater ponds	> 2 times the volume of largest growing pond	1-2 times the volume of largest growing pond	< the volume of the largest growing pond
<b>21. Organic Waste Mgt</b> (eg dead fish, processing waste and other putrescible waste)			
(a) Temporary storage of organic waste prior to disposal	<ul style="list-style-type: none"> <li>Daily disposal; or</li> <li>Held prior to disposal so no odour generated (eg in freezer in sealed container)</li> </ul>	Held in covered containers prior to intermittent disposal	No specific arrangements
(b) Disposal of organic waste on-site or off-site	<ul style="list-style-type: none"> <li>Disposed at an approved off-site recycling or landfill facility; or</li> <li>Buried (with lime) in an area which is &gt; 100m from a waterways and where the groundwater is &gt; 3m. and the soil has low permeability</li> </ul>	<ul style="list-style-type: none"> <li>Buried (with lime) in an area which is &lt; 100m from a waterways or where the groundwater is &lt; 3m or the soil is not low permeability; or</li> <li>Composted (with lime)</li> </ul>	No specific arrangements
<b>22. Planning and building issues</b>			
(a) Buildings or structures Set back from nearest road boundary	>5 metres	< 5 metres	
(b) Building height excluding any parapet	< 7.2 metres	> 7.2 metres	
(c) Driveways with regard to access, widths and turning circle	Comply with RTA standards	Modification required to the public road to meet RTA Standards	
(d) Truck loading and unloading space on site	No queuing or waiting on public roads	Queuing or waiting required on public roads	
(e) Compliance with Building Code of Australia	Meet the deemed to satisfy provisions	Modifications required	
(f) If unsewered site, on-site human sewerage system	Complies with the approval requirements of the Local Govt Act	Modifications required to comply with the approval requirements of the Local Govt Act	

# Project Profile Analysis for Tanks

## Tier 1 - Site Evaluation for Tanks

As a first step in the site evaluation process, a “desk top” study should be undertaken of potential sites using readily available information in maps and other data sources held by Councils, DLWC and government agencies. This desk top study will provide a quick and efficient approach to weeding out unsuitable sites and for focusing in on those sites which would justify a more intensive site evaluation. Tier 1 Evaluation Criteria are used to as a first “sieve” to identify areas that are likely to be suitable for aquaculture.

### Information available from Government Sources

SITE EVALUATION CRITERIA FOR TANKS	TIER 1 LEVEL OF ASSESSMENT FOR TANKS		
	Level 1	Level 2	Level 3
<b>1. Water Supply</b> Based on DLWC information			
(a) Saline - if dependent on Estuarine – Tidal amplitude	>300 mm	100-300 mm	< 100 mm
(b) Fresh - Water availability	<ul style="list-style-type: none"> <li>Existing irrigation license approved for bore or river extraction; or</li> <li>Irrigation license available for purchase.</li> </ul>	<ul style="list-style-type: none"> <li>New licence required for bore or river extraction; or</li> <li>Reliant upon on-farm dam and 10% run-off</li> </ul>	
<b>2. Acid Sulfate Soils</b> If site is < 2 metres AHD; ASS Risk profile based on ASS Risk maps <sup>1</sup>	ASS Landform Process <sup>3</sup> Class A with Landform Element Class b, l, t, p, y or w	ASS Landform Process <sup>3</sup> Classes A,W, B, E, L, S with other Landform Element than b, l, t, p, y or w	
<b>3. Heritage issue</b>			
(a) Heritage sites based on LEP or REP maps and State Heritage Inventory	No listings on the proposed site	Listings on-site	
(b) Aboriginal heritage based on NPWS Aboriginal Sites Register	No recorded sites or places	Sites or places recorded on the land	
<b>4. Conservation issues</b>			
(a) NPWS protected areas, RAMSAR Wetlands, Critical habitat, Aquatic Reserves and Marine Parks (except “General Zone”)	Not located in or adjacent these areas and no potential to disturb these areas	Adjacent to but no potential to drain into or extract water from these areas	Activity will result in direct disturbance of these areas
(b) SEPP 14, SEPP 26, Marine Parks (“General Zone”), World Heritage Areas	Not located in or adjacent these areas and no potential to disturb these areas	Adjacent to but no potential to drain into or extract water from these areas but may involve water pipe access across the areas	Activity located in areas or draining into these area
<b>5. Stock species</b> <i>Note: Species that are inconsistent with translocation policy are not permissible</i>	Indigenous to catchment	Species consistent with translocation policy	
<b>6. Site accessibility</b> Vehicle & electricity accessible based on LEP maps & power suppliers information	Existing access and services or access and services can be readily provided	Access and services limited or difficult – may involves disturbance of a wetland (other than SEPP 14 wetlands dealt with above)	

<sup>1</sup> Sourced from the Acid Sulphate Soil (ASS) Risk Maps

<sup>2</sup> This provision will not apply to the use of land required for gaining access to water

<sup>3</sup> Proposals which disturb more than 1 tonne of acid sulfate soils will be required to prepare an Acid Sulfate Soils Management Plan consistent with the ASS Manual.

## Tier 2 - Site Evaluation for Tanks

The next step in site evaluation is to undertake more detail site assessment including investigations by technical experts and in some cases, laboratory analysis. The purpose of this level of investigation is to eliminate sites that have inherent management problems that could result in increased costs during assessment and approval, construction or operation. The information gained from this investigation can provide the basis for preliminary design and operation planning.

### Information sourced from site investigations by applicant

SITE EVALUATION CRITERIA FOR TANKS	TIER 2 LEVEL OF ASSESSMENT FOR TANKS		
	Level 1	Level 2	Level 3
<b>7. Water Supply Quality</b>			
(a) Water quality risks from nearby land uses			For estuarine, inlet within 1km of sewage treatment plant outlet
(b) Potable water for processing or other purposes	<ul style="list-style-type: none"> <li>Mains water; or</li> <li>Onsite existing reliable water of potable quality</li> </ul>	<ul style="list-style-type: none"> <li>Onsite water of potable quality but may need to be supplemented during drought; or</li> <li>No existing potable water supply on site</li> </ul>	
<b>8. Water Supply Access from rivers or estuaries</b>			
(a) <i>Estuarine</i> - pump station site	Not require sump pit or any deepening of bed of estuary or waterway	Require sump pit in estuary or waterway or need to cross an ocean beach	
(b) <i>Estuarine</i> - Estuary Circulation	Flushing time < 15 days	Flushing time > 15 days	
(c) <i>Freshwater</i> - pump station site	Not require sump pit or any deepening of bed of river	Require sump pit in river	
(d) <i>Freshwater</i> – Environmental flows	No access restrictions based on flows in normal conditions	Access permitted only during high flows in normal conditions	
<b>9. Soils</b> For freshwater tanks culture: Area to irrigate for agriculture, plantation, horticulture or landscaping if: (a) no trade waste agreement for disposal of discharge water or (b) no non-irrigation reuse scheme eg hydroponics	<ul style="list-style-type: none"> <li>Soils suitable; and/or</li> <li>Adequate land to irrigate/use recycled water on site or off-site near-by</li> </ul>	<ul style="list-style-type: none"> <li>Soils potentially unsuitable; and/or</li> <li>Inadequate land to irrigate or use recycled water-dependent on neighbours or other arrangements for use of water</li> </ul>	
<b>10. Hydrology issues</b>			
(a) Catchment Stormwater Drainage	<ul style="list-style-type: none"> <li>No catchment-related stormwater drainage across site; or</li> <li>With provision to manage across-site flows not likely to affect surrounding area</li> </ul>	<ul style="list-style-type: none"> <li>Important catchment stormwater drainage across site; or</li> <li>Change in drainage of stormwater likely to affect surrounding properties</li> </ul>	
(b) Flood liability for non-indigenous species to the catchment ( <i>except high security species, eg. barramundi which must be located &gt; PMF</i> )	Site not flood liable (above the PMF level)	Below the PMF and above 1:100 year flood	Below the 1:100 year flood but can be constructed so that unlikely to be inundated by 1:100 year flood
(c) For Fresh Water Tanks: Drinking Water supply protection <sup>φ</sup>	<ul style="list-style-type: none"> <li>Not located in a drinking water catchment; or</li> <li>With a trade waste agreement for the disposal of discharge water</li> </ul>	Located within a drinking water catchment	

<sup>φ</sup> Note: a drinking water catchment means the restricted areas prescribed by the controlling water authority

SITE EVALUATION CRITERIA FOR TANKS	TIER 2 LEVEL OF ASSESSMENT FOR TANKS		
	Level 1	Level 2	Level 3
<b>11. Ecology</b>			
(a) Type of existing vegetation on the actual development site	Cultivated land, improved pasture, or predominantly cleared – may include some regrowth or exotics	Predominantly native vegetation – trees, shrubs, grasslands	
(b) Likely disturbance of native vegetation communities	No need for a permit to clear or disturb native vegetation or habitat (under Native Vegetation Conservation Act) and no disturbance of vegetation of high conservation significance – eg riparian vegetation, or species / associations of regional or local significance	Disturbance of vegetation requires a permit (under Native Vegetation Conservation Act or Rivers and Foreshore Improvement Act)	
(c) Likely occurrence of threatened species, populations or ecological communities or their habitats	No threatened species, populations or ecological communities or their habitats known or likely to occur – 8 Part Test not required	Threatened species, populations or ecological communities or their habitats known or likely to occur – 8 Part Test required	
(d) Likely impact on aquatic habitats and mangroves	No likely disturbance or impact	Disturbance or impact on aquatic habitat or mangroves – permit needed to disturb mangroves or dredge	
<b>12. Aboriginal heritage</b>			
(a) Location of Aboriginal Sites	No recorded Aboriginal site/place and NPWS advises that no archaeological assessment is required because of the characteristics of the land or the proposed works	Recorded Aboriginal site/place and/or the NPWS advises that an archaeological assessment is required	
(b) Consultation with Aboriginal community ( <i>Call NPWS for appropriate contacts</i> )	NPWS advises that no consultation with Aboriginal Communities required	Place of potential significance to the Aboriginal community identified. Agreement reached between Aboriginal community and proponent on the management of any places of significance	Place of potential regional or national significance and no agreement with Aboriginal community on the management of the site
(c) Likely impact on Aboriginal heritage	No impact on Aboriginal sites or places of significance to Aboriginal community	Site/place present and likely to impact on sites/places	Sites/places of regional or national significance present and likely to significantly impact on sites/places.
<b>13. Adjacent Land use to tank culture</b>			
(a) Potential for Conflict with Neighbours	Neighbouring land zoned for compatible purposes, eg. agricultural or industrial development.	Neighbouring land zoned for residential or rural/residential purposes or potentially to be rezoned for this purpose	
(b) Potential Visual Impact	<ul style="list-style-type: none"> <li>• In an existing building; or</li> <li>• In a new building &lt; 7.2 metres in height; or</li> <li>• On a site in a rural zone that is not overlooked by residential neighbours or from a prominent site (eg from highway)</li> </ul>	<ul style="list-style-type: none"> <li>• In a new building &gt;7.2 metres in height; or</li> <li>• In a new building in rural area and site overlooked by residential neighbours or from prominent sites (eg from highway)</li> </ul>	
(c) Proximity to residences	<ul style="list-style-type: none"> <li>• In industrial zone; or</li> <li>• In rural zone with no residences within 200 m of buildings or pumps unless pumps are electric.</li> </ul>	Residences in rural zone < 200m of the buildings or pumps	

### Tier 3 - Operational Evaluation Criteria for Tanks

The next sieve in the evaluation process is to consider the operational criteria – species, design, layout and operating regime and the likely risk to the environment from various options. Avoidance of environmental impacts on the community or the environment should be paramount. Where avoidance is not possible, impact minimisation must be considered. The lower the level of environmental risks the lower the costs of mitigation and the simpler the assessment and approval process.

#### Information sourced from investigations by applicant

OPERATIONAL CRITERIA FOR TANK CULTURE	TIER 3 LEVEL OF ASSESSMENT FOR TANKS		
	Level 1	Level 2	Level 3
<b>14. Health Management</b>			
(a) Arrangements for the timely identification and treatment of disease	<ul style="list-style-type: none"> <li>On site trained staff with appropriate facilities, or</li> <li>Demonstrated arrangement with accredited laboratory or veterinary</li> </ul>	No on-site provision for analysis of stock health problems and no backup arrangements with an accredited laboratory or veterinary	
(b) Clean in Place (CIP)	Systems are designed to ensure total disinfection and dry-out of all facilities to break pathogen cycle	Difficulty in ensuring total disinfection and dry-out of all facilities	No CIP provision
<b>15. Food and Feeding Management</b>			
(a) Feed storage to prevent odour emissions or vermin problems	Facilities to store feed (eg enclosed shed)	Feed stored outdoors or so as not to minimise odour or other problems	
(b) Feeding system	<ul style="list-style-type: none"> <li>Facilities to monitor food consumption and adjust feed; or</li> <li>Provision of a system to adjust feed quantities via feeding schedule</li> </ul>	No system to monitor feeding and adjust feed quantities	
<b>16. Water Monitoring</b>			
(a) Capacity Level (1) DO, temperature & pH	Provisions for regular daily monitoring	No provisions for regular daily monitoring;	
(b) Capacity Level (2) Water analysis eg N, P, Alkalinity/acidity, NFR, BOD	<ul style="list-style-type: none"> <li>On site facilities for basic water analysis; or</li> <li>Only dependent on contract with accredited laboratory for water analysis</li> </ul>	No provision for regular water analysis	
<b>17. Tank Water Management</b>			
(a) Water Supply	Access to good quality and quantity of water – town supply, groundwater or irrigation licence (with no restrictions based on flows) or on-site dams	Limited access to good quality and quantity of water due to environmental flow restrictions on irrigation	
(b) Recycling System capacity for estuarine systems which discharge to waterbodies expressed in terms of			
(i) Retention period of water prior to reuse or discharge; or	Retention period of >6 days, or	Retention period of 1-6-days, or	Retention period of <1 days; or
(ii) Surface Area of water in recycling pond (including drainage channels) relative to total water surface area of growing ponds	Surface area of recycling pond > 20% of total water surface area of the growing ponds	Surface area of recycling pond 10-20% of total water surface area of the growing ponds	Surface area of recycling pond <10% of total water surface area of the growing ponds
(c) Water quality management and recycle system	Recycle system with biofiltration and/or chemical treatment, or better		Flow through system with no provision for the recycling of water
(d) Storage capacity of recycling ponds	> 2 times the volume of largest growing tank	1-2 times the volume of largest growing tank	< the volume of the largest growing tank

## Project Profile Analysis

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August 2000

OPERATIONAL CRITERIA FOR TANK CULTURE	TIER 3 LEVEL OF ASSESSMENT FOR TANKS		
	Level 1	Level 2	Level 3
<b>18. Organic Waste Management</b> (eg dead fish, processing waste and other waste)			
(a) Temporary storage of organic waste prior to disposal (eg dead fish, processing waste and other putrescible waste)	<ul style="list-style-type: none"> <li>Daily disposal or</li> <li>Held prior to disposal so no odour generated (eg in freezer in sealed container)</li> </ul>	Held in covered containers prior to intermittent disposal	No specific arrangements
(b) Disposal of organic waste	<ul style="list-style-type: none"> <li>Disposed at an approved off-site recycling or landfill facility; or</li> <li>Buried (with lime) in an area which is &gt; 100m from a waterways and where the groundwater is &gt; 3m. and the soil has low permeability</li> </ul>	<ul style="list-style-type: none"> <li>Buried (with lime) in an area which is &lt; 100m from a waterways or where the groundwater is &lt; 3m or the soil is not low permeability; or</li> <li>composted (with lime)</li> </ul>	No specific arrangements
<b>19. Planning and building issues</b>			
(a) Buildings or structures Set back from nearest road boundary	>5 metres	< 5 metres	
(b) Building height excluding any parapet	< 7.2 metres	> 7.2 metres	
(c) Landscaping with trees and shrubs on each street frontage or surrounding buildings (except in industrial sites where space is a limiting factor)	< 3 metres in width	> 3 metres in width	
(d) Driveways with regard to access, widths and turning circle	Comply with RTA standards	Modification required to the public road to meet RTA Standards	
(e) Truck loading and unloading space on site	Queuing or waiting not required on public roads	Queuing or waiting required on public roads	
(f) Compliance with Building Code of Australia	Meet the deemed to satisfy provisions	Modifications required	
(g) If unsewered site, on-site human sewerage system	Complies with the approval requirements of the Local Govt Act	Modifications required to comply with the approval requirements of the Local Govt Act	