Appendix 1: Specific activities occurring within each marine farming zone

The specific details on activities to occur within each marine farming zone for the following components of each aspect of the action are listed below (with those not covered in detail here indicated):

- **Expansion of Marine Farming Lease Areas**
  - Changes to lease areas and locations
  - Changes to management controls (covered in Appendices 2, 3 and 4)
- **Salmon Farming Operations Consistent with the MFDP**
  - Construction and Infrastructure Development
    - Mooring and Grid System
    - Size and Configuration of Sea Pens
    - Other Infrastructure/Construction (not covered here)
  - Operation of fish farms
    - Servicing and Maintenance of Sea Pens and Associated Infrastructure
      - Boat Movements
      - Infrastructure Maintenance
    - Feeding and Managing Health, Waste, Processing and Predators of fish in the Farms
      - Fish size/stocking density
      - Fish Health (not covered here)
      - Predator Control
      - Waste Management
      - Environmental Management
    - Transportation of fish to and from the farms across water and land

Expansion of Marine Farming Lease Area

The approval of the draft amendment will pave the way for the following to occur:

- change in location of existing marine farming zones and lease areas
- increase in leasable area within zones
- addition of a new zone
- changes to management controls/operations which apply to zones

Changes to Lease Areas and Locations (Zone Specific)

Zone 1

It is proposed to amend Zone 1 (currently located at Channel Bay) by moving the zone approximately 17 km to the south east and expand the zone. The amended zone would be located approximately 2.4 km to the north east of Hogan Cove. The zone area would be increased from 10.08 ha to approximately 167.4 ha. The maximum leasable area would be increased from 6 ha to 100 ha.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 213 to within the boundaries of an amended Zone 1 and expand the lease from 6 ha to 100 ha.

Zone 2

It is proposed to amend Zone 2 by combining parts 2A and 2B (currently at Backagain Point) and moving the zone approximately 13 km to the south east and expand the zone. The amended zone would be located approximately 930 m to the north east of Pelias Cove. The zone area will be increased from 31.97 ha to approximately 51.46 ha. The maximum leasable area within Zone 2 will remain unchanged at 30 ha.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 216 to within the boundaries of an amended Zone 2.

Zone 3

It is proposed to amend Zone 3 by moving part 3A approximately 860 m to the north east and modify its boundaries and move part 3B to the south eastern side of Liberty Point approximately 210 m from the coastline and modify its boundaries. Zone 3 would be increased in size from 134.88 ha to approximately 169.6 ha. Part 3A would be increased from 132.90 ha to approximately 167.6 ha. Part 3B would be increased from 1.98 ha to approximately 2.00 ha. Part 3A will have a maximum leasable area of 104 ha and part 3B will have a maximum leasable area of 2 ha. Note Zone 3 part 3B will not allow for the culture of fish and may only be used for the mooring of vessels associated with marine farming activities.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 215 to within the boundaries of an amended Zone 3 and expand the lease from 100 ha to 106 ha.

Zone 4

It is proposed to amend Zone 4 by moving part 4B approximately 2 km to the north east and modify the boundaries. It is also proposed to modify the boundaries of part 4A. Zone 4 would be increased from 219.99 ha to approximately 336.2 ha. Part 4B would be approximately 187 ha and part 4A would be approximately 149.20 ha. The maximum leasable area within Zone 4 would be increased from 180 ha to 210 ha. Part 4B will have a maximum leasable area of 120 ha and part 4A will have a maximum leasable area of 90 ha. Figure 4.3 shows the location of the proposed zone. Part 4B would be amended to allow for the culture of finfish subject to the provisions of a marine farming licence.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 217 to within the boundaries of amended Zone 4 part 4A and reduce the area of the lease from 180 ha to 90 ha.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 133 currently located at Bryans Bay to within the boundaries of the amended Zone 4 part 4B and expand the lease from 8 ha to 120 ha.

Zones 7 and 8

There are no changes proposed to the existing Zones 7 and 8.

Zone 9

It is proposed to amend Zone 9 (currently located at Bryans Bay) by moving the zone approximately 1.6 km to the north east and expanding the zone. Zone 9 would be increased from 10.50 ha to approximately 190.4 ha. The maximum leasable area within Zone 9 would be increased from 8 ha to 120 ha.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention that Tassal Operations Pty Ltd be allocated a marine farming lease within the boundaries of Zone 9.

Zone 10

It is proposed to amend Zone 10 (currently located at Pelias Cove) by moving the zone approximately 2.2 km to the north east and expanding the zone. Zone 10 would be increased from 100.00 ha to

approximately 169.7 ha. The maximum leasable area within Zone 10 would be increased from 80 ha to 100 ha. Figure 2.1 shows the location of the proposed zone.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention to vary marine farming Lease No. 220 to within the boundaries of the amended Zone 10 and expand the lease from 80 ha to 100 ha.

Zone 11

A new zone, Zone 11, is proposed approximately 700 m to the south east of the modified Zone 10. Zone 11 would be approximately 169.7 ha. The maximum leasable area within Zone 11 would be 100 ha.

Zone 11 would provide for the culture of finfish subject to the provisions of a marine farming licence.

Subject to the provisions of the *Marine Farming Planning Act 1995* it is the planning intention that Huon Aquaculture Company Pty Ltd be allocated a marine farming lease within the boundaries of Zone 11.

Salmon Farming Operations Consistent with the MFDP

Construction and Infrastructure Development

In order to operate, the expansion of fish farms in Macquarie Harbour requires the construction and placement of new and existing infrastructure.

New mooring and grid structures are required to moor existing and additional sea pens to. The size of these pens varies across leases, as does their configuration and locations. Additional on water structures are also required for servicing expanded farms (e.g. barges).

Mooring and Grid system

Each operator will use their own mooring system to attached sea pens/cages to. The mooring systems to be used across zones is described in the text and figures below.

Zone 1

The grid mooring system will accommodate 2 x32 cage bays making available a total of 64 cage bays. Figure A1.1 shows the proposed mooring system.

Zones 2, 10 and 11

Figure A1.2, Figure A1.3 and Figure A1.4 show the proposed mooring system for Zones 2, 10 and 11.

Zone 3

The individual mooring system currently in place at Lease No. 215 will eventually be replaced by 3 new mooring grids, each grid consisting of 30 cage bays, making available a total of 90 cage bays. Figure A1.5 shows the proposed mooring system.

Zone 4

When fully developed, the grid mooring system will accommodate 3 x 30 cage bays, making available a total of 90 cage bays in parts 4A and 4B. Figure A1.6 and Figure A1.7 show the proposed mooring grid.

Zone 9

The proposed grid system to be constructed in Zone 9 would be a similar design to the existing 24-bay grids already successfully deployed in Macquarie Harbour in Lease Nos 214 and 219. Figure A1.8 shows the proposed mooring system for Zone 9.

The deployment of new grid systems for Zones 1, 3 and 4 will commence after the variations to Lease Nos 215 and 217. Work will commence first on Lease 215 and is expected to take 12 weeks. Work will then commence on Lease No. 217 in part 4A which is also expected to take 12 weeks. Then work will commence on Lease No. 133 in part 4B with an expected completion date of 16 weeks later. Grids systems for Lease No. 213 in Zone 1 will begin on the completion of the above. The

deployment of the new grid systems will require the use of Petuna's workboat the *Sapphire Star* and barge *Tasma*, which have the necessary equipment. All cages will be constructed on-site at the recently expanded Smiths Cove land base under the supervision of the cage manufacturer and the operator's Infrastructure, Operations Manager.

The deployment of new grid systems for zones 2, 10 and 11 is anticipated to take 4-6 weeks per grid with a number of weeks on land also required for preparation and integration of the ropes, chains, shackles, etc. Presently cages are constructed at low tide on the banks of the King River estuary. The pens are then towed off the fine sediment banks by boat, usually at high tide. Sea pens can be deployed within a day; however, from the start of construction at the King River site through to full deployment with nets, etc., may take up to one week.

Zone 9 lease is of sufficient size to facilitate relocation of the grid within the lease every 5-6 years, onto fresh bottom sediments to facilitate fallowing an recovery. This would co-incide with the routine replacement of the mooring grid. The duration of deployment of the grid/mooring system will be 45-60 days.

Size and configuration of Sea Pens (Zone specific)

The location and configuration of pens associated with the amendment of the MFDP for each operator is described below. There is no change to Zones 7 and 8 as a result of this proposal.

Zones 1, 3 and 4

The cages deployed in lease areas are to be the same design as those currently deployed by Petuna, utilising 80, 120 and 160 m circumference plastic cages. The nets in which fish are housed have a side wall of 10 m, and the deepest part of the net is approximately 11 m.

Underwater predator nets are not utilised, instead Petuna is investing in world's best technology where the cage netting is heavily weighted with a sinker ring at the base to hold/maintain the net in a cylindrical shape to provide better protection against seals and maximise utilisable area in which the fish can reside. Additionally all cages containing livestock have nets placed over the top of the cage with a mesh size of 100 mm to protect from both seals and birds, where deemed appropriate.

The site will be arranged in such a fashion that each grid bay will be fallowed both during the course of a normal stocking program annually and be rested in addition every two years, thus allowing for a seamless continual rotational fallowing program, which will not be dependent on relocations of the grid system on a periodic basis.

Zones 2, 10 and 11

Huon will employ 100 m and 160 m circumference pens in the harbour. 100 m pens will be used for the fish in their first year in the harbour (smolt year class) and the 160 m pens will be used for the fish in the second year in the harbour (harvest year class). Maximum net depth will be 10 m although most nets will hang no deeper than 8m.

The range of net sizes are basically the same as used by Huon in the south east, with all sizes of mesh from 12 mm through to 40 mm being employed for the appropriate size of fish in the pens. Ply size reflecting the strength of the net is also a very important feature of Huon's nets and for the 40 mm nets in particular a very heavy ply with heavy weights for tension is used to serve as a predator defence mechanism below the waterline.

Together with net ply size/weights, Huon is incorporating a range of modifications to its seal defence systems in the harbour as the seals' presence in recent years suggests they may have the capacity to become more of an issue than presently experienced. These defences include jump fences on all pens, presently the poles required to support these are being installed on all pens and these poles also serve to support bird nets. Further, the incidence of seals is to be monitored on an ongoing basis, and all pens (those with fine ply stock nets) will be provided with predator nets should the need arise.

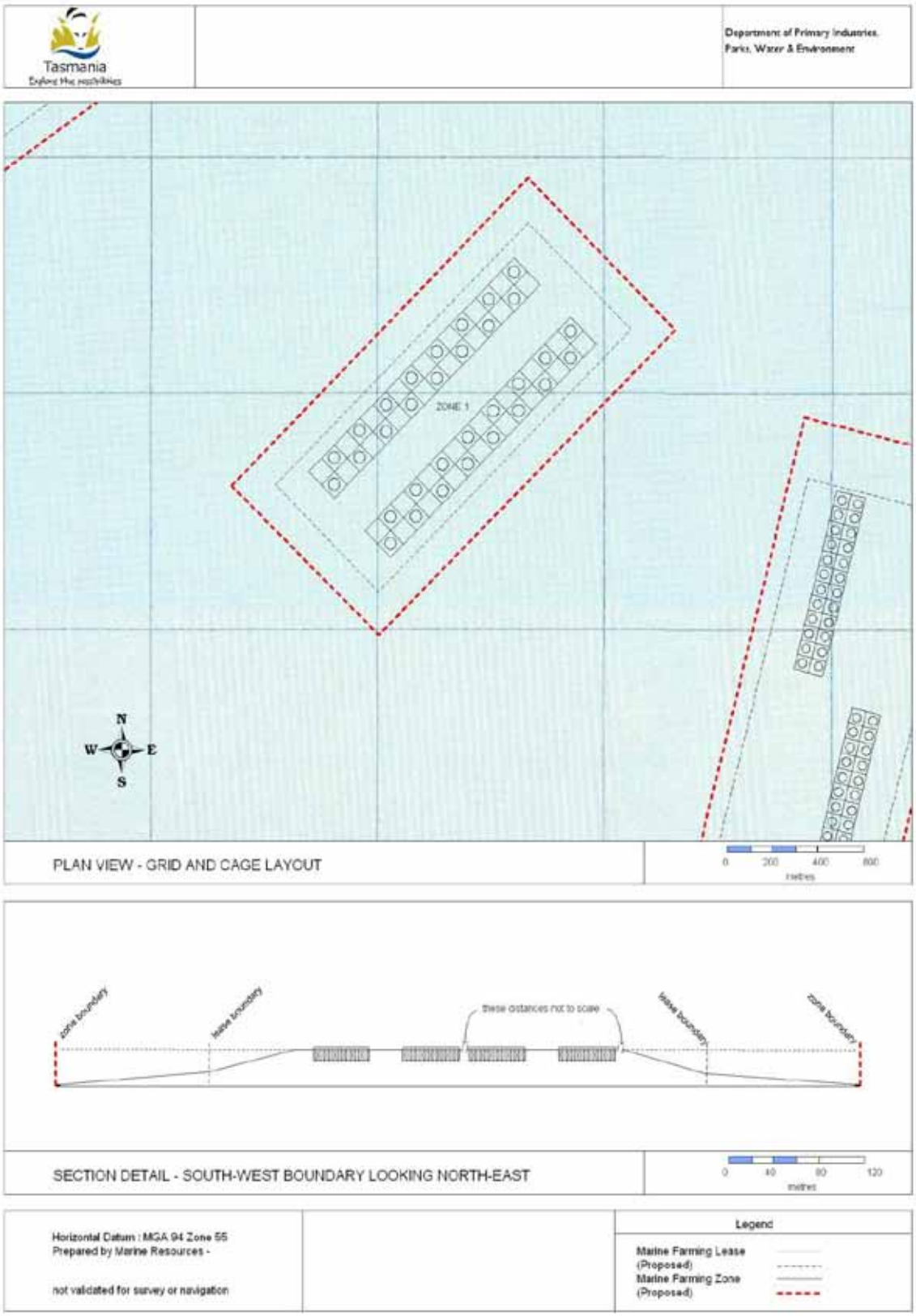

Figure A1.1 : Proposed mooring system for Zone 1

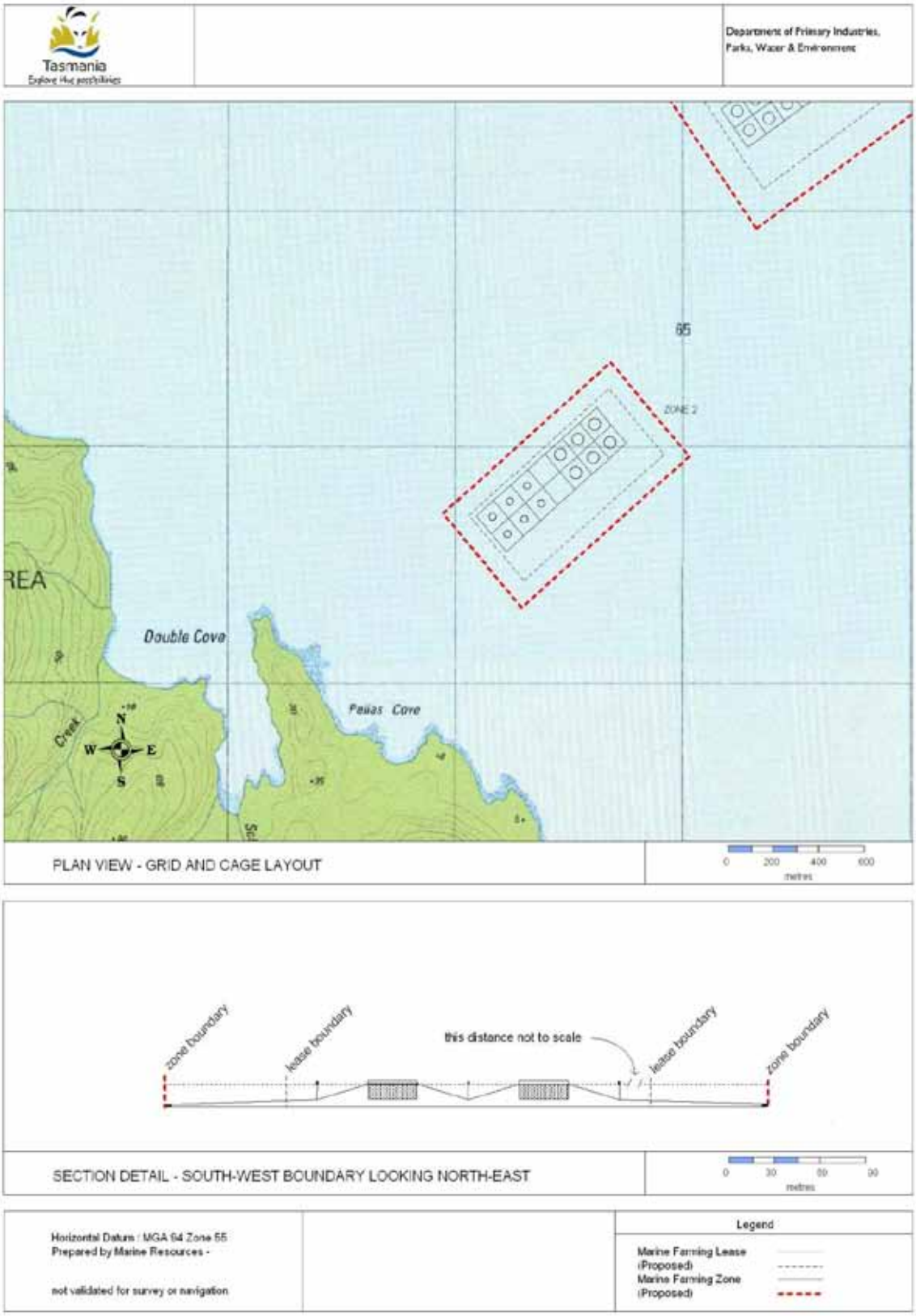

Figure A1.2: Proposed mooring system for Zone 2

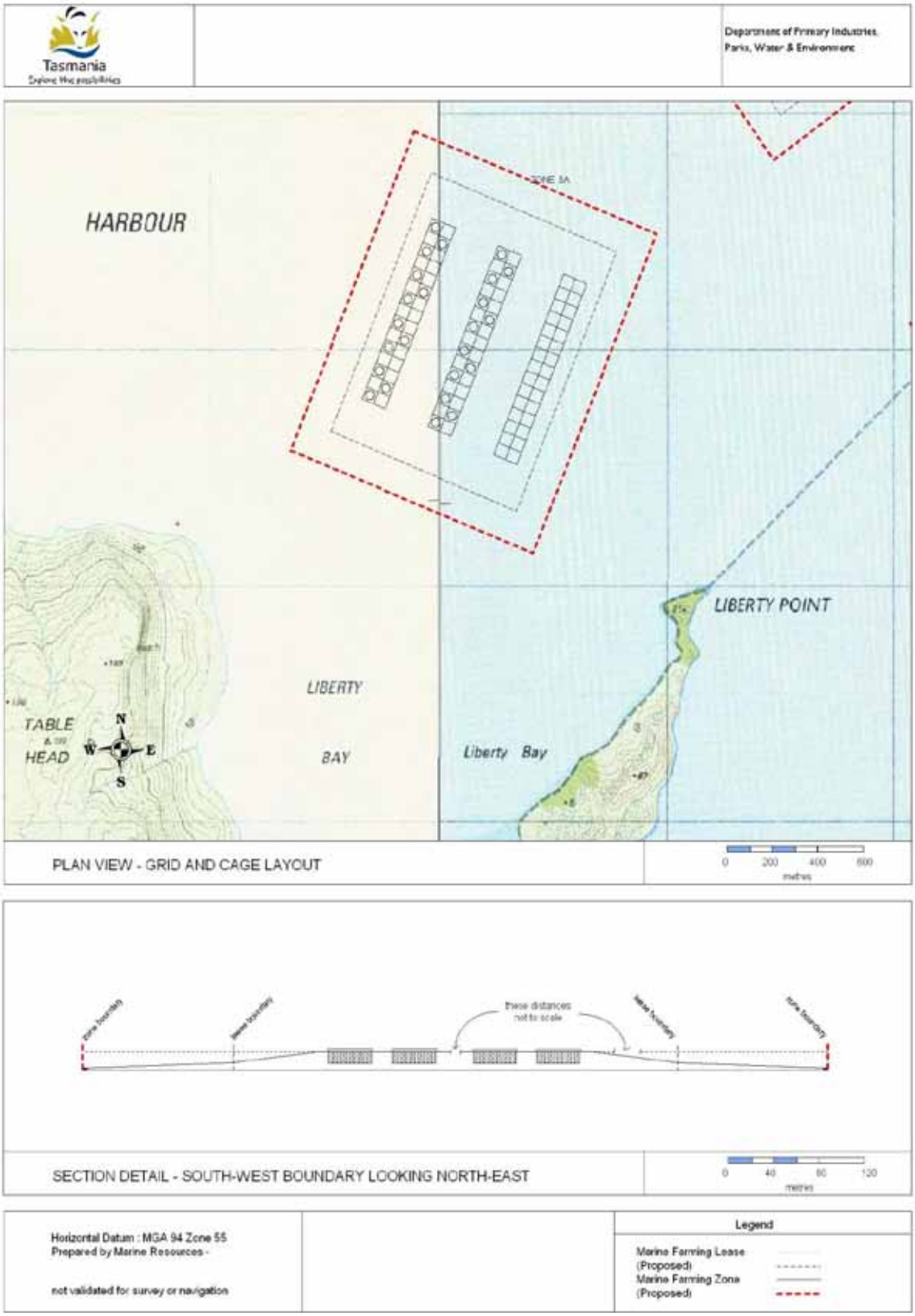

Figure A1.3: Proposed mooring system for Zone 3

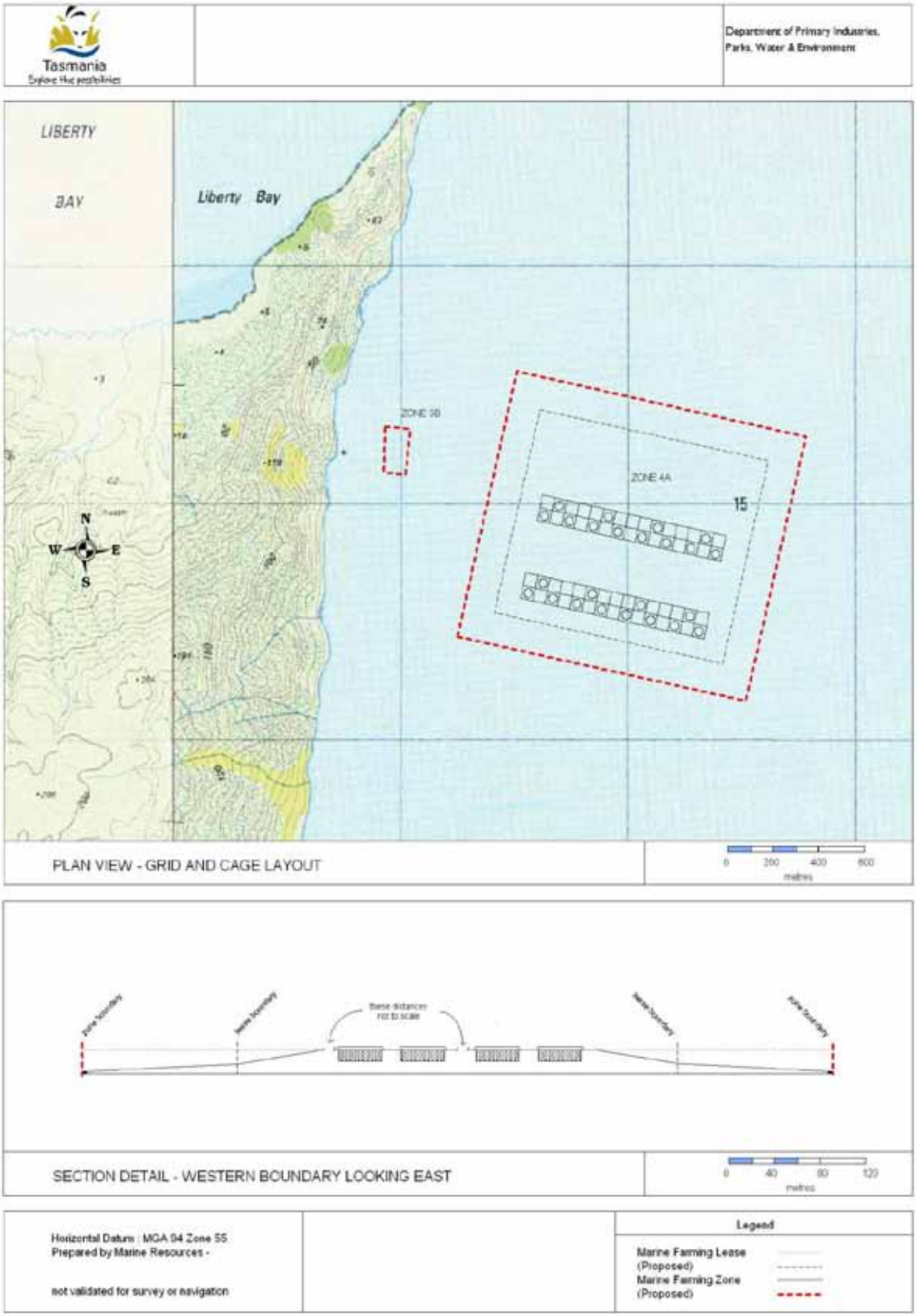

Figure A1.4: Proposed mooring system for Zone 4A

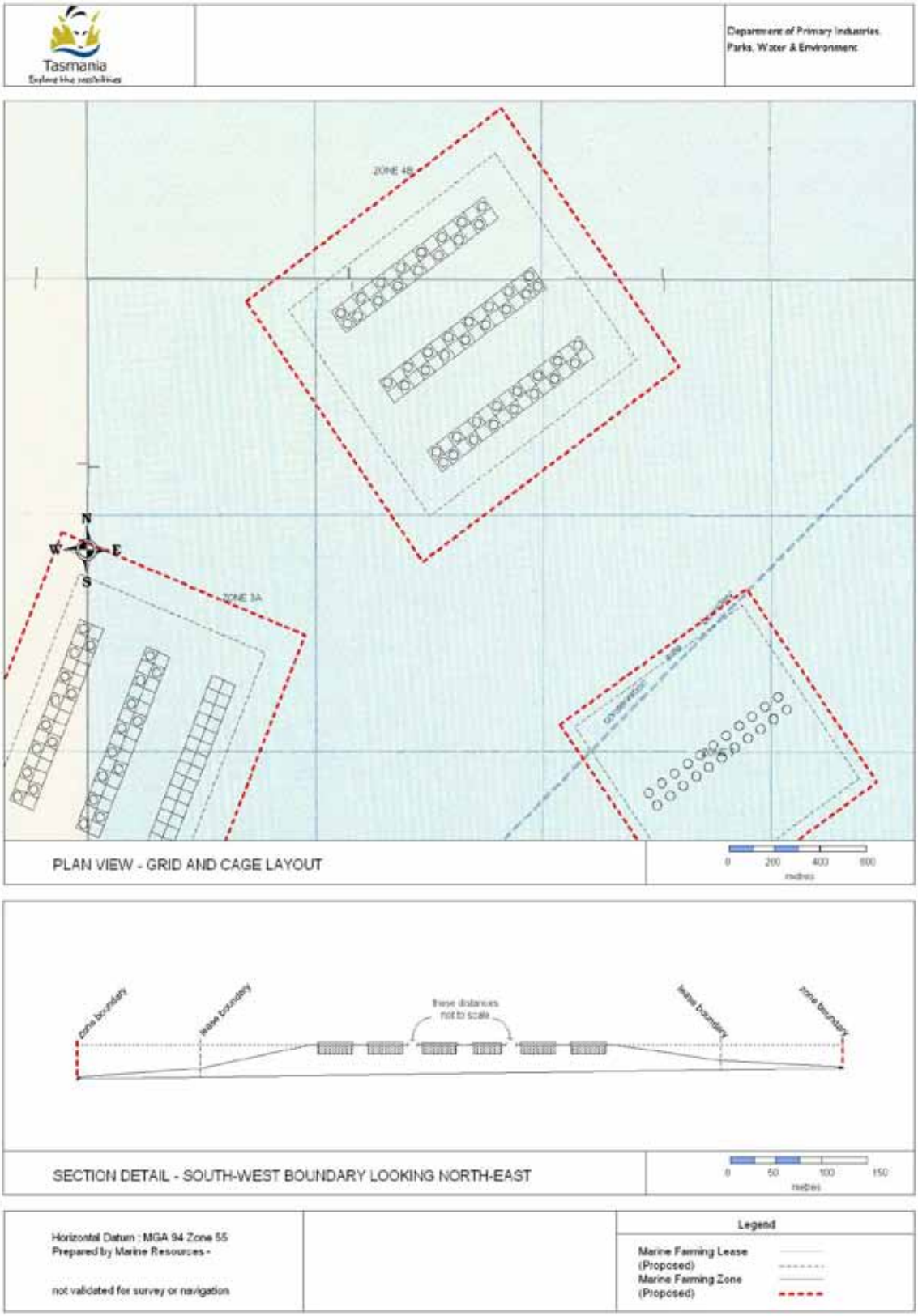

Figure A1.5: Proposed mooring system for Zone 4B

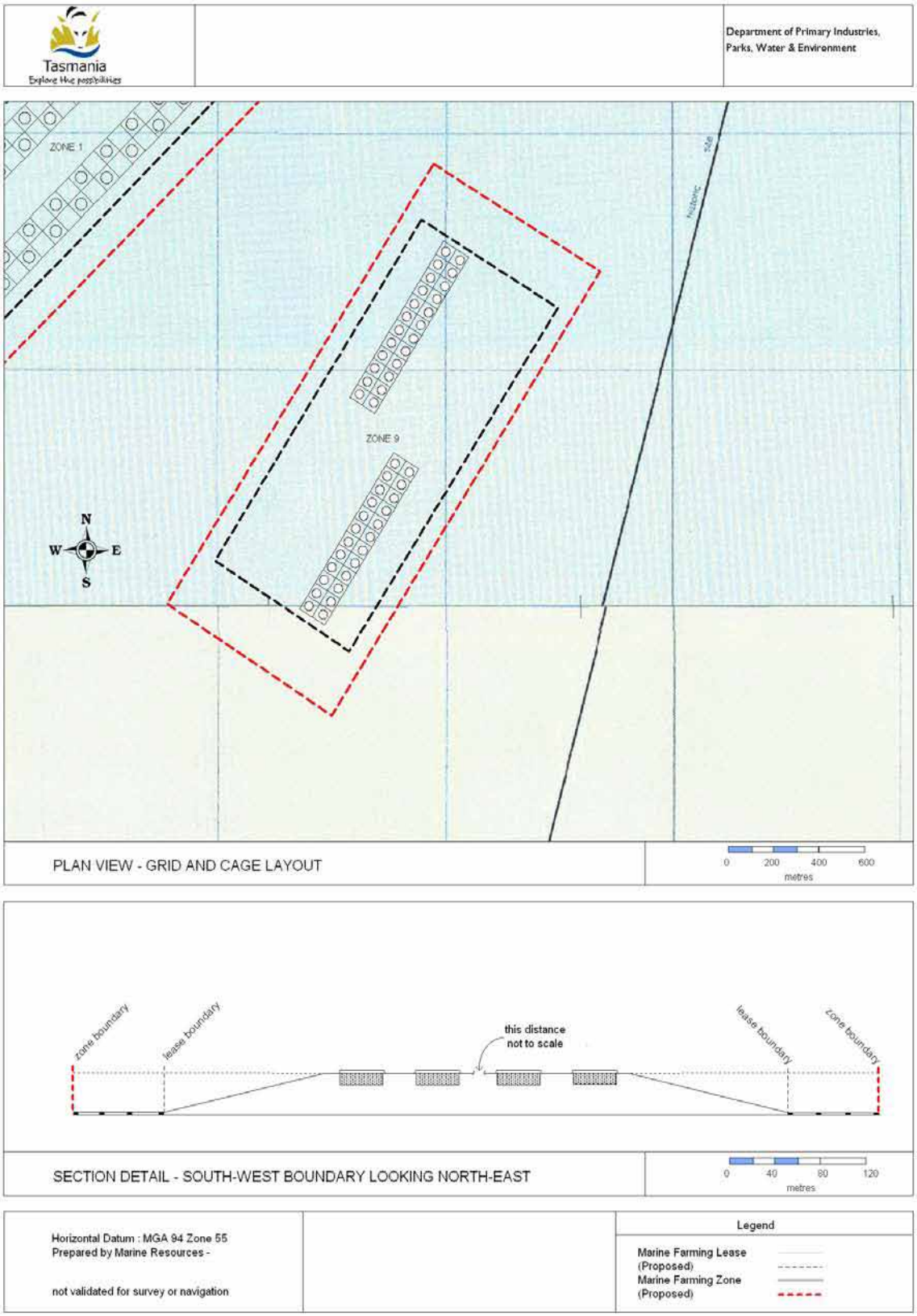

Figure A1.6: Proposed mooring system for Zone 9

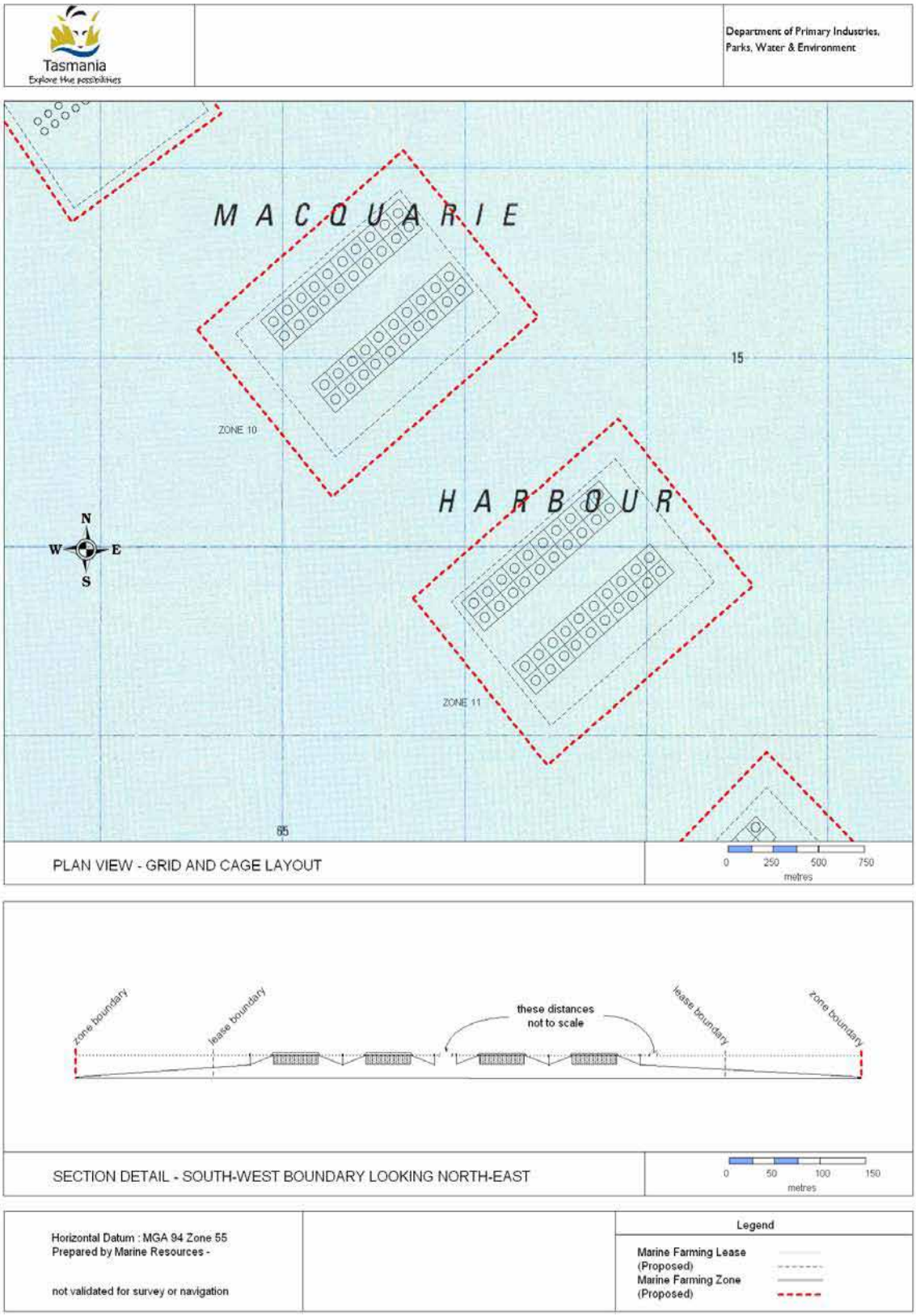

Figure A1.7: Proposed mooring system for Zones 10 and 11

As inferred above anti-predation measures are also focussed on preventing cormorants and seagulls (which eat pellets) entering pens. The bird nets employed in the harbour will be based on the very latest designs employed and tested in the south east with choice reflecting their ability to prevent the ingress of birds without tearing the nets and the prevention of tangling of birds in nets. Huon is having the greatest success with 200 mm mesh and will seek to deploy this size of mesh on a trial basis through a permit from DPIPWE.

There will be a requirement for an extension to the zone on at least 2-3 boundaries during deployment of the grid as trip lines to the anchors are required for positioning of the moorings and these will possibly stretch outside the zone area as the moorings are being deployed, stretched and tightened. This practice is common in the south east and requires a Notice to Mariners generally to cover the 4-6 weeks of deployment of the moorings. The additional area required extending generally to 200 m outside the zone area on the relevant sides of the lease.

For pen construction and /or repairs the area occupied would be that of the pen itself, that is, for 160 m pens the area occupied will be approximately 2,050 m2, and for 100 m pens this will be 800 m2. The width of channel required for towing such pens would be 51 m, which is not an issue at the King River site, although the depth at this site does mean that shallow draft boats only can be employed for towing purposes.

Zone 9

Cages to be used by Tassal within the zone would be 120 m circumference plastic cages. The nets have a side wall of 15 m, and the deepest part of the net is approximately 17 m.

Underwater predator nets are not utilised. Instead the cage netting is heavily weighted to provide stiffness which protects against seal predation. The top of the cage is covered by a bird net with a mesh size of less than 115 mm.

Copper antifoulant will not be used on cage nets that are deployed at this Lease.

The lease is of sufficient size to facilitate relocation of the grid within the lease every 5-6 years, onto fresh bottom sediments to facilitate fallowing an recovery. This would co-incide with the routine replacement of the mooring grid. The duration of deployment of the grid/mooring system will be 45-60 days.

Initial smolt input will be into 24 existing cages (which will be relocated from existing Tassal Lease Nos 214 and 219) after they are emptied by harvesting fish from the existing Lease Nos 214 and 219. An additional 48 cages will then be built over the following 12 months to provide 24 additional cages to split out smolt numbers on the new proposed lease, as well as 24 cages to replace the relocated cages for the following years smolt input into Lease Nos 214 and 219.

Cages are normally constructed by Plastic Fabrications, or Mitchell Plastic Welding. Assembly of the cages takes place onshore at a site near the mouth of the King River, after construction they are towed to the marine farm.

Operation of Fish Farms

The operation of fish farms in Macquarie Harbour requires a range of activities within the key areas listed below:

- Servicing and maintenance of sea pens and associated water and land based infrastructure;
- Feeding and managing the health, waste, processing and predators of fish in the farms;
- Transportation of fish to and from the farms across water and land.

Servicing and Maintenance of Sea Pens and Associated Infrastructure

Servicing of on water infrastructure involves the movement by boat of maintenance teams multiple times a day to sea pens to undertake a range of maintenance (and stock husbandry) tasks. Boat movements and maintenance tasks are described in detail below.

Boat Movements (by zone)

Zones 1, 3 and 4

Servicing of the realigned and varied leases will follow the same pattern as Petuna's existing servicing program. Work crews access sites on a daily basis in daylight hours from Smiths Cove. On a typical day, sites would be accessed by up to five vessels.

The average number of boat trips between Smiths Cove and the leases would be one to two on weekdays and one on weekends and Public Holidays, with working hours on the sites being 7 am to 7 pm in the summer and 7 am to 6 pm in the winter. Security patrols may visit the sites outside of these hours.

The equipment and infrastructure to service the lease sites would be the same as currently operated by Petuna. At present Petuna feed fish using smaller individual feed vessels which return to a mother barge on Lease No. 217 to refill with feed. A new steel centralised feeding system barge 25 m x 10 m will be constructed for Lease No. 213 in Zone 1. Lease Nos 133, 215 and 217 will be serviced by the smaller feed vessels, however in the future it is Petuna's intention to move to centralised feeding systems on all lease areas therefore dedicated feed barges will be required for each lease area.

Zones 2, 10 and 11

Vessels used by Huon to service current operations include those listed in the following table:

Table A1.1: Vessels and Service Requirements for Zones 2, 10, 11

Boats	Requirements
Wandi 2 **(Landing Barge 31 m x 6 m)-**	**Transport of feed and all large equipment from Land bases to the Marine farms. Used in harvesting operations, moorings replacement and servicing and all other major works around the farm.**
Numani **– Plastic Fabs 6.5 m with Yamaha outboards 115 hp 4 strokes.** *Chucky 2* **– used for manual feeding backup and AQ feed boat for trout. 2 tonnes Feed Capacity.**	**Feed Monitoring Boat, Chucky also used for feed transport.**
Morticia **– Tristar boat 8.5 m 2 x 225 hp Yamahas.**	**Travel Boat, for transfer of staff to and from the marine farm leases.**
Posiedon **10.9 m x 4.4 m – 12 tonnes.**	**Used for feed bin filling, moored at the marine farm lease.**
Chucky 1 **– Crane boat.**	**Weight boat, and general works boat, generally moored at the marine farm lease.**
2 x 17 ft Aluminium Dinghy - 4 stroke 60 hp Yamaha	**Used for travel in and around the marine farm leases. Moored at the leases.**

In addition, Huon uses one permanently moored barge at the Pelias site, *Hammerhead*. The commissioning of the three proposals will require a larger landing barge for transport of tanker trucks to and from the marine farm leases. In addition, as the grids increase in number between the leases there will be a requirement for an extra feeder boat over time (albeit that in the immediate future *Chucky 2* can perform this requirement). Huon will need one more feed boat in 3-5 years and another in 5-7 years. These additional boats may be purchased or leased.

Presently boats travelling from Strahan to the marine farming lease at Pelias Cove number on average two to three return trips per day, with *Morticia* and *Wandi* making daily trips to the lease, and the dive contractors travelling between Middle Bay and the lease four times per week. In

essence this will not change greatly as *Wandi* will be replaced by the new landing barge albeit that the loads carried will obviously increase greatly. The dive boat will probably be needed on a daily basis. In 5-10 years time there may be a need for another travel boat such as the *Morticia*.

Vessel traffic will increase within the central harbour area where it is likely that boats moored at Pelias Cove will make return trips between their moorings/permanently moored barge and any central harbour leases. Further, towing vessels are contracted by Huon within the harbour and these are employed to transfer pens from one lease to the other. However, the towing distances are short (1-2 km) and the pens will only be transferred between leases once per annum and therefore we estimate only a month of towing at full capacity with 2-3 tows per day. There will likely be up to 10 return trips per day between Pelias Cove and central harbour once a grid is located there. During harvests there may be a requirement on some days for the landing barge (presently the *Wandi*) to make two trips per day to and from the wharf at Strahan although this will be rare.

Generally all trips from Strahan (including central harbour) to the lease will be made in daylight hours. This is also the intention for movement between Pelias Cove and any central harbour leases. However, harvest operations are undertaken in the evening through to the early night and therefore the return of the harvest vessel to the wharf at Strahan will be in the early night between 10 pm and 2 am. This practice occurs presently with the barge having its spot lights down when entering Strahan harbour. Into the future this will be even less intrusive if the Aquaculture Hub goes ahead, with unloading operations then taking place there.

Hammerhead is used as the power source for activities such as oxygenation and lighting at Pelias. It also serves as accommodation, a feed store, a general repository for all spare parts, tools, and as a floating jetty for smaller boats and harvest pens. All waste is pumped directly into tanks on the *Wandi* for transport to Strahan wharf and subsequent transfer (pumping) into the Cradle Mountain Water infrastructure.

Oxygenation barges will be used within the grid systems, as operated in the south east. Netox grids will be deployed with the pens and the oxygen supplied from the barge. At present Huon employ a small barge (approximately 3 m x 5 m) next to the pens. There are two silent pack generators (60 kVA and one 240 kVA) on the *Hammerhead* barge, and at least one of these is used continuously (24 hours a day, seven days a week). Huon is investigating additional systems using inverters and wind power to enable the generators to be used more sparingly during the day. These generators are also used to power the lighting within salmon pens for four months of the year during harvesting in order to silver-up the fish.

At present, fish pens are towed to the *Hammerhead* barge, and then harvested (pumped) through the Seafish harvesting systems, and into bins. The fish bins are then transferred to the *Wandi* for transport to the wharf at Strahan. In the future when any Central Harbour sites are developed Huon hopes to harvest straight into tanker trucks on a barge.

For silvering the fish close to harvest time, continuous lighting will be employed. The lights will all be 400 W metal halide, using four or more lights per cage. This operation is currently experimental and the level of lighting in each pen may vary. However, if only trout are grown at this site then lights will not be needed.

Smolt are presently transferred at the wharf in Strahan from the trucks to three 14,000 L water tanks located on the *Wandi* and taken out to the pens at the lease at Pelias Cove. Commencing later this year, the smolt trucks will be driven straight on to a landing barge and taken out to the pen, using a single transfer operation.

Zone 9

Number and types of vessels to be used are detailed in the following table:

Table A1.2: Vessels and Service Requirements for Zone 9

Vessel	Activity	Frequency
Mareeba	Feed Haulage	5 trips/wk

Sea Hauler	**Farm Works**	**5 trips/wk**
Rufus Dawes	**Dive Tender**	**5 trips/wk**
People Mover 1	**Crew Movement**	**7 trips/wk**
People Mover 2	**Crew Movement**	**7 trips/wk**
Harvest Vessel	**Harvesting**	**6 trips/wk average over 6 months (harvesting every 24 months)**
Net Cleaner	**In situ net cleaning**	**3-4 trips/wk**

Vessels will service the proposed zone in daylight hours under normal operational circumstances. It should be noted that the increased frequency of vessel movements does not necessarily correspond to the proposed expansion. As Tassal currently farms out of Lease Nos 214 and 219, there are vessel movements associated with these existing activities. The majority of vessel movements that would occur to the proposed site would also conduct business at the two existing leases on route. The vessel movements as observed from Strahan Village will not appear to have increased as a result of the proposed expansion.

A feed barge would be permanently located on the lease. This would be of either steel or concrete construction with a feed silo storage capacity of 180-200 tonnes. The barge would support a centralised feeding system, linked to all the cages on the farm. The system would be operated from the barge. Facilities would consist of an operator station and a small mess area, with kitchen and toilet facilities. There will be no overnight accommodation on the barge.

Generators and blowers on the feed barge will operate during daylight hours only; a generator may be run after dark, to provide deck lighting only in exceptional circumstances. An airlift pump and compressor will be used to transfer fish during splitting operations for a limited part of the year and only during daylight hours. A compressor for venturation, located on the barge may be run continuously (24 hours a day, seven days a week), usually during summer months -if ambient oxygen conditions are low.

All equipment deployed on the new lease will have a noise profile developed and noise mitigation will be designed to support occupational health and safety (OH&S) and in reference to any potential noise or nuisance conflicts. Special consideration will be given to equipment that will operate during night-time hours.

There are no plans to deploy above water or underwater cage lights at the site. The harvest system will be a pump and bleed system into the harvest boat.

Smolts will be delivered in tanks on board the *Mareeba*, or similar vessel. The smolt will be loaded from trucks into the tanks at our wharf, onshore in Strahan, and then discharged directly into the cages from the vessel.

Tassal has an Environmental Management System (EMS) in place across all of its marine farming locations. The EMS is designed to place operational controls over the significant environmental aspects associated with aquaculture. The implementation and continuous improvement of the EMS limits the potential for negative environmental impacts as a result of Tassal's activities.

Tassal operates support activities for its Macquarie Harbour sites from four land-based locations. Its wharf in Strahan is used for all loading and unloading activities, office and workshop facilities and feed storage, as well as smolt input and harvest offload. Tassal's net paddock is located on the Zeehan Road about 3 km from Strahan, and is used for net maintenance and storage. Tassal also operates a West Coast Council approved disposal site for fish waste on Forestry Tasmania land about 12 km from Strahan. Net repairs are also carried out on Tassal's behalf at a site where Lowanna Road meets the King River. This site is also used for repairs to and construction of Huon cages.

Infrastructure Maintenance

Specific maintenance activities are described by zone below. There will be no change to activities occurring at Zone 7 and Zone 8.

Zones 1, 3 and 4

Cage, net, routine equipment and vessel maintenance are carried out at Petuna's Smiths Cove freehold land base site. Petuna has its own maintenance team employed and based at the Smiths Cove site carrying out routine preventative maintenance programs on company infrastructure. Larger maintenance projects, such as the slipping of our barges, would normally be carried out in Devonport or Bridport where appropriate facilities are available to undertake such larger maintenance works.

Cage nets are inspected by divers twice a week as part of our routine livestock and infrastructure monitoring program, whilst bird nets are inspected as part of our daily inspection process. Moorings are subject to periodic inspection, with additional inspections instigated following storm events.

Zones 2, 10 and 11

Huon employs a service contractor (from Cooee) for all large servicing jobs, generators diesel engines, etc. All engines are serviced in one day, and the contractors take all old oils and filters off-site for disposal. Baileys Marine, Huonville, service all outboards under the same protocols. All boat maintenance is carried out at the slip in the harbour, that is, the Strahan Port Shipways slip.

As described previously Huon has land-based operations spread between four sites. Strahan wharf (waterfront) for all loading and unloading activities, all transfers of staff, fish feed, etc., to the marine lease(s), mooring of boats and landing barges, and offices. There are also three other separate facilities at Strahan: one just on the edge of town at the beginning of the Lyell Highway where all net mending operations are carried out; another out of town off the Henty Road where waste fish are disposed of in limed pits, and the third site is where the Lowanna Road meets the King River shoreline this site is shared with Tassal, and is where all new and old pens are deployed, constructed and/or repaired.

Currently the company has strict controls on anything moving on or off the Macquarie Harbour sites. The basic company protocols are as follows:

> Make sure the item is clean. The process will depend on the item, but preferably hot wash with detergent – preferably pressure wash larger items (dirty items cannot be disinfected effectively).
>
> Immerse in, or spray with Virkon Aquatic (1:200 dilution). Read the Health and Safety information for Virkon Aquatic before use. Leave at least 20 minutes – then wash off with clean water or leave on to dry/dissipate. It is preferable to wash the Virkon Aquatic off metal objects. If water is used to wash the item, the water must not be contaminated (i.e. do not use water from the harbour).
>
> Items such as clothes need to be machine washed in the normal way.
>
> If items such as computers, folders, etc. come in contact with contaminated material they can be brushed clean and wipe over with a cloth soaked in alcohol (e.g. methylated spirits)

Zone 9

Feed systems, generators and compressors will be maintained on site according to a documented maintenance schedule.

Cage nets are inspected by divers at least once a week. Nets will be cleaned in situ and repairs will be carried out at our shore facility on the Zeehan road (Crown Lease). Bird nets are inspected daily.

Moorings are subject to periodic inspection by divers and/or remotely operated vehicle (ROV), and additional inspections may be instigated following storm events.

Tassal has a comprehensive biosecurity procedural manual. Below is an extract directly relating to equipment disinfection which indicates how this will occur:

> ***Large Equipment (e.g. vessels, grade/bath gear, nets, cages, vehicles)***

Position equipment in cleaning and disinfection area to contain runoff and solids. Spray with either a hot water high pressure cleaner or hose to remove any dirt, scales, mucus from the surfaces.

Using a stiff broom or scrubbing brush with soap/detergent in hot (>85°C) water scrub all surfaces thoroughly and systematically to ensure all surfaces and grooves are cleaned appropriately. All solids are to be disposed of to a licensed landfill and no spillage to occur. Mix up disinfectant in a spray bottle and spray down all surfaces and allow to stand for recommended time.

Spray down with freshwater to remove all chemicals and allow to dry. Tag cleaned equipment with date, site and name of cleaner. Place equipment in designated hygiene area.

Small Equipment (e.g. personal protective equipment -PPE, dive gear, dip nets, rope, etc.)

Cold water pressure wash all equipment to remove organic debris.

Immerse all equipment in Virkon for 10 minutes.

Rinse thoroughly in freshwater.

Immerse all equipment Virkon for designated time.

Rinse in freshwater and dry in a well ventilated area.

Life span of onsite equipment:

Moorings 5-6 year replacement. Nets 5-6 year replacement. Cages 8-9 year replacement. Vessel maintenance is carried out at Tassal's wharf in Strahan, on-shore at Tassal's shore base in Strahan or at Tasports slipways in Hobart or Strahan, as appropriate.

Feeding and managing the health, waste, processing and predators of fish in the farms

The management of fish farming activities includes the management of:

- fish size and stocking densities;
- fish feeding;
- fish health;
- predator control;
- waste management;
- environmental management.

Fish Size/Stocking Density (zone specific)

Zones 1, 3 and 4

The species to be cultivated in Lease No. 213 at Zone 1 would be rainbow trout (*Oncorhynchus mykiss*). The site would be stocked with intake fish at around 100-250 g, and fish would be grown through to harvest at around 4 to 5 kg. This site would be managed in conjunction with the Lease No. 217, part A which would also be used to culture rainbow trout to allow for year class separation.

Atlantic salmon (*Salmo salar*) would be cultured in Lease No. 133, Zone 4 part B, Lease No. 215 Zone 3 part A and lease 217 Zone 4 part A to allow for year class separation of Atlantic salmon. Atlantic salmon would be stocked with intake fish at around 100 g and grown through to harvest at around 5 kg.

The maximum stocking density of fish would be 17 kg/m^3 of cage volume.

Zones 2, 10 and 11

It is Huon's intention to licence all leases in the harbour for both Atlantic salmon (*Salmo salar*) and rainbow trout (*Oncorhynchus mykiss*). However, initially in order to separate species, Zone 2 would only be stocked with rainbow trout, and Zones 10 and 11 would be stocked with Atlantic salmon. In terms of stocking for Zone 2 this will mean that for a greater part of the year that two year classes will be present, one year class contained in 100 m pens and the other in 160 m pens. For Zones 10 and 11 in any year one lease/zone will be stocked with the harvest year class (all 160 m cages) and the other stocked with the new or smolt year class (all 100 m cages). Trout and salmon will be stocked at >300 g and >80 g respectively and grown through to over 4 kg. Stocking of pens for either species will rarely exceed 12 T/ha.

The maximum stocking density of fish would be 17 kg/m^3 of cage volume.

Zone 9

The species to be cultivated on the lease would be Atlantic salmon (*Salmo salar*). The site would be stocked with smolt at around 150 g, and fish would be grown through to harvest at around 5 kg.

The maximum stocking density of fish would be 17 kg/m^3 of cage volume.

Fish Feeding (zone specific)

Zones 1, 3 and 4

Fish cultured by Petuna will be fed commercial extruded salmon and trout feeds. Projected monthly feed amounts would vary according to water temperature, fish size, fish health, and harvest profile. Feeding is currently undertaken by feed boats utilising a water cannon, with the operator controlling the feeding by camera feedback and feed counter systems. It is Petuna's intention to move to centralised feed system contained on a specially constructed feed barges.

Sediment monitoring is carried out during the Annual Video Surveys as required by marine farming licence conditions, as well as our routine internal environmental monitoring program, as part of our sustainable management program for leases. These programs are managed by our company Sustainability & Fish Health Officer in conjunction with our external environmental consultant DHI (Malaysia).

Zones 2, 10 and 11

Huon use dry extruded sinking pellets from Ridley Aquafeeds (Narangba, Queensland) and Skretting (Cambridge, Tasmania). Feeds are formulated for Atlantic salmon and rainbow trout.

Volumes of feed will vary depending on market expansion, the percentages of the total feed fed in a calendar year is shown in following table.

Table A1.3: Volumes of feed for salmon and trout over calendar year

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Salmon	13%	11%	10%	8%	6%	5%	5%	5%	6%	8%	10%	12%
Trout	9%	8%	9%	13%	10%	8%	8%	8%	9%	7%	6%	5%

At present Huon's feed volume for the next twelve months in the harbour is estimated to be 2029 T for salmon and 1317 T for trout. Predicted biological feed conversion ratio is 1.3.

All fish are fed using AQ300 pellet sensors driving solar powered centre-mounted feed hoppers. This system responds to the appetite ingestion rate of the fish to feed to satiation without waste

Sediment monitoring methods follow those employed to assess seafloor condition as outlined in the Monitoring Protocols of the Fish farm licences. Through its Environmental consultants, AMD, Huon will use video monitoring to assess sediment condition.

Zone 9

The fish will be fed commercial extruded salmon feeds. Projected monthly feed amounts would vary according to smolt type, smolt size, transfer date, photoperiod regime, water temperature, fish

health, and harvest profile. Projected biological food conversion ratio (FCR) for the grow out cycle would be 1.35.

Feeding is by centralised feed system, with the operator controlling the feeding by a camera feedback system.

Visual sediment monitoring is carried out during the Annual Video Survey ROV as required under marine farming licence conditions, as well as additional ROV monitoring carried out "in-house" as part of our sustainable management of the lease. The benthic environment has been identified as a significant environmental aspect within the Tassal EMS. As a result numerous operational controls are in place to ensure that excess feed and fish faeces is managed in a manner that allows the benthic environment to assimilate the loadings.

Predator Control

Zones 1, 3 and 4

Australian and New Zealand Fur Seals are a potential predator of salmon and trout in marine farms. The main means of controlling seal predation is through exclusion, by means of heavily weighted sinker ring and tensioned cage nets and above water predator nets.

Birds are also a potential problem. The means of control is to prevent access to the fish or to feed pellets, by means of properly designed and supported bird nets.

Zones 2, 10 and 11

Single seals are occasionally found in the harbour and more recently have taken fish where the nets have not been properly tensioned or weighted. Currently Huon is updating the weighting systems of all nets and putting seal fences above the water line to deter attacks by these very occasional visitors during winter. Therefore presently the list of predators is restricted to cormorants, with seagulls providing nuisance value as fish pellet feeders.

No antifouling paints or stiffeners are employed in the harbour. Presently the bird net mesh used in the harbour complies with the licence requirements. In the near future Huon may seek, through agreement with Wildlife Management Branch of DPIPWE, to trial 200 mm mesh bird netting supported by plastic frames, if they prove to be as success in trials in other regions.

Zone 9

Australian and New Zealand Fur Seals are predators of salmon in marine farms. The main means of controlling seal predation is through exclusion, by means of heavily weighted, tensioned and stiffened cage nets. Net barriers may also be required above the handrails to prevent seals from jumping into the cages.

Tassal is committed to passive seal deterrents and continues to investigate and trial new exclusion and deterrent technologies. Under the DPIPWE's seal management protocols, Tassal and other salmon farmers can apply to the Department to relocate problem seals.

Effective management of the seal interactions is a matter of crucial importance for Tassal, as seal interaction with the company's farms has the potential to impact on employee safety, Tassal's environmental management practices, seal and fish welfare. To this end, Tassal has created a Seal Management Officer position. This new step has proven very effective and Tassal is aiming to reduce its number of seal entries into cages and number of relocations significantly. This has been achieved through improved practices on farms, improved exclusion techniques and an improved understanding of the seal population and behaviour.

Marine mammals have been identified as a significant environmental aspect within the Tassal EMS. As a result numerous operational controls are in place to ensure that seal exclusion measures and wildlife management protocols are followed to limit potential impacts on these species.

Properly designed and supported bird nets are also used to restrict access to birds and limit their interaction with the marine farm.

Waste Management

Zones 1, 3 and 4

Solid Waste

Solid waste and bloodwater from the harvest process is contained in the harvest bins during the harvest and delivered to the processing facility at Devonport, then is handled under Petuna's trade waste agreement.

Mortalities from the farm are collected and buried at an approved mort lease site located on forestry land.

Nets are cleaned by hanging from poles located at our Smiths Cove site, no anti-fouling paint or net washing is required.

Uneaten feed is minimised through the use of underwater-video camera feedback systems and additional tools such as electronic pellet sensors. Any pellets that do fall through the cages are detected in routine video surveys, and the information is used to continuously improve feed management.

Fish faeces fall through the bottom of the fish cages and are deposited on the seabed below the cages. Video survey enables Petuna to demonstrate that there is very little spread beyond the immediate vicinity of the cage. The cage positions are routinely fallowed to allow the biological processes in the sediment to process the organic matter, and for the sediments to recover.

Liquid Waste

Black water from the toilet on the barge located at Lease No. 217 in Zone 4 part A is currently treated within an approved sewage treatment system, with effluent discharge occurring after prescribed water quality parameters stipulated in marine farming licence conditions have been met. Effluent samples are periodically submitted for independent laboratory testing, in accordance with license conditions. Grey water is discharged within the confines of the Lease No. 217.

Wastes from all future amenities will be processed in accordance with marine farming licence conditions.

Zones 2, 10 and 11

Solid Waste

Mortalities are collected in tubs and taken back to the Strahan wharf on *Wandi* for transfer to the burial site off the Henty road. The amounts of mortalities are variable and subject to prevalent conditions within the harbour.

All harvest bloodwater is collected on board the harvest vessel in large tanks on *Wandi* (9,000 L capacity). From here the tanks are transported to the Strahan wharf where the liquid is then released in to the municipal sewerage scheme through a Trade Waste Agreement with Cradle Mountain Water Authority. The volume of this waste will not exceed the 9,000 L into the foreseeable future, as dry bleed systems have now become the norm for Huon.

Generally all nets are simply hung to dry at the net processing site. No power washing is used to clean the nets. The dry bio-solids fall off the nets and are swept up and collected in bags and disposed of to landfill. The build up of solids at this site has not been sufficient to cause any real issue, and the site is a long distance from any natural water course.

All fish are fed using AQ300 pellet sensors which respond to the appetite and ingestion rate of the fish to feed to satiation without waste, therefore uneaten feed pellets are kept to an absolute minimum. As at high organic sites in the south east the build up of fish faeces under the pens will be managed through the use of fallowing practices as described previously.

Liquid Waste

Black and grey water from barges is presently collected on board *Hammerhead* and pumped to tanks (9,000 L total capacity) on the *Wandi* for transfer to Strahan Wharf, where the waste is then pumped into the municipal sewerage system.

In general there is little in situ cleaning in the harbour as the water quality in the harbour restricts the growth of fouling organisms, and therefore also, the nets are not anti-fouled. With the incidence of fouling being reduced the liquid waste in the harbour from this source is not presently regarded as significant (only 25 in situ cleans last year). However, liquid waste production from in situ cleaning is subject to a Caring for our Country grant supported study being undertaken by Tassal and Huon with support from DPIPWE, and any results from that study that might be relevant to the use of in situ cleaners in the harbour will be adopted by Huon.

There is no waste water at the net operations site, the nets are simply hung and dried, nor is there any pressure blasting, so there is no liquid waste.

Zone 9

Solid Waste

Bloodwater from the harvest process is contained in the harvest vessel during the harvest and delivered to Cradle Mountain Water infrastructure under a Trade Waste Consent. Solid waste from the harvest process is not generated through Tassal operations. Whole fish are sent to a third party processor (under contract to Tassal) in Devonport. Mortalities from the farm are collected and transported to Tassal's West Coast Council approved land-based disposal facility.

Solid waste produced at the land-based, net washing paddock site is collected and disposed of through Zeehan landfill via the Strahan transfer station.

Uneaten feed is minimised through the use of video camera feedback systems and additional tools such as pellet catching panels. Any pellets that do fall through the cages are detected in routine video surveys, and the information is used to continuously improve our feed management.

Fish faeces fall through the bottom of the fish cages and are deposited on the seabed below the cages. Video survey enables demonstration that there is very little spread beyond the immediate vicinity of the cage. The cage positions are routinely fallowed to allow the biological processes in the sediment to process the organic matter, and for the sediments to recover.

Liquid Waste

The toilet facilities will discharge to a storage tank which will be emptied regularly by the service vessel for shore disposal. Grey water will be discharged into the marine environment according to marine farming licence conditions. Tassal will use only biodegradable soap and detergents.

Transportation of fish to and from the farms across water and land

The change in traffic movements one way into Strahan from Hobart and the North West coast by operator are outlined in Tables 1.### a - c below.

Table A1.4a: Current and Projected Traffic Movements to Strahan from Hobart and the North West for Tassal

	Current From		Proposed Production	
	Northwest	**Hobart**	**Northwest**	**Hobart**
Smolt		119		153
Feed	345		431*	
Harvest	492		466	
Other	442	416	702	624

*note that the feed trucks are reduced as much of the feed is transported in harvest truck backloads due to the use of the new tanker trucks

Table A1.4b: Current and Projected Traffic Movements to Strahan from Hobart and the North West for Huon Aquaculture

Current From			Proposed Production	
	Northwest	**Hobart**	**Northwest**	**Hobart**
Smolt	159	45	576	165
Feed	492		444*	
Harvest	370		1341	
Other	349	815	473	1102

*note that the feed trucks are reduced as much of the feed is transported in harvest truck backloads due to the use of the new tanker trucks

Table A1.4c: Current and Projected Traffic Movements to Strahan from Hobart and the North West for Petuna

Current From (at 2012)			Proposed Production	
	Northwest	**Hobart**	**Northwest**	**Hobart**
Smolt	178	10	190	362
Feed	488	209	1435	615
Harvest	516	0	1519	0
Other	212	141	624	415

Appendix 2: Draft Amendment No1 to the Macquarie Harbour Marine Farming Development Plan 2005 and Environmental Impact Statement

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/ALIR-4YS3VE#DraftMarineFarmingDe