Proposed Sea-Based Aquaculture Development Zone in Saldanha Bay

Environmental Management Programme

Report Prepared for

Department of Agriculture, Forestry and Fisheries

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Report Prepared by

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Environmental Management Programme

Department of Agriculture, Forestry and Fisheries

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Profile and Expertise of EAPs

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by the Department of Agriculture, Forestry and Fisheries (DAFF) as the independent consultants to undertake the Environmental Impact Assessment (EIA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting comprises over 1 300 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Cape Town environmental department has a distinguished track record of managing large environmental and engineering projects and has been practising in the Western Cape since 1979. SRK has rigorous quality assurance standards and is ISO 9001 accredited.

As required by NEMA, the qualifications and experience of the key individual practitioners responsible for this project are detailed below.

Project Director: Christopher Dalgliesh, BBusSc (Hons); MPhil (EnvSci)
Chris Dalgliesh is a Partner and Principal Environmental Consultant with over 24 years' experience, primarily in South Africa, Southern Africa, West Africa and South America (Suriname). Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure (including rail and ports) and industrial sectors. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs) and associated management plans, in accordance with international standards. He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies for lenders, and also has a depth of experience in Strategic Environmental Assessment (SEA), State of Environment Reporting and Resource Economics. He holds a BBusSci (Hons) and MPhil (Env) and is a Certified Environmental Practitioner of South Africa (CEAPSA).

Project Manager: Sue Reuther, BSc Hons (Econ); MPhil (EnviroMan)
Certified with the Interim Board for Environmental Assessment Practitioners South Africa (CEAPSA)
Sue Reuther has been involved in environmental assessment sector in South Africa for the past 13 years. Her expertise includes the management of environmental impact assessments, which she has undertaken for a variety of sectors and projects, in South Africa and overseas. Sue also has extensive experience with strategic environmental projects as well as economic and resource economic, visual and social impact assessments. Sue has two years of previous experience in strategy and financial research and assessment (London). She holds a BSc (Hons) in Economics and MPhil in Environmental Management and is a Certified Environmental Practitioner of South Africa (CEAPSA).

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no prior association with DAFF in regard to the development that is the subject of this Report. SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by DAFF. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

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Acronyms and Abbreviations

ADZ	Aquaculture Development Zone
AMC	ADZ Management Committee
BA	Basic Assessment
BAR	Basic Assessment Report
BEE	Black Economic Empowerment
DAFF	Department of Aquaculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme
GN	Government Notice
ICMA	Integrated Coastal Management Act 24 of 2008
IMTA	Integrated Multi-Trophic Aquaculture
MPA	Marine Protected Area
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act 107 of 1998 as amended
NSRI	National Sea Rescue Institute
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SRK	SRK Consulting (South Africa) (Pty) Ltd
TNPA	Transnet National Ports Authority

Glossary

Activity	An activity or operation carried out as part of the construction or operation of the power plant
Aspect	An action, event, product or service, occurring as a component or result of an activity, which interacts with the existing environment (or which results in impacts to it)
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.
Contractor	Any company appointed by the Proponent to undertake construction or related activities on site, and will include the main Contractor, as well as any Sub-Contractors.
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Contaminated water	Water contaminated by activities on site, e.g. concrete water and run-off from plant / personnel wash areas.
Design Phase	The stage during which detailed layout and development plans are prepared, including the drafting of contract documents for construction.
Environment	The external circumstances, conditions and influences that surround and affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	The authorisation by a competent authority of a listed activity or specified activity in terms of NEMA.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project
Environmental Management Measures	Requirements or specifications for environmental management, as presented in the EMPr, some of which are based on the mitigation measures identified in the EIA Report (in this case the BAR).
Hazardous substance	A substance (including materials and waste) that can have a deleterious (harmful) effect on the environment and those substances declared hazardous substances in terms of the Hazardous Substances Act 15 of 1973.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Method Statement	A mandatory written submission by the aquaculture operator to the AMC setting out the location, species, structures, mooring plan and production volume the operator proposes to establish.
Mitigation Measures	Actions identified in the BAR to manage (avoid, minimise or optimise) potential environmental impacts which may result from the development.
Operation Phase	The stage of the works (including maintenance) following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.

Performance indicator	A measurable indicator of the outcome of environmental management, used to assess the success with which mitigation measures have been implemented. Often captures the results of several different monitoring activities.
Phase	A defined period during the life of the power plant project, e.g. the *construction* and *Operation* phases.
Proponent	The person or organisation implementing the project.
Resources	The personnel, financial, equipment and technical requirements necessary for the successful completion of mitigation measures and for monitoring activities.
Schedule	The schedule or deadline for completion of each mitigation measure, which are recorded to ensure that mitigation measures are implemented in good time and in the correct sequence.
Solid waste	All solid waste including construction debris, chemical waste, broken / redundant equipment, oil filters, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

1 Introduction

1.1 Background

DAFF proposes to establish a sea-based Aquaculture Development Zone (ADZ) in Saldanha Bay, Western Cape. SRK Consulting (South Africa) Ltd (SRK) undertook the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA). NEMA requires that an Environmental Management Programme (EMPr) be submitted with the Basic Assessment Report (BAR) to demonstrate how environmental management and mitigation measures will be implemented.

The EMPr for the Saldanha ADZ addresses aspects applicable to each individual farming operation within the ADZ as well as aspects applicable to the ADZ as a whole, to allow for the management of cumulative effects of all farms. Measures applicable at the farm level must be compatible with and supportive of measures applicable at the ADZ level. Additional aquaculture areas / operations in Saldanha Bay approved through individual processes will be incorporated into the ADZ, and the measures in this EMPr will apply.

The management and mitigation measures identified during the BA process apply to the following phases of the development process:

- ***The Design Phase***: These measures relate to the detailed layout, planning and design of individual aquaculture farms and the ADZ, and will be implemented prior to the commencement of physical expansion activities. The measures are presented in Section 3;
- ***The Construction Phase*****:** These measures are applicable during construction of individual aquaculture farms within the ADZ and are presented in Section 4;
- ***The Operation Phase:*** These measures are applicable during the long-term operation and maintenance of individual aquaculture farms and the ADZ and are presented in Section 5; and
- ***The Decommissioning Phase:*** These mitigation measures are applicable during the decommissioning of individual aquaculture farms within the ADZ (and potentially decommissioning of the ADZ as a whole) and are presented in Section 6.

Management and mitigation measures must typically be implemented by individual farm operators. The ADZ Management Committee has a coordinating and supervising role, as detailed in Section 2.

As new farming operations in the ADZ will be incrementally added to the existing operations, it is expected that **design, construction, operation and decommissioning of individual farms will occur in parallel** throughout much of the lifespan of the ADZ.

The measures listed for the various phases are either:

- **Essential**: best practice measures which must be implemented and are non-negotiable; or
- **Best Practice**: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented. *These measures have been italicized for ease of reference.*

Note: The EMPr will be submitted to DEA for approval along with the BAR. Once an environmental authorisation has been issued by DEA, this document may need to be updated to ensure that all relevant conditions of authorisation are adequately captured.

It is also recommended that the EMPr is reviewed and, where necessary, amended based on experience acquired during the initial years of operating the ADZ, and submitted to DEA for acceptance if required.

1.2 Content of the EMPr

The EIA Regulations, 2014 (Government Notice (GN) 982) prescribe the required content of an EMPr. These requirements, and the sections of this EMPr in which they are addressed, are summarised in Table 1-1.

Table 1-1: Content of the EMPr as prescribed by the EIA Regulations, 2014

GN 982 Ref.:	Item	Section Ref.:
(a) (i)	Details of the person who prepared the EMPr	Page i
(a) (ii)	Expertise of that person to prepare an EMPr	Page i
(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	1.3
(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	1.3
(d)	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	1.4
(d)(i)	Planning and design;	3
(d)(ii)	Pre-construction activities;	3 to 4
(d)(iii)	Construction activities	4
(d)(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	n/a
(d)(v)	Where relevant, operation activities;	
(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	3 to 6
(f)	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to-	3 to 6
(f)(i)	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	3 to 6
f(ii)	Comply with any prescribed environmental management standards or practices;	3 to 6
f(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	n/a
f(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	n/a
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	3 to 7
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	3 to 7
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	3 to 6
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	3 to 6
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f)	3 to 7
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	7
(m)	An environmental awareness plan describing the manner in which-	
(m)(i)	The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	3 to 6

GN 982 Ref.:	Item	Section Ref.:
(m)(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	3 to 6
(n)	Any specific information that may be required by the competent authority.	n/a

1.3 Site and Project Description

1.3.1 Background

The Department of Agriculture, Forestry and Fisheries (DAFF) aims to develop and facilitate aquaculture (the sea-based or land-based rearing of aquatic animals or the cultivation of aquatic plants for food) in South Africa to supply food, create jobs in marginalised coastal communities and contribute to national income.

Saldanha Bay is a highly productive marine environment and has an established aquaculture industry, with potential for growth. Some 468 ha of the Bay are currently leased for aquaculture production. Of these, some 152 ha are actively farmed, mostly in Small Bay, for mussels and oysters (see Table 1-2). Research has determined that the carrying capacity of the Bay can support higher bivalve production.

DAFF proposes to establish a sea-based ADZ in Saldanha Bay, Western Cape to encourage investor and consumer confidence, create incentives for industry development, provide marine aquaculture services, manage the risks associated with aquaculture and provide skills development and employment for coastal communities.

1.3.2 Proposed ADZ Areas

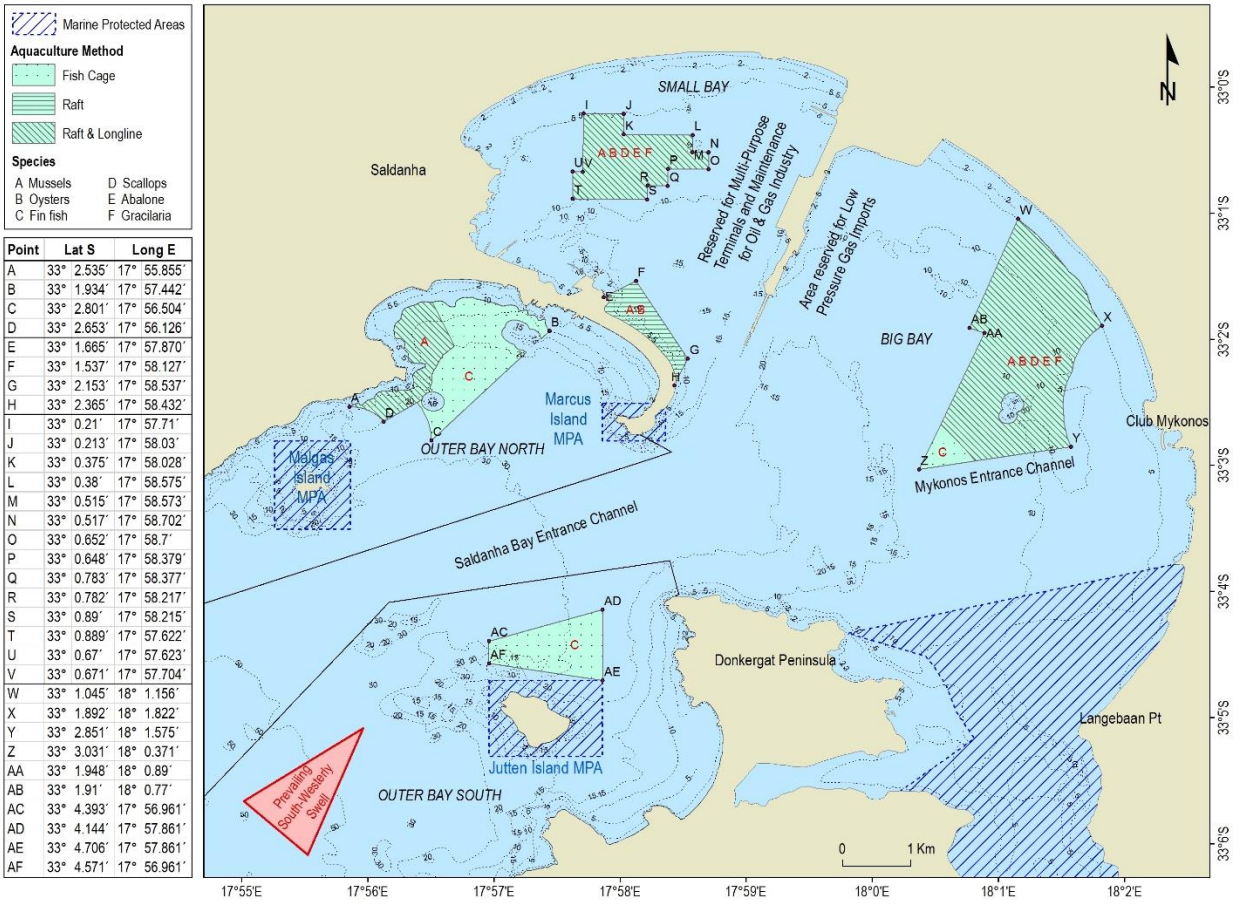
The recommended **post-mitigation ADZ area**[1] BAR comprises four precincts in Saldanha Bay, adding 420 ha of new aquaculture areas in Saldanha Bay for a total ADZ comprising 884 ha (see Table 1-2 and Figure 1-1):

- Small Bay: no additional aquaculture areas are proposed;
- Big Bay North: north of Mykonos entrance channel;
- Outer Bay North: north of Port entrance channel, near Malgas Island; and
- Outer Bay South: south of Port entrance channel, near Jutten Island.

Table 1-2: Post-mitigation ADZ precincts in Saldanha Bay

Area	Currently allocated	Currently farmed	New areas	Total future
Small Bay	163	125	-	163
Big Bay North	254	25	155	409
Outer Bay North	37	1	179	216
Outer Bay South	10	-	86	96
Total	**464**	**151**	**420**	**884**

[1] Note that only the post-mitigation scenario is described in the EMPr, since this is the scenario that is recommended for authorisation. A description of the pre-mitigation scenario is provided in the BAR.



Point	Lat S	Long E
A	33° 2.535′	17° 55.855′
B	33° 1.934′	17° 57.442′
C	33° 2.801′	17° 56.504′
D	33° 2.653′	17° 56.126′
E	33° 1.665′	17° 57.870′
F	33° 1.537′	17° 58.127′
G	33° 2.153′	17° 58.537′
H	33° 2.365′	17° 58.432′
I	33° 0.21′	17° 57.71′
J	33° 0.213′	17° 58.03′
K	33° 0.375′	17° 58.028′
L	33° 0.38′	17° 58.575′
M	33° 0.515′	17° 58.573′
N	33° 0.517′	17° 58.702′
O	33° 0.652′	17° 58.7′
P	33° 0.648′	17° 58.379′
Q	33° 0.783′	17° 58.377′
R	33° 0.782′	17° 58.217′
S	33° 0.89′	17° 58.215′
T	33° 0.889′	17° 57.622′
U	33° 0.67′	17° 57.623′
V	33° 0.671′	17° 57.704′
W	33° 1.045′	18° 1.156′
X	33° 1.892′	18° 1.822′
Y	33° 2.851′	18° 1.575′
Z	33° 3.031′	18° 0.371′
AA	33° 1.948′	18° 0.89′
AB	33° 1.91′	18° 0.77′
AC	33° 4.393′	17° 56.961′
AD	33° 4.144′	17° 57.861′
AE	33° 4.706′	17° 57.861′
AF	33° 4.571′	17° 56.961′

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SALDANHA ADZ
RECOMMENDED POST-MITIGATION ADZ AREAS

Project No. 499020

Figure 1-1: Recommended (post-mitigation) ADZ areas

1.3.3 Proposed Species and Methods

The following species are considered for farming in the ADZ:

- Currently cultivated bivalve species:
  - Pacific oyster (*Crassostrea gigas*)
  - Mediterranean mussel (*Mytilus galloprovincialis)*
  - Black mussel (*Choromytilus meridionalis*)
- New indigenous shellfish species:
  - Abalone (*Haliotis midae*)
  - South African scallop (*Pecten sulcicostatus*)
- New indigenous finfish species:
  - White Stumpnose (*Rhabdosargus globiceps*)
  - Kabeljou (*Argyrosomus inodorus*)
  - Yellowtail (*Seriola lalandi*)
- Alien finfish species:
  - Atlantic salmon (*Salmo salar*)
  - Coho salmon (*Oncorhynchus kisutch*)

- King/Chinook salmon (*Oncorhynchus tshawytscha*)
- Rainbow trout (*Oncorhynchus mykiss*)

- Seaweed:
  - *Gracilaria gracilis*

The following production methods are considered most viable for farming in the ADZ:

- Longlines for bivalve culture, comprising a surface rope with floats and moored at each end to fix the line in position. The production ropes for mussels or oyster racks are then suspended from the surface rope;
- Rafts for bivalve culture, comprising of a floating top structure moored to the seabed from which mussel ropes are suspended;
- Cages for finfish production, constructed of circular flexible high density polyethylene with multi-mooring systems; and
- Barrel culture for abalone, which can be deployed from rafts and longlines.

Table 1-3 summarises the proposed species and production methods per ADZ precinct. These are also shown in Figure 1-1.

Table 1-3: Proposed Saldanha Bay ADZ areas, species and production methods

ADZ Precinct	**Recommended species** *(*individual species as per list provided above)*	**Recommended Production Method**
Small Bay	Currently cultivated bivalve species* Indigenous shellfish species not currently cultivated* Seaweed*	Rafts / longlines
Big Bay - North	Currently cultivated bivalve species* Indigenous shellfish species not currently cultivated* Seaweed*	Longlines / rafts
	Indigenous finfish species* Alien finfish species*	Floating cages (depths of more than 13m)
Outer Bay - North	Mediterranean mussel (*Mytilus galloprovincialis*) Black mussel (*Choromytilus meridionalis*)	Sub-surface longlines
	Indigenous finfish species* Alien finfish species*	Floating cages
Outer Bay - South	Mediterranean mussel (*Mytilus galloprovincialis*) Black mussel (*Choromytilus meridionalis*)	Sub-surface longlines
	Indigenous finfish species* Alien finfish species*	Floating cages

Table 1-4 indicates the extent of identified post-mitigation ADZ areas for bivalves and fish, as shown in Figure 1-1 above. It is assumed that areas identified as suitable for fish are also suitable for bivalve cultivation, though the reverse does not necessarily apply.

Table 1-4: Extent of identified post-mitigation ADZ areas for bivalves and fish (ha)

Area	Total ADZ Area	Bivalves	Fish
Small Bay	163	163	-
Big Bay North	409	387	22
Outer Bay North	216	76	140
Outer Bay South	96	-	96
Total	**884**	**626**	**258**

1.3.4 Production Volumes

1.3.4.1 Bivalve Production

Based on calculations of the ecological carrying capacity of Saldanha Bay (refer to the BAR), the ADZ could support total aquaculture bivalve production of up to 27 597 tpa ungraded / 15 203 tpa graded production.

1.3.4.2 Finfish Production

Based on estimated production of nutrients from fish farming, finfish production should be limited to 5 000 tpa. Assuming an average fish farming density of 40 t/ha, the recommended ADZ area could accommodate up to 10 000 tpa finfish production. However, 5 000 tpa should only be exceeded if deemed acceptable based on stringent environmental monitoring (see later sections in the EMPr).

1.3.5 Sea-based Aquaculture Activities

Sea-based activities associated with aquaculture in the ADZ include:

- Servicing and maintenance of aquaculture structures (such as rafts, lines, cages);
- Harvesting of cultivated species;
- Initial processing of bivalves, including de-clumping and grading, typically on the raft or support vessel; and
- Vessel trips between the shore and aquaculture areas, e.g. to service structures or harvest species.

1.3.6 Associated Sea-based Infrastructure

Besides the rafts, lines, cages and barrels (including moorings and flotation devices) required for aquaculture, the following associated sea-based infrastructure is required:

- Navigational lights demarcating aquaculture areas;
- Mooring facilities for boats.

1.3.7 Associated Land-based Infrastructure and Activities

Land-based infrastructure and activities depend on cultivated species, production methods and processing. Mussels can largely be harvested, de-clumped and graded on the raft or support vessel. Basic land-based support infrastructure includes:

- Landing quays (catering to personnel, equipment and product) that are accessible for vehicles;
- Mooring space in protected harbour areas for support vessels; and
- Product holding facilities (which can be off-site if they do not rely on seawater).

The capacity of existing quays is deemed sufficient to accommodate a moderate expansion of the aquaculture industry.

Detailed information on land-based facilities, as would be required for the authorisation of such facilities in terms of NEMA and the ICMA, could not be provided as part of this study. As such, no land-based facilities that require Environmental Authorisation are included in this assessment. Where authorisations or permits are required, these must be obtained by individual applicants.

A more detailed project description is provided in Section 1 of the BAR (SRK Report 499020/1).

1.4 Potential Impacts

A summary of the potential impacts of the proposed development identified and assessed in the BAR is presented in Table 1-5. Additional details on the nature of these impacts are provided in the BAR.

Table 1-5: Potential impacts of the proposed project

Impact	Description	Post-mitigation impact
Construction Phase		
Biological	Crushing of biota in sediments during placement of mooring infrastructure	Low (-)
Socio-economic	Investment in the economy	Low (+)
	Increased employment, income and skills development	Very low (+)
Cultural-historical	Destruction, damage or alteration of heritage material or sites	Very low (-)
Operation Phase		
Biological	Modification of seabed characteristics by:	
	- Shellfish farming	Low (-)
	- Finfish farming	Medium (-)
	Modification of water column characteristics	Low (-)
	Creation of habitat	Medium (+)
	Alteration of behaviour and entanglement of seabirds and marine fauna	
	- Shellfish farming	Low (-)
	- Finfish farming	Low (-)
	Introduction of alien invasive species or spread of fouling pests	Medium (-)
	Transmission of diseases to wild populations	Very low (-)
	Risk of genetic interaction with wild populations	
	- Shellfish farming	Low (-)
	- Finfish farming	Low (-)
	Contamination by therapeutants and trace contaminants from finfish farming	Low (-)
Socio- economic	Contribution to the economy	Medium (+)
	Increased employment, income and skills development	Medium (+)
	Possible reduction in water sport activities and associated decline in tourism and business activities	Low (-)
	Possible restrictions to military activities	Low (-)
	Pressures on resources and infrastructure due to an influx of people	Very low (-)
Visual	Altered sense of place and visual intrusion from the proposed development	Medium (-)
	Altered sense of place and visual quality caused by light pollution at night	Very low (-)

2 ADZ Management

The ADZ comprises of a number of aquaculture farms that are managed by different operators. The EMPr contains measures applicable both to individual farming operation and the ADZ as a whole. To ensure appropriate ADZ management, two bodies are proposed:

- An ADZ Management Committee (AMC), comprising of DAFF, DEA, DEA&DP and TNPA, to fulfil a coordinating and supervising role and ensure compliance with the EMPr throughout all phases of aquaculture farming in the ADZ (see Section 2.1); and
- A Consultative Forum that includes other relevant government departments, authorities and relevant local organisations, to review environmental monitoring data, advise on management and recommend measures (see Section 2.2).

2.1 ADZ Management Committee (AMC)

2.1.1 Inception

The AMC comprises of DAFF, DEA, DEA&DP and TNPA. Since aquaculture farming is already taking place in Saldanha Bay, DAFF must establish the AMC promptly after the formal establishment of the ADZ.

Upon establishment, a notice shall be published in a local newspaper announcing the inception of the AMC, providing contact details for the AMC Secretariat and inviting interested stakeholders to register on a stakeholder database to receive relevant notifications about the ADZ.

2.1.2 Functions of the AMC

The overarching function of the AMC is to oversee, facilitate, manage and monitor aquaculture operations in the ADZ.

Key functions of the AMC are to:

- Monitor aquaculture operators' compliance with the EMPr and ADZ EA conditions;
- Oversee environmental monitoring related to aquaculture in Saldanha Bay;
- Monitor production volumes in the ADZ;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised ADZ;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations;
- Review and comment on new / expanded aquaculture farm proposals within the approved ADZ; and
- Provide updated information to the public (e.g. farm coordinates, water quality information, notification of new aquaculture operations).

2.1.3 Structure and Roles

It is suggested that the AMC organisational structure should make provision for various functions, including:

- Chairperson: Calls and chairs meetings of the AMC;
- Secretariat: Fulfils secretariat functions, including:
    - Maintenance of member details and arrangement of meetings;
    - Compiling and distribution of meeting notes;
    - Distribution of communication to AMC members and aquaculture farmers in the ADZ;
    - Maintenance of a database of registered (public) stakeholders;
    - Drafting and distribution of regular (at least biannual) AMZ Reports to all Consultative Forum members and registered stakeholders on activities in the ADZ;
    - Administration of and responding to stakeholder comments on aquaculture activities in the ADZ; and
    - Reporting on stakeholder aspects at AMC meetings;
- Environmental Representative: Fulfils environmental control functions, including:
    - Liaising with the suitably qualified service provider(s) appointed to attend to environmental sampling, monitoring and auditing aspects in the ADZ to ensure that monitoring is implemented as per the requirements;
    - Receiving and reviewing monthly Farm Monitoring Reports;
    - Receiving and reviewing environmental sampling, monitoring and audit results;
    - Notifying the Chairperson in the event any aspects require immediate attention of the AMC;
    - Notifying the Secretariat in the event any aspects require immediate attention of other aquaculture farmers in the ADZ; and
    - Reporting on environmental aspects at AMC meetings.

The suggested AMC organisational structure is shown in Figure 2-1.

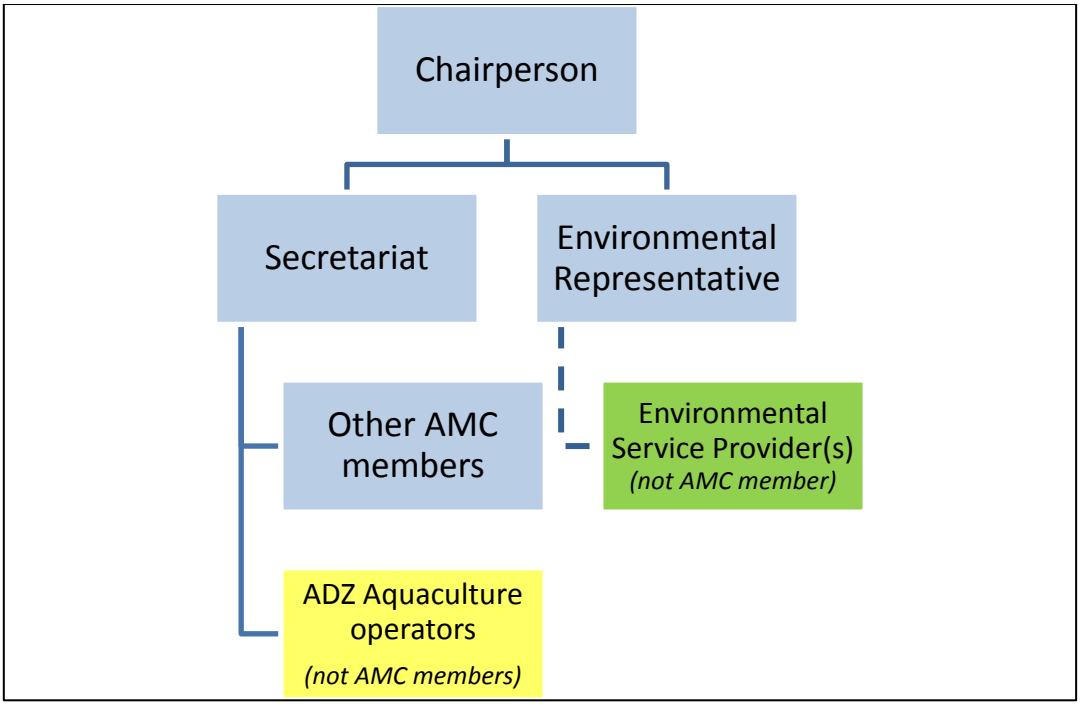

Figure 2-1: Suggested Organisational structure of the AMC

2.2 Consultative Forum

2.2.1 Membership of the Consultative Forum

DAFF should invite representatives of relevant government departments, authorities, local organisations and ADZ operators to become members of the Consultative Forum, including following institutions / organisations:

- Government and authorities:
    1. South African National Parks (SANParks);
    2. Western Department of Agriculture (DoA);
    3. CapeNature;
    4. Saldanha Bay Municipality;
- Aquaculture industry:
    5. Local industry association representing operators in the ADZ;
    6. Farmers operating in the ADZ;
- Other organisations:
    7. South African National Defence Force (SANDF) / South African Navy (SAN); and
    8. Saldanha Bay Water Quality Forum Trust (SBWQFT).

Forum members will join on a voluntary basis and at no costs to DAFF.

2.2.2 Functions of the Consultative Forum

The overarching function of the Consultative Forum is to review environmental monitoring data, advise on ADZ management and recommend measures.

Key functions of the Consultative Forum are to:

- Review environmental monitoring data related to aquaculture in Saldanha Bay;
- Make recommendations based on the outcomes of environmental monitoring; and
- Provide a platform for discussion of environmental management in the ADZ.

3 Measures Applicable to the Design Phase

Design Phase measures will apply to:

- The formulation of aquaculture specifications in the ADZ during ADZ inception;
- New farms that are in the process of establishing; and
- Existing farms that are in the process of expanding.

3.1 Roles and Responsibilities

The key role players during the design phase of the project are:

- AMC; and
- Proponents of new / expanding ADZ aquaculture farms.

Their roles and responsibilities during the detailed design phase with respect to the implementation of the EMPr are outlined below.

AMC:

- Ensure that the individual aquaculture operators are aware of and take into consideration relevant measures in the EMPr and EA;
- Review and comment on new / expanded aquaculture farm proposals within the ADZ;
- Review and approve EMPr for individual farming operations;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA; and
- Provide updated information to the public (e.g. notification of proposed new aquaculture operations).

Aquaculture Operators:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the design of aquaculture operations;
- Submit proposals for aquaculture farm establishment / expansion to the AMC for review and comment prior to installation; and
- Take into account formal AMC review comments and amend proposals accordingly.

DAFF and other authorities will fulfil specific authority oversight functions as per legal requirements.

3.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the design phase, as well as timelines for the implementation of these measures and monitoring thereof, are laid out below:

- Table 3-1 specifies ADZ-level measures that must be implemented by the AMC; and
- Table 3-2 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the design phase are addressed in Section 7.

Table 3-1: ADZ-level management and mitigation measures that must be implemented during the Design Phase by the AMC

ADZ-level Design Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
ADZ layout	1.	Avoid the following areas to mitigate impacts (these are already excluded in Figure 1-1): • *Big Bay North:* 100 m-wide buffer around reefs and blinders and 1 km buffer from residents along the eastern shoreline (to mitigate marine ecology and visual impacts); • *Big Bay South:* entire precinct (to mitigate marine ecology and socio-economic impacts); • *Outer Bay North:* 1 000 m buffer for finfish and 500 m buffer for shellfish around the Malgas Island MPA and 100 m-wide buffer around reefs and blinders (to mitigate marine ecology impacts); and • *Outer Bay South:* 250 m-wide buffer around Jutten Island MPA (aligned with the island) and portion between Jutten Island and Donkergat Peninsula (to mitigate marine ecology, socio-economic and heritage impacts).	Upon establishment of the ADZ	Survey and map farm boundaries
	2.	Compile detailed site-layout plans for ADZ precincts approved as part of the EA, including recommended layout of farms within precincts and longlines / rafts / cages within individual farms.	Within 6 months of establishment of the ADZ	Review layout maps against approved boundaries
ADZ phasing	3.	Implement a phased approach for the expansion of **shellfish** farms in the ADZ, limiting annual ungraded shellfish production to 10 000 tpa for the first two years, increasing thereafter annually by up to 5 000 tpa only if monitoring results indicate that environment health has been maintained and impacts remain manageable, to a maximum of 27 600 tpa ungraded production.	Until full production is phased in, or production limits are reduced due to environmental impacts	Compare actual production to phasing requirements
	4.	Implement a phased approach for the development of **finfish** cage culture in the ADZ to avoid the need for analytical and numerical modelling of aquaculture farms: • Limit annual increases in finfish production to no more than 1 000 t to a maximum of 5 000 tpa only if monitoring results indicate that environment health has been maintained and impacts remain manageable. • Split the recommended annual increase in production between Big Bay and Outer Bay.	Until production of 5 000 tpa is phased in, or production limits are reduced due to environmental impacts	Compare actual production to phasing requirements

ADZ-level Design Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	5.	Finfish production beyond 5 000 tpa, to a maximum of 10 000 tpa, should only be pursued if: • Ecological monitoring indicates that production of 5 000 tpa has no adverse ecological effects, and there is adequate information to permit further expansion in fish production; • Intensified monitoring is applied (a detailed monitoring plan to be implemented) and that expanded production can only occur by following a more precautionary ramp up approach; and • In the ramp up period, and for any production beyond five years, a further period of strict monitoring and environmental quality standards is introduced. Should standards or precautionary limits be approached or exceeded, sampling and monitoring plans must include a response procedure that leads to appropriate downward adjustments of fish production.	Until full production is phased in, or production limits are reduced due to environmental impacts	Compare actual production to phasing requirements
ADZ management specifications	6.	Specify requirements applicable to all existing and future operators with regards of aquaculture farms, which must be in compliance with farm-specific measures listed in the EMPr and include specifications with regards to: - Lighting; - Equipment visible at the surface; - Safety and security; - Waste management; - Biosecurity management; and - Vessel launch, mooring and loading / offloading protocols. Communicate such requirements to all existing and prospective operators.	Within 6 months for existing farms and at least 2 months before the first new farms establish	Relevant guidelines and communication
	7.	Confirm with key stakeholders (notably Port Captain, representatives of water users in the area and the South African National Defence Force / South African Navy) whether certain boundaries of the ADZ located away from night-time traffic require lighting at all.	At least 1 month before the first new farms establish	Relevant guidelines and communication
	8.	Develop maintenance and operational guidelines and standards in relation to potential entanglement risks at farms, including loose ropes, lines, buoys or floats.	At least 1 month before the first new farms establish	Relevant guidelines and communication
	9.	Specify a period within in which existing operators must adhere to specifications applicable to all operators.	Within 6 months of establishment of the ADZ	Relevant guidelines and communication
Expansion of existing / establishment of new farms	10.	Develop a template for individual operators to provide farm establishment / expansion proposals to the AMC for review and comment. Such proposals should contain information on the proposed: - Location; - Layout; - Stocking density, with reference to the maximum production volume authorised;	At least 2 month before the first new farms establish	Relevant guidelines and communication

ADZ-level Design Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
		- Mooring plan, with reference to heritage resources on the seabed; - Measures to ensure equipment is securely in place; - Emergency procedures in the event of loose equipment, loss of stock, entanglement of animals etc; and - Any other aspects deemed relevant.		
	11.	Review farm establishment / expansion proposals of individual operators and provide comment to proponents.	Within 1 month of submission of proposal to the AMC	Clear advice to prospective operators on way forward
	12.	*Give consideration to the development of Integrated Multi-Trophic Aquaculture (IMTA), which combines, in appropriate proportions, the cultivation of organic extractive aquaculture species (e.g. shellfish) and inorganic extractive aquaculture species (e.g. seaweeds) in close proximity to fed aquaculture species (e.g. finfish).*	*Throughout lifetime of the ADZ*	
Emergency response	13.	Draw up species-specific emergency response protocol(s) to respond to a range of potential incidents in the ADZ, including: - Loose / drifting equipment; - Accidents (collisions) with other water users; - Loss of stock; and - Disease outbreak or algal bloom. Communicate the protocol to all ADZ aquaculture operators and registered stakeholders.	Within 6 months of establishment of the ADZ	Relevant guidelines and communication
	14.	Develop disentanglement protocols in collaboration with DAFF, DEA and the SA Whale Disentanglement Network and establish a rapid response unit to deal with entanglements.	Within 6 months of establishment of the ADZ	Relevant guidelines and communication
Stakeholder communication	15.	Invite the general public to register as stakeholders on a stakeholder database maintained by the AMC.	Within 6 months of establishment of the ADZ	Advert / communication to public
	16.	Make available updates to all registered stakeholders / consultative forum on aspects relating to the ADZ, including: - Location of existing and planned aquaculture farms; - Results of environmental monitoring in the reporting period; - Any other relevant aspects.	At least biannually	Relevant regular communication

Table 3-2: Farm-level management and mitigation measures that must be implemented during the Design Phase by individual operators

Farm-level Design Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
EMP	1.	Compile an individual environmental management plan (EMP) for each farm to allow for efficient management at the individual farm scale. The EMP must be compatible, supportive and facilitative of the EMPr for the ADZ.	During design of farm / application for marine right Within 6 months of EA for existing farms	Review farm-level EMP
Farm layout	2.	Consult the AMC specifications regarding the layout of aquaculture farms.	Before design of farm	Compliance of layout
	3.	Ensure a minimum width of 10 m between lines to allow for access.	During design of farm	Review layout
	4.	**Fish farming:** Ensure that finfish cages are suspended at least 5 m above the seabed to allow for adequate dispersion to prevent build-up of wastes (uneaten food and faeces) below the cages.	During design of farm	Proposed layout
	5.	Ensure that finfish cages do not occupy more than 30% of the total area allocated for finfish farming at any one time, both within individual licence areas and overall within the portions of the ADZ identified for finfish culture.	During design of farm	Proposed layout
	6.	Submit detailed proposals for expansions / new farms to the AMC, reporting on the following aspects: - Location (coordinates, size); - Species; - Equipment specifications; - Layout (location and orientation of individual structures); - Mooring plan; - Surveys to be conducted prior to installation; - Measures to ensure equipment is securely in place; - Stocking density; - Feeding protocols (if any); and - Any other information deemed relevant or requested by the AMC.	At least 2 months before installation of farm	Relevant submission
Equipment	7.	Use aquaculture structures and equipment that are suitable for the environmental conditions in the farming area, e.g. that can withstand the maximum recorded wave / swell heights.	During design of farm	AMC approval of layout and design Proven design in similar conditions Review order specifications
	8.	Ensure mooring systems will prevent / limit movement of anchors and chains over the sea floor.	During design of farm	AMC approval of layout and design Proven design in similar conditions Review order specifications

Farm-level Design Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	9.	Minimise entanglement by using mesh size less than 6 cm.	During design of farm	Review netting specifications Review order specifications
	10.	Use environmentally safe aquaculture infrastructure to prevent entanglement of faunal species such as fish, whales, dolphins and turtles.	During design of farm	Proven design in similar conditions Review order specifications
Visual impacts	11.	Use grey based hues for all project components visible above the water surface (rafts, cages, barrels, buoys / flotation devices) as far as possible.	During design of farm	Review order specifications
	12.	Ensure project components are of a similar style, scale and have a consistent spacing between them as far as possible to promote visual cohesiveness.	During design of farm	Review order specifications
	13.	Utilise the minimum number of safety / warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet Ports Authority (Transnet) safety requirements.	During design of farm	Review TNPA requirements
	14.	*Use only minimal non-navigational lighting at night.*	*During design of farm*	
	15.	*Use downward-pointing and shaded lights where possible.*	*During design of farm*	
	16.	Mark all equipment (buoys, raft and cage components) with an identifier unique to the operator to enable tracing of loose equipment / debris.	Before installation of farm commences	Review equipment prior to installation
Decommissioning	17.	Plan and make adequate financial provision for removal of all infrastructure upon cessation of farming operations.	Before installation of farm commences	Review financial provision documents

4 Measures Applicable to the Construction Phase

Construction Phase measures will apply to:

- New farms that are installing infrastructure and equipment in the ADZ; and
- Existing farms that are installing new infrastructure and equipment in the ADZ as part of an expansion.

4.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- AMC;
- Aquaculture operators; and
- Contractors responsible for construction / placement of infrastructure.

Individual operators retain the final responsibility with regards to compliance with the EMPr and EA. All instructions relating to the EMPr will be given to contractors via the respective aquaculture operators. Contractors will report issues of concern to the aquaculture operator, who in turn will report on progress to the AMC.

Key roles and responsibilities during the construction phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Section 7.1.

AMC:

The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations;
- Provide information to the public (updated maps/coordinates, water quality information, notification before new aquaculture operations start); and
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:

Individual aquaculture operators retain the overall responsibility for the management of construction activities and the implementation of the EMPr. Operators are required to:

- Ensure that contractors are aware of and comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Inform the AMC should there be any notable changes to submitted plans; and
- Report any incidents and initiate the emergency protocol if required.

Contractors:

All contractors will be required to:

- Ensure that all employees are aware of and comply with the EMPr;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Immediately notify the aquaculture operator of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the AMC.

4.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the construction phase, as well as timelines for the implementation of these measures and monitoring thereof, are laid out below:

- Table 4-1 specifies ADZ-level measures that must be implemented by the AMC; and
- Table 4-2 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the construction phase are addressed in Section 7.

Table 4-1: ADZ-level management and mitigation measures that must be implemented during the Construction Phase by the AMC

ADZ-level Construction Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Stakeholder communication	1.	Make available updates to all registered stakeholders on aspects relating to the ADZ, including: - Location of existing and planned aquaculture farms; - Results of environmental monitoring in the reporting period; - Any other relevant aspects.	At least biannual	Relevant communication
Complaints Register	2.	Maintain and disclose a complaints / comments register. The register must record: • Name and contact details of person complaining / commenting; • Date submission was lodged; • Person who initially received the submission; • Nature of the submission; • Operator that is subject to the submission; • Actions taken to investigate a complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to the complainant.	Duration of farm installation activities	Keep record of all complaints
Response to environmental incidents	3.	Record all environmental incidents related to aquaculture farm construction / expansion, including: - Loose / drifting equipment; - Accidents (collisions) with other water users; - Entanglement of marine animals; - Spill of pollutants; and - Waste in the marine environment.	In the event of an incident	Maintain register of incidents and response Following resumption of activities, frequently inspect area to ensure issue was properly addressed
	4.	Coordinate a response to environmental incidents related to aquaculture operations, if necessary.	In the event of an incident	Time taken to address incident
	5.	Initiate the emergency response protocol to respond to an environmental incident if it cannot be dealt with at farm level.	In the event of an incident	Time taken to address incident

Table 4-2: Farm-level management and mitigation measures that must be implemented during the Construction Phase by individual operators

Farm-level Construction Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
ECO	1.	Appoint an Environmental Control Officer (ECO) during the construction phase (installation of new farms) to ensure compliance with stipulations in the Environmental Authorisation and EMPr.	During installation of new (including extension of existing) farms	ECO reports submitted to the AMC
Visual impacts	2.	Use grey based hues for all project components visible above the water surface (rafts, cages, barrels, buoys / flotation devices) as far as possible.	During installation of farms Within specified timeframe for existing farms	Visual inspection
	3.	Ensure project components are of a similar style, scale and have a consistent spacing between them as far as possible to promote visual cohesiveness.	During installation of farms Within specified timeframe for existing farms	Visual inspection
	4.	Utilise the minimum number of safety / warning buoys as far as possible. Only demarcate the corner points of each precinct and the minimum interval distance along the precinct boundary to meet Ports Authority (Transnet) safety requirements.	During installation of farms Within specified timeframe for existing farms	Visual inspection
	5.	Demarcate all equipment (buoys, raft and cage components) with the operators logo / name to enable tracing of lose equipment / debris.	During installation of farms Within specified timeframe for existing farms	Visual inspection
Protection of heritage resources	6.	Undertake diver surveys prior to / while setting anchor / mooring arrays, and do not place mooring blocks on visible shipwreck features.	During installation of farm	Record of diver surveys
	7.	Contact an archaeologist if shipwreck material is identified at mooring sites.	During installation if required	
	8.	Provide the location and nature of any identified maritime and underwater cultural heritage resources to a maritime archaeologist and to SAHRA for inclusion on their shipwreck database.	During installation if required	Appropriate communication
	9.	Obtain a permit from SAHRA prior to continuing with activities that have disturbed a wreck site or part thereof, including objects or artefacts.	During installation if required	Appropriate communication
	10.	*Submit a detailed anchor / mooring distribution plan to the Maritime and Underwater Cultural Heritage Unit at the South African Heritage Resources Agency (SAHRA).*	*Before installation commences*	*Record of diver surveys* *Placement of farms*

Farm-level Construction Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Equipment	11.	Ensure that, upon installation of the aquaculture structures: - Primary longline / raft / net is secured appropriately so that it is kept taut and rigid at all times. Nets of fish cages should be weighted; - Ropes and anchor lines are taut, especially after rough seas; and - There is adequate separation between rafts and longlines, even during strong currents and rough seas; *or* - There is adequate separation between the primary and secondary nets of fish cages, even during strong currents and rough seas.	Following installation	Visual inspection (above and below water)
Vessel operation	12.	Implement maritime safety protocols while working on vessels and at sea.	Throughout farm installation	Visual inspection of bay
	13.	Do not discard any waste overboard.	Throughout farm installation	Visual inspection of bay
	14.	Take waste generated on vessels back to shore and dispose of properly.	Throughout farm installation	Visual inspection of bay
	15.	In the event of litter and debris entering the sea, remove these as soon as possible.	Throughout farm installation	Visual inspection of bay
Land-based activities Hazardous substances	16.	Ensure that contaminants are not placed directly on the ground to prevent runoff reaching the marine environment.	Throughout farm installation	Visual inspection of hazardous materials handling and storage areas
	17.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	Throughout farm installation	Visual inspection of hazardous materials handling and storage areas
	18.	Avoid unnecessary use and transport of hazardous substances.	Throughout farm installation	
	19.	Keep Material Safety Data Sheets (MSDS) for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	Throughout farm installation	Visual inspection of MSDS
Waste management	20.	Ensure that no litter and debris reaches the marine environment during construction activities.	Throughout farm installation	Visual inspection of waste collection and disposal areas Check waste disposal slips
	21.	Train all staff in the effects of debris and litter in the marine environment.	Throughout farm installation	Training manual and attendance register
	22.	Minimise waste through reducing and re-using (packaging) material.	Throughout farm installation	Visual inspection of waste collection and disposal areas Check waste disposal slips
	23.	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	Throughout farm installation	Visual inspection of site
	24.	Provide separate bins for hazardous / polluting materials and mark these clearly.	Throughout farm installation	Visual inspection of waste collection and disposal areas

Farm-level Construction Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Employment / Procurement	25.	Utilise local labour (Saldanha Bay municipality) as much as possible.	Throughout farm installation	Staff profiles
	26.	Procure goods and services from local, provincial or South African suppliers as far as possible, with an emphasis on BEE suppliers where possible.	Throughout farm installation	Procurement records
	27.	Procure ancillary services for goods purchased overseas, such as installation, customisation and maintenance, from South African companies as far as possible.	Throughout farm installation	Procurement records
Environmental awareness training	28.	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of waste and construction activities on the environment; • Suitable disposal of waste; • Key measures in the EMPr relevant to worker's activities; • How incidences and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	Before workers start working on-site Before new activities are undertaken	Training attendance register Observe whether activities are executed in line with EMPr requirements
Complaints Register	29.	Forward all public submissions received by operators the AMC.	Within 1 week of receiving the submission	Keep record of all complaints
	30.	Provide a response to the submission, where required.	Within 1 week of receiving the submission	Keep record of all complaints
Response to environmental pollution	31.	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	Throughout farm installation	Maintain register of pollution events and response Following resumption of activities, frequently inspect area
	32.	Only resume activity once the problem has been stopped, the equipment has been repaired and/or the pollutant can be captured without reaching the marine environment.	Throughout farm installation	Maintain register of pollution events and response Following resumption of activities, frequently inspect area
	33.	Repair faulty equipment as soon as possible.	Throughout farm installation	Visual inspection Time to address issue

Farm-level Construction Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Response to environmental incidents	34.	Report all environmental incidents related to aquaculture farm construction / expansion to the AMC, including: - Loose / drifting equipment; - Accidents (collisions) with other water users; - Entanglement of marine animals; - Spill of pollutants; and - Waste in the marine environment.	Throughout farm installation	Maintain register of pollution events and response Appropriate communication
	35.	Initiate steps to contain the environmental incident at a farm level.	Throughout farm installation	Record of events
	36.	Request and support assistance with environmental incidents from the AMC if the incident cannot be dealt with at farm level.	Throughout farm installation	Appropriate communication

5 Measures Applicable to the Operation Phase

Operation Phase measures will apply to aquaculture farms that are operating with the ambit of the ADZ in Saldanha Bay.

5.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- AMC; and
- Aquaculture operators.

Individual operators retain the final responsibility with regards to compliance with the EMPr and EA.

Key roles and responsibilities during the operation phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Section 7.1.

AMC:

The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations;
- Provide information to the public (updated maps/coordinates, water quality information, notification before new aquaculture operations start);
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:

Individual aquaculture operators retain the overall responsibility for the management of operations and the implementation of the EMPr. Operators are required to:

- Comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Inform the AMC should there be any notable changes to operations;
- Report any incidents and initiate the emergency protocol if required.

5.2 Reporting

The AMC must make available biannual **ADZ Reports** to registered stakeholders including at a minimum the following information:

- Extent of current operations;
- Location and type of proposed new operations;
- Key environmental monitoring results;
- Feedback on stakeholder concerns; and
- Any other relevant aspects.

Note that environmental monitoring reports are addressed in Section 7.2.

5.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the operation phase, as well as timelines for the implementation of these measures and monitoring thereof, are laid out below:

- Table 5-1 specifies ADZ-level measures that must be implemented by the AMC; and
- Table 5-2 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during the operation phase are addressed in Section 7.

Table 5-1: ADZ-level management and mitigation measures that must be implemented during the Operation Phase by the AMC

ADZ-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Demarcation of ADZ precincts	1.	Ensure that all active aquaculture farms are accurately marked on navigational charts.	Throughout operations	Accurate charts Notification of stakeholders
	2.	Ensure that the outside boundaries of all active aquaculture areas are accurately marked day and night using markers compliant with South African Marine Safety Authority (SAMSA) regulations.	Throughout operations	Visual inspection
	3.	Monitor that markers are fully functional.	Throughout operations	Visual inspection
	4.	If the Ports Authority requires flashing lights, ensure the lights flash simultaneously.	Throughout operations	Visual inspection
Supervision of farming activities	5.	Enforce maintenance and operational guidelines and standards in relation to potential entanglement risks at farms, including loose ropes, lines, buoys or floats.	Throughout operations	Record of visual inspection and (non)compliances
	6.	Implement monitoring as per the environmental monitoring requirements stipulated in Section 7 of the EMPr.	Within 3 months of establishment of the ADZ	Monitoring records
Stakeholder communication	7.	Notify registered stakeholders before installation of new farms commences. Provide detail on the proposed farm type and location.	Throughout operations	Record of notification of stakeholders
	8.	Make available ADZ Report updates to all registered stakeholders on aspects relating to the ADZ, including: - Location of existing and planned aquaculture farms; - Results of environmental monitoring in the reporting period; - Any other relevant aspects.	At least biannual	Record of stakeholder communication
Complaints Register	6.	Maintain and disclose a complaints / comments register. The register must record: • Name and contact details of person complaining / commenting; • Date submission was lodged; • Person who initially received the submission; • Nature of the submission; • Operator that is subject to the submission; • Actions taken to investigate a complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to the complainant.	Duration of operations	Keep record of all complaints

ADZ-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Response to environmental incident	9.	Record all environmental incidents related to aquaculture farm operations, including: - Loose / drifting equipment; - Accidents (collisions) with other water users; - Entanglement of marine animals; - Loss of stock; and - Disease outbreak or algal bloom. - Spill of pollutants; and - Waste in the marine environment.	Throughout operations	Maintain register of pollution events and response
	10.	Coordinate a response to environmental incidents related to aquaculture operations, if necessary.	Throughout operations	Maintain register of pollution events and response
	11.	Activate the emergency response protocol to respond to an environmental incident if it cannot be dealt with at farm level.	Throughout operations	Maintain register of pollution events and response
Sector development	12.	*Liaise with relevant authorities to encourage the development of South African spat and fingerling hatcheries to reduce the reliance on import, and associated risk of non-intentional introduction of associated alien species and diseases.*	*As early as possible*	
	13.	*Encourage the municipality, in cooperation with aquaculture operators and the AMC, to initiate a study to identify industries or projects that could benefit from the direct and indirect opportunities generated by the ADZ, and mechanisms to promote or establish such industries or projects.*	*As early as possible*	
	14.	*Encourage the municipality, in cooperation with aquaculture operators and the AMC, to encourage and support projects and / or networks that provide training and support for small and medium enterprises in the Saldanha Bay Municipality to benefit from the opportunities generated by the ADZ.*	*As early as possible*	

Table 5-2: Farm-level management and mitigation measures that must be implemented during the Operation Phase by individual operators

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Bio-fouling	1.	Undertake routine surveillance for indications of non-native fouling species on and around marine farm structures and associated vessels and infrastructure.	At least monthly throughout operations	Visual inspection
	2.	Maintain effective antifouling coatings and monitor for fouling.	Throughout operations	Visual inspection
	3.	Clean structures and hulls regularly to ensure eradication of pests before they become established.	Throughout operations	Visual inspection
	4.	Avoid using chemicals for the cleaning of cage nets. It is recommended that high-pressure water hoses and drying or sunning be used to clean cage nets of algae and debris.	Throughout operations	Record of materials used
	5.	Minimise the impact of bio-fouling organisms by using smooth, plastic coated, knotless mesh on nets, or copper-alloy mesh.	Throughout operations	Visual inspection
	6.	Do not use of antifouling products based on heavy metals.	Throughout operations	Record of materials used
	7.	Use only prescribed veterinary chemicals and antifoulants.	Throughout operations	Record of materials used Prescription
	8.	Establish and adhere to guidelines around the use of anti-fouling products in the mariculture industry.	Throughout operations	Record of materials used
	9.	Do not apply antifoulants on site and use environmentally friendly alternatives where effective.	Throughout operations	Record of materials and methods used
	10.	Ensure that veterinarian protocols to eliminate any pests, parasites and diseases are strictly adhered to.	Throughout operations	Record of implementation
	11.	Obtain health certificates for any new batches of fry / finfish introduced into the bay (finfish and oysters).	Throughout operations	Health certificates
Biosecurity	12.	Ensure that a high level of biosecurity management and planning is in place to limit the introduction of pests and diseases and to be able to respond quickly and effectively should biosecurity risks be identified. Comply with procedures prescribed by the DAFF Aquatic Animal Health Plans. Key components to biosecurity management include: • Prevention of incursions, focussing on the management of: - High-risk pathways (including international source regions); - New pathways; and - Regional sources known to be infected by recognised high-risk pests; • Surveillance (detection), focussing on: - Passive surveillance (screening at airports and ports) - Routine surveillance (undertaken on and around marine farm structures and associated vessels and infrastructure by farm operators); and	Throughout operations	Record of implementation Farm Monitoring Report

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
		- Targeted surveillance of high-risk areas; and • Control of populations and outbreaks through coordination with, and support from: - All marine stakeholders whose activities can spread unwanted organisms; and - Agencies at local, regional and national scales. Eradication measures and / or application of therapeutants (pharmaceutical products, or 'medicines') are only advised if the risk of re-invasion can be managed and pests can be detected before they become widespread.		
Maintenance of Aquaculture Infrastructure	13.	Maintain all project infrastructure in good working order.	Throughout operations	Visual inspection Maintenance records Farm Monitoring Report
	14.	Regularly clean cages, rafts etc and inspect for alien species.	Throughout operations	Visual inspection Maintenance records
	15.	Regularly inspect aquaculture infrastructure for integrity of the structure, anchorage and general wear and tear.	Throughout operations	Visual inspection Maintenance records
	16.	Keep all lines taught through regular inspections and maintenance.	Throughout operations	Visual inspection
	17.	Leave mooring anchors or blocks in place when undertaking cage or raft maintenance or fallowing sites to avoid repetitive impacts on the seabed.	Throughout operations	Visual inspection
	18.	Keep marine structures clean and free of unnecessary equipment.	Throughout operations	Visual inspection
	19.	Maintain service barges and boats to withstand local weather conditions and fit them with the necessary safety equipment to provide a safe working environment.	Throughout operations	Visual inspection Maintenance records
Vessel operation	37.	Implement maritime safety protocols while working on vessels and at sea.	Throughout operations	
Safety	20.	Clearly mark cages and other offshore infrastructure with clear warning markers, bells and radar reflectors to ensure visibility to marine traffic.	Throughout operations	Visual inspection
	21.	Keep necessary safety equipment (e.g. life rings) on platforms in an accessible position.	Throughout operations	Visual inspection
Human consumption	22.	Ensure that products intended for human consumption are of an acceptable quality and comply with health standards for seafood as prescribed by the relevant authorities such as the South African Bureau of Standards (SABS) and DAFF.	Throughout operations	Compliance with health prescribed standards
Waste management	23.	Minimise waste through reducing and re-using material (e.g. packaging).	Throughout operations	Visual inspection of waste collection areas
	24.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	Throughout operations	Visual inspection of waste collection areas
	25.	Collect all waste in bins and/or skips. Prevent littering by staff at work sites by providing bins or waste bags in sufficient locations.	Throughout operations	Visual inspection of waste collection areas

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	26.	Provide separate bins for hazardous / polluting materials and mark these clearly.	Throughout operations	Visual inspection of waste collection areas
	27.	Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.	Throughout operations	Visual inspection of waste collection areas
	28.	Ensure no debris and waste material used at the operations enters the marine environment (particularly plastics), to minimise the risk of attraction, harming and entanglement by seabirds, marine mammals and large predators.	Throughout operations	Visual inspection of bay areas Reports of non-compliance
	29.	Do not discard non-organic waste overboard vessels.	Throughout operations	Visual inspection of bay areas Reports of non-compliance
	30.	In the event of equipment, litter and debris entering the sea, remove these as soon as possible.	Throughout operations	Visual inspection of bay areas Reports of non-compliance
	31.	Remove debris washed onshore. This should be done / paid for by the operator the debris belongs to (which should be marked).	Throughout operations	Visual inspection of shore Reports of non-compliance
Employment	32.	Procure goods and services from local, provincial or South African suppliers as far as possible, with an emphasis on BEE suppliers where possible.	Throughout operation	Staff records
	33.	Procure ancillary services for goods purchased overseas, such as installation, customisation and maintenance, from South African companies as far as possible.		
	34.	Utilise local labour (Saldanha Bay municipality) as much as possible. Where non-local specialist staff is required, implement a training programme to upskill local labour to assume these positions over a period of 5 years.	Throughout operation	Staff records Training programmes Farm Monitoring Report
	35.	Implement a local recruitment policy, to discourage an uncoordinated influx of outside workers.	Throughout operation	
	36.	Collect data on staff numbers, composition and origin and report these to the AMC.	Throughout operation	Farm Monitoring Report
Environmental awareness training	37.	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of waste and farming activities on the environment; • Suitable disposal of waste; • Key measures in the EMPr relevant to worker's activities; • How incidences and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	Before workers start working on-site Before new activities are undertaken	Check training attendance register Observe whether activities are executed in line with EMPr requirements
Mussel farm management	38.	Seed ropes with specimens present in the area and do not introduce mussels from other areas.	Throughout operation	

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	39.	Do not dispose of mussels in the Bay during red tides.	Throughout operation	Visual inspection Reports of non-compliance
	40.	Avoid high density culture (overcrowding). The recommended density is: • One raft of 800 droppers per ha; or • 11 longlines of 832 droppers per ha.	Throughout operations	Visual inspection Farm Monitoring Report
Oyster farm management	41.	Use only spat sourced from biosecure certified hatcheries and/or quarantine facilities.	Throughout operations	Certificate
	42.	Inspect imported spat for other species before introduction into the Bay. Destroy any other species associated with oyster spat and report the incident to the AMC.	Throughout operations	Visual inspection Farm Monitoring Report
	43.	Avoid high density culture (overcrowding). The recommended density is 11 longlines of 176 oyster stacks / abalone barrels per ha.	Throughout operations	Visual inspection Farm Monitoring Report
	44.	Do not discard fouling organisms removed from cultured stock taken onshore for maintenance back into the marine environment.	Throughout operation	Reports of non-compliance Disposal record
Finfish farm management Farm layout and density	45.	Ensure that finfish cages do not occupy more than 30% of the total area allocated for finfish farming at any one time, both within individual licence areas and overall within the portions of the ADZ identified for finfish culture.	Throughout operations	Visual inspection Farm Monitoring Report Approved layout
	46.	Rotate cages within a production area to allow recovery of benthos.	Throughout operations	Visual inspection Farm Monitoring Report
	47.	Destock, or fallow, a site after a growing cycle to allow seabed recovery prior to restocking.	Throughout operations	Visual inspection Farm Monitoring Report
Feed	48.	Purchase only registered aquaculture feeds from recognised feed companies that produce high quality feeds of which the ingredients, composition and manufacturing methods are known.	Throughout operations	Certificates Order records
	49.	Use palatable feeds of the correct pellet or grain size to ensure low levels of feed loss.	Throughout operations	Farm Monitoring Report
	50.	Use high digestibility, high energy and low phosphorus feeds, species and system-specific feeds and maximize food conversion ratios (and minimize waste).	Throughout operations	Certificates Order records
	51.	Store and use feed on a “first-in-first-out” basis to prevent unnecessary aging and deterioration in quality.	Throughout operations	Visual inspection of feed quality
	52.	Ensure that feed storage areas are well ventilated, cool, dry and free of vermin that can damage, contaminate and consume feeds.	Throughout operations	Visual inspection of feed storage areas

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	53.	Use feeding regimes that minimise direct feed wastage and excessive faecal and metabolite releases from fish.	Throughout operations	Visual inspection Farm Monitoring Report
	54.	Record feed types and feeding rates daily so that conversion efficiency can be calculated and monitored.	Daily, throughout fish farming	Farm Monitoring Report
	55.	Monitor and manage feeding regimes to minimise feed wastage and chemical usage.	Throughout operations	Farm Monitoring Report
Genetics	56.	Use all female or triploid salmonids in the farms.	Throughout operations	Certificate Veterinary record
	57.	Implement suitable management and planning measures to limit the possibility of genetic interactions.	Throughout operations	Farm Monitoring Report
	58.	Adhere to DAFF genetic management guidelines.	Throughout operations	Certificate
	59.	Use appropriate spawning regimes in the hatchery to maintain genetic diversity in the offspring.	Throughout operations	Appropriate records
	60.	Implement annual genetic monitoring between wild caught and farmed fish to monitor for any significant differences.	Throughout operations	Monitoring results
	61.	Implement the “Genetic Best Practice Management Guidelines for Marine Finfish Hatcheries” developed by DAFF and ensure adequate genetic monitoring of brood stock rotation.	Throughout operations	Appropriate records
Escapes	62.	Ensure good physical and biological containment to limit the effects of escaped stocks.	Throughout operations	Visual inspection
	63.	Use robust, well-maintained containment systems.	Throughout operations	Visual inspection
	64.	Maintain cage integrity through regular maintenance and replacement.	Throughout operations	Visual inspection Maintenance records Farm Monitoring Report
	65.	Develop and implement recovery procedures should escapes occur.	Throughout operations	Farm Monitoring Report
Maintenance	66.	Keep cage netting clean, free of algal growth and free of any damage that could lead to the escape of farmed organisms or the penetration of predators.	Throughout operations	Visual inspection
	67.	Keep nets well maintained (e.g. repair holes immediately)	Throughout operations	Visual inspection Maintenance records
Waste	68.	Do not discard fouling organisms removed from netting taken onshore for maintenance back into the marine environment.	Throughout operation	Reports of non-compliance Disposal record

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	69.	Do not discard sick or dead fish into the marine environment.	Throughout operation	Reports of non-compliance Disposal record
Predators	70.	Remove any injured or dead fish from cages promptly.	Throughout operation	Visual inspection Farm Monitoring Report
	71.	Do not release any blood and/or offal (organic waste) from finfish into the bay.	Throughout operation	Visual inspection
	72.	Use predator exclusion nets as necessary. Enclose nets at the bottom to minimise entanglement, keep nets taut, use mesh sizes of < 6 cm and keep nets well maintained (e.g. repairing holes).	Throughout operation	Visual inspection
Diseases	73.	Ensure all fry undergoes a health examination prior to stocking in sea cages.	Throughout operation	Veterinary records
	74.	Take necessary action to eliminate pathogens through the use of therapeutic chemicals or improved farm management as per veterinary identification and prescriptions.	Throughout operation	Appropriate records Farm Monitoring Report
	75.	Regularly inspect stock for disease and/parasites as part of a formalised stock health monitoring programme approved by DAFF.	Throughout operation	Veterinary records Farm Monitoring Report
	76.	Maintain comprehensive records of all pathogens and parasites detected as well as logs detailing the efficacy of treatments applied.	Throughout operation	Veterinary records Farm Monitoring Report
	77.	Locate cages stocked with different cohorts of the same species as far apart as possible; if possible stock different species in cages successively.	Throughout operation	Visual inspection Approved farm layout
	78.	Implement good house-keeping practices in place at all times i.e. keep nets clean and allow sufficient fallowing time on sites to ensure low environmental levels of intermediates hosts and or pathogens.	Throughout operation	Visual inspection Farm Monitoring Report Sampling records
	79.	Treat adjacent finfish cages simultaneously even if infections have not yet been detected if prescribed by veterinarian.	As required	Farm Monitoring Report
	80.	Quarantine new juveniles or new broodstock when introduced to identify and treat potential diseases and parasites under the supervision of a veterinary professional. OR Ensure all newly introduced organisms undergo a health exam by a suitably qualified veterinarian and are certified as disease free.	Throughout operation	Veterinary records Farm Monitoring Report
	81.	Humanely euthanize production animals that are injured or diseased to a point that causes excessive suffering.	Throughout operation	Farm Monitoring Report
	82.	Remove and dispose of dead organisms daily (weather permitting) and dispose of in a responsible manner.	Throughout operation	Reports of non-compliance Disposal record Farm Monitoring Report

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	83.	Clean and sanitise equipment used for disposing of dead organisms.	Throughout operation	
	84.	Appoint an aquaculture veterinarian to conduct a health assessment at least annually.	At least annually throughout operations	Veterinary records Farm Monitoring Report
	85.	Take the following actions in the event of a disease breakout: • Notify the AMC immediately; • Isolate the affected individuals / cages; • Identify the disease; • Consult a veterinarian for treatment advice; • Apply treatment recommended by veterinarian; and • Monitor the efficacy of the treatment.	As required	Appropriate communication and records
Medication and pesticides	86.	Seek assistance of an aquaculture veterinarian in the use of therapeutics and treatments, where required.	Throughout operations	Veterinary records Farm Monitoring Report Record of treatments
	87.	Avoid using excessive amounts of medication, antibiotics, hormones and pesticides.	Throughout operations	Veterinary records Record of treatments
	88.	The use of chemicals in disease management is discouraged due to negative impacts on the aquatic environment, consumer reluctance, and because the frequent use of traditional therapeutics may trigger the emergence of disease-resistant strains of pathogens.	Throughout operations	Veterinary records Record of treatments
	89.	Reduce levels of nutritional therapeutants and trace contaminants in feed, using only the lowest effective doses.	Throughout operations	Veterinary records Record of treatments
	90.	Use the most efficient drug delivery mechanisms that minimise the concentrations of biologically active ingredients entering the environment.	Throughout operations	Veterinary records Record of treatments
	91.	Malachite Green as a bactericide or fungicide is prohibited.	Throughout operations	Veterinary records Record of treatments
	92.	Reduce reliance on therapeutic chemicals through the use of sound husbandry practices aimed at disease and stress prevention.	Throughout operations	
	93.	Antibiotics use as a prophylactic or preventative measure is prohibited.	Throughout operations	
	94.	Use bait type pesticides with care to prevent poisoning of non-target species.	Throughout operations	Veterinary records Record of treatments
	95.	Use only recognised and registered chemicals as treatments, medicines, herbicides, insecticides, pesticides and for other purposes.	Throughout operations	Veterinary records Record of treatments

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	96.	Record dosages, application methods and the resultant outcome of all treatments in a treatment register.	Throughout operations	Veterinary records Record of treatments
	97.	File Material Safety Data Sheets (MSDS) or medicine datasheets and reference during use, storage and disposal.	Throughout operations	
***Gracilaria* management**	98.	Use only locally sourced *Gracilaria* for stocking the ropes.	Throughout operations	Visual inspection Records
	99.	*Avoid the use of fertilizers or chemicals in the culture of seaweeds.*	*Throughout operations*	*Farm Monitoring Report*
	100	*Use as a co-culture species for use in Integrated Multi-Trophic Aquaculture (IMTA) rather than as monoculture, if possible.*	*Throughout operations*	*Approved farm layout*
Predatory birds	101	Use exclusion devices to prevent killing of stock by predatory birds and do not kill predatory birds.	Throughout operations	Visual inspection
Other	102	Comply with all management programmes required by DAFF (e.g. health management programme) including the reporting requirements of these programmes.	Throughout operations	
Response to environmental pollution	103	In the event of environmental pollution, immediately stop the activity causing the problem.	Throughout operations	Visual inspection Farm Monitoring Report
	104	Initiate steps to contain the environmental incident at a farm level.	Throughout operations	Maintain register of pollution events and response Farm Monitoring Report
	105	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the marine environment.	Throughout operations	Maintain register of pollution events and response Farm Monitoring Report
	106	Repair faulty equipment as soon as possible.	Throughout operations	Maintain register of pollution events and response Farm Monitoring Report
	107	Report all environmental incidents related to aquaculture farm operation to the AMC, including: - Loose / drifting equipment; - Accidents (collisions) with other water users; - Entanglement of marine animals; - Loss of stock; and - Disease outbreak or algal bloom. - Spill of pollutants; and - Waste in the marine environment.	Throughout operations	Appropriate communication Farm Monitoring Report

Farm-level Operation Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
	108	Request assistance with environmental incidents from the AMC if the incident cannot be dealt with at farm level.	Throughout operations	Appropriate communication Record of incidents
Entanglement	109	Ensure that exclusion nets are clearly visible under and above water.	Throughout operations	Visual inspection
	110	*Ensure all mooring lines and rafts are highly visible (use thick lines and bright antifouling coatings).*	*Throughout operations*	*Visual inspection*
	111	Implement the relevant AMC protocol in case of entanglement.	Throughout operations	Farm Monitoring Report
	112	Request assistance with entanglement incidents from the AMC if the incident cannot be dealt with at farm level.	Throughout operations	Appropriate communication Record of incidents
	113	Contact experts from the NSRI in the event of large marine mammals becoming entangled in cage systems.	Throughout operations	Record of contact with NSRI
	114	Keep record of all incidents of entanglement and the outcome of these incidents.	Throughout operations	Record of entanglements
Incident logging	115	Maintain an incident register in which all events caused by farming activities or farm infrastructure, such as escape events or the dislodging of infrastructure, which may have environmental risks, are recorded.	Throughout operations	Incident register on file
	116	Report all non-routine events that may have an environmental impact to the AMC.	Throughout operations	Appropriate communication Farm Monitoring Report

6 Measures Applicable to the Decommissioning Phase

Decommissioning Phase measures will apply to:

- Individual farms in the ADZ that are decommissioning part or all of their infrastructure and equipment; and
- Decommissioning of the ADZ as a whole.

6.1 Roles and Responsibilities

The key role players during the decommissioning phase of the project are anticipated as follows:

- AMC;
- Aquaculture operators; and
- Contractors responsible for decommissioning / removal of infrastructure.

Individual operators retain the final responsibility with regards to the compliance of aquaculture operations with the EMPr and EA. All instructions relating to the EMPr will be given to contractors via the respective aquaculture operators. Contractors will report issues of concern to the aquaculture operator, who in turn will report on progress to the AMC.

Key roles and responsibilities during the decommissioning phase with respect to the implementation of the EMPr are outlined below.

Roles and responsibilities relating to environmental monitoring are laid out in Section 7.1.

AMC:

The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Ensure that environmental monitoring is undertaken in line with the monitoring plan until decommissioning is complete;
- Make decisions based on the outcomes of environmental monitoring, which could lead to the recommendations about the decommissioning process;
- Settle disputes regarding the interpretation of requirements in the EMPr and EA;
- Receive and manage stakeholder comments;
- Record and, if necessary, coordinate a response to environmental incidents related to aquaculture operations during decommissioning;
- Provide information to the public (updated maps/coordinates, water quality information, notification when aquaculture operations cease); and
- Record and if necessary, respond to, environmental aquaculture-related incidents.

Aquaculture operators:

Individual aquaculture operators retain the overall responsibility for the management of decommissioning activities and the implementation of the EMPr. Operators are required to:

- Ensure that contractors are aware of and comply with the conditions of the EMPr;
- Ensure that staff are aware of and comply with the conditions of the EMPr;
- Ensure that aquaculture infrastructure is secure during decommissioning and removed completely;
- Report any incidents and initiate the emergency protocol if required; and
- Reports to the AMC when decommissioning is complete.

Contractors:

All contractors will be required to:

- Ensure that all employees are aware of and comply with the EMPr;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Immediately notify the aquaculture operator of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the AMC.

6.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the decommissioning phase, as well as timelines for the implementation of these measures, are laid out below:

- Table 6-1 specifies farm-level measures that must be implemented by individual operators.

Environmental monitoring requirements during decommissioning are addressed in Section 7.

Table 6-1: Farm-level management and mitigation measures that must be implemented during decommissioning by individual operators

Farm-level Decommissioning Phase Measures				
Aspect	**ID**	**Mitigation measure / Procedure**	**Implementation Timeframe**	**Monitoring Methods**
Determine requirements	1.	Initiate consultation with the AMC before decommissioning to discuss potential decommissioning options, methods and requirements.	While preparing for decommissioning	Record of consultation with AMC
	2.	Determine other potential commercial uses for the plant equipment and infrastructure to be decommissioned.	While preparing for decommissioning	
	3.	Identify and assess any potential environmental and societal risks associated with the preferred method of decommissioning and implement mitigation to minimise risks.	While preparing for decommissioning	
	4.	Notify the AMC before decommissioning activities commence.	While preparing for decommissioning	Record of notification of AMC
Removal of aquaculture equipment	5.	Remove all aquaculture infrastructure and equipment and disposed of it appropriately.	Upon decommissioning	Visual inspection
	6.	Do not deposit any parts of the decommissioned infrastructure and equipment in the bay.	Upon decommissioning	Visual inspection
	7.	Ensure that no litter and debris reaches the marine environment during the removal of equipment, cleaning of infrastructure and general decommissioning activities.	Upon decommissioning	Visual inspection
	8.	In the event of equipment, litter and debris entering the sea, remove these as soon as possible.	Upon decommissioning	Visual inspection Reports of non-compliance
	9.	Train all staff in the effects of debris and litter in the marine environment and appropriate disposal procedures.	Before decommissioning	Training records
	10.	Aim to reuse or recycle decommissioned items.	Upon decommissioning	Disposal records
	11.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	Upon decommissioning	Disposal records
	12.	Do not allow any burning or burying of waste on site.	Upon decommissioning	Visual inspection

7 Environmental Monitoring and Corrective Action

Monitoring is essential for the ADZ and will inform the phasing of aquaculture expansion in Saldanha Bay, maximum production that can sustainably be achieved in the ADZ and an adaptive management strategy to environmental management of the ADZ.

Monitoring will be undertaken at two levels:

- ADZ-level monitoring, implemented / coordinated by the AMC, includes monitoring for wider spatial and cumulative impacts of farms, including monitoring further afield and at control sites, to determine the ADZ footprint and inform expansion of aquaculture within the approved limits / boundaries. In addition, monitoring for the ADZ EMPr would include studies of disease and parasites and genetic variability within wild stocks, and status of ecosystem indicators further afield (e.g. bird nesting success on islands, cetacean use of important feeding and breeding habitats, habitat use by fish, cetaceans and sharks via telemetry studies). Many of these programmes will need to be in collaboration with existing studies in Saldanha Bay. (Partial) funding for environmental monitoring may be sought from individual farm operators; and
- Farm-level monitoring must be implemented by individual operators and is specific to monitoring and record keeping of animal husbandry, stock health and feeding programmes, as well as water quality sampling within and adjacent to farms and, in the case of finfish farms, plans to deal with escapees and predators.

This monitoring plan applies to:

- All phases of the ADZ (which are likely to overlap throughout lifetime of the ADZ); and
- All farms under design, construction, operation or decommissioning within the Saldanha Bay ADZ.

Additional monitoring data may be collected outside of this EMPr framework:

- As part of other authorisations;
- In compliance with some form of code of practice;
- By regulatory authorities as part of enforcement; and
- By regulatory authorities as part of monitoring in the wider environment.

7.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- AMC;
- Aquaculture operators; and
- Specialists appointed / nominated to undertake environmental sampling and monitoring.

Individual operators retain the final responsibility with regards to the compliance of aquaculture operations with the EMPr and EA. Individual operators also retain responsibility for undertaking any monitoring required at farm level and in terms of other authorisations.

All instructions relating to the service providers appointed to conduct sampling and monitoring on behalf of the AMC will only be given by the AMC, and service providers will report directly to the AMC.

Key roles and responsibilities relating to sampling and monitoring are outlined below.

AMC:

The AMC has oversight over environmental management at the ADZ. In terms of environmental management, the AMC will:

- Ensure that environmental monitoring is undertaken in line with the EMPr and sampling / monitoring plans;
- Monitor ADZ aquaculture operators' compliance with the EMPr and EA conditions; and
- Monitor production volumes in the ADZ.

Aquaculture operators:

Individual aquaculture operators retain the overall responsibility for the management of their activities and the implementation of the EMPr. Operators are required to:

- Undertake all necessary farm-level monitoring required in terms of authorisations and/or for the sustainable operation of the farm;
- Record and monitor farm-related aspects as per this EMPr;
- Provide monthly Farm Monitoring Reports to the AMC; and
- Provide service provider(s) appointed by the AMC with access to farm areas and requested information.

Specialists:

Specialists appointed by the AMC to conduct environmental sampling and monitoring will be required to:

- Conduct all sampling and monitoring in line with the requirements in the EMPr and specific plans;
- Provide an independent and impartial account of environmental conditions and compliance with the EMPr to the AMC; and
- Submit reports to the AMC as required by the EMPr and AMC.

7.2 Sampling Plan

The AMC must appoint / nominate a suitably qualified specialist to compile a comprehensive Sampling Plan for the ADZ. The plan must clearly lay out:

- Sampling aspects (e.g. water column, seabed sediments);
- Sampling locations;
- Sampling methods and procedures;
- Sampling frequency;
- Parameters to be analysed;

- Applicable guideline limits for individual parameters; and
- "Trigger" limits for individual parameters, considering the existing conditions in Saldanha Bay based on historical measurements undertaken by the SBWQFT and other parties and applicable guidelines and standards.

Consider including the following aspects in the Sampling Plan:

- Water column monitoring at the following locations:
  - Within farms;
  - 50 m from farms; and
  - At control sites at least 10 km from the nearest farm structures;

  for parameters including:
    - Temperature;
    - pH;
    - Dissolved oxygen;
    - Ammonia;
    - Nitrite;
    - Dissolved oxygen levels;
    - Organic matter / suspended solids;
    - Dissolved trace minerals;
    - Copper leachate from antifouling paint;
    - Inorganic nitrogen;
    - Organic nitrogen and carbon;
    - Pathogenic microorganisms; and
    - Hydrocarbons;
    - Dissolved carbon;
    - Phosphorus;
    - Clorophyll a; and
    - Phytoplankton abundance and species composition.
- Seabed monitoring, including:
  - Monitoring beneath aquaculture infrastructure to assess the extent of deposition;
  - Benthic monitoring prior to aquaculture expansion to describe broad scale sediment characteristics and benthic macrofauna communities; and
  - Benthic monitoring during aquaculture operation near selected farms and at control sites, using grab sampling and/or diving and/or video and photographic methods, for:
    - Sediment physical and chemical characteristics (e.g. particle size, organic content, redox, pH, hydrogen sulphide concentration and concentration of any potentially harmful chemicals such as antifoulant constituents);
    - Infaunal and epifaunal macrobenthic communities; and
    - Presence of bacterial mats and black anoxic sediments.
- Relevant aspects of international standards and guidelines (such as Modelling – On growing fish farms – Monitoring (MOM) and Aquaculture Stewardship Council (ASC)).

7.3 Reporting

Environmental monitoring reports are listed in Table 7-1.

Table 7-1: Monitoring reports required throughout the lifespan of the ADZ

Report	Frequency[2]	From	To
Farm Monitoring Report	Monthly	Operator	AMC
Environmental Sampling Report	Quarterly	Service provider	AMC
EMPr Compliance Report	Quarterly	Service provider	AMC

Individual aquaculture operators must submit monthly **Farm Monitoring Reports** to the AMC including at a minimum the following information:

- Species farmed;
- Farming methods (equipment, feeds, stock volume, production cycle etc);
- Maintenance activities (equipment, stock health etc);
- Staff (number, skill level, origin etc);
- Issues encountered (e.g. disease, pollution events, damage, dislodging of infrastructure, collisions); and
- Sighting of marine animals (mammals, birds, sharks, etc.).

A pro forma report template for the Farm Monitoring Report is attached in Appendix A, although a suitable template format should be agreed between the AMC and Operator.

A suitably qualified specialist must submit quarterly **Environmental Sampling Reports** to the AMC. The frequency of report submission can be amended by the AMC after 1 year. Reports must include at a minimum the following information:

- Sampling / monitoring activities undertaken in reporting period;
- Sampling / monitoring results;
- Key trends; and
- Items of concern.

A suitably qualified specialist must submit quarterly **EMPr Compliance Reports** to the AMC. The frequency of report submission can be amended by the AMC after 1 year. Reports must include at a minimum the following information:

- Monitoring / audit activities undertaken in reporting period;
- Overall compliance with the EMPr across the ADZ;
- Key aspects of non-compliance; and
- Operators where non-compliance was identified.

7.4 Corrective Action

Corrective action is a critical component of the implementation–review–corrective action–implementation cycle and it is through corrective action that continuous improvement can be

[2] or as amended by the AMC

achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring indicates non-conformance with the EMPr, the AMC will formally notify the operator through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance / environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the aquaculture operator will be required to report in the Farm Monitoring Report how the required actions were implemented and success or failure of the corrective action.

Should proposed standards or targets be regularly exceeded, an independent committee or service provider should investigate and objectively assess the effectiveness of mitigation measures. If effective mitigation cannot be implemented, stocked biomass should be reduced until targets are consistently achieved.

7.5 Monitoring Measures

The monitoring measures that must be implemented for the ADZ, as well as timelines for the implementation of these measures, are laid out below:

- Table 7-2 specifies ADZ-level measures that must be implemented by the AMC; and
- Table 7-3 specifies farm-level measures that must be implemented by individual operators.

A timeline for initial ADZ monitoring and sampling steps is provided in Figure 7-1.

Table 7-2: ADZ-level monitoring requirements that must be implemented by the AMC

ADZ-level Monitoring Measures				
Aspect	**ID**	**Monitoring measure**	**Timeline**	**Standard / target**
General	1.	Ensure that the aquaculture industry association in Saldanha Bay designates an individual to monitor the shoreline of the Bay weekly for any aquaculture equipment washed ashore. The frequency of monitoring can be reduced after 6 months with the approval of the AMC if incidents of equipment washing ashore are very limited.	Within 1 months of establishment of the ADZ	Appointment and Terms of Reference
	2.	Ensure that the shoreline of the bay is monitored for any aquaculture equipment washed ashore.	Weekly monitoring Frequency can be amended by the AMC after 6 months.	Any debris is quickly removed, and owner is notified.
	3.	Appoint / nominate a suitably qualified specialist to compile a comprehensive Sampling Plan for the ADZ and present the Sampling Plan to the AMC and consultative forum for review.	Within 6 months of establishment of the ADZ Sampling Plan to be compiled within 2 months of appointment of service provider.	Appointment and Terms of Reference Sampling Plan includes appropriate parameters and is (cost) effective and efficient
	4.	Ensure that a suitably qualified specialist conducts sampling and sample analysis in line with the Sampling Plan.	Initiate sampling within 2 month of completion and approval of the Sampling Plan	Good understanding of aquaculture impact on bay, to inform phased implementation of aquaculture
	5.	Appoint a suitably qualified specialist to monitor / audit compliance of aquaculture operators with specifications in the EMPr.	Within 6 months of establishment of the ADZ	Appointment and Terms of Reference
	6.	Ensure that a suitably qualified specialist monitors / audits compliance of aquaculture operators with specifications in the EMPr and submits EMPr Compliance Reports.	Audits to be undertaken at least quarterly initially. Frequency can be amended by the AMC after 1 year.	Compliance of aquaculture activities with EMPr
	7.	Support ongoing State of the Bay monitoring and aim to include parameters that are also relevant to monitoring potential impacts of aquaculture and respective baselines.	Throughout the lifespan of the ADZ	Complementary monitoring and reporting
	8.	Review and interpret results of environmental monitoring in Saldanha Bay and make decisions based on the outcomes of environmental monitoring, which could lead to the amendment of operations within the authorised limits.	At least quarterly Throughout the lifespan of the ADZ	Expansion / phasing in of activities does not compromise marine ecology of the bay
	9.	Develop effective protocols to report on stocking densities, mortalities, graded and ungraded production, biofouling discards.	Throughout the lifespan of the ADZ	Data to be used in ADZ management

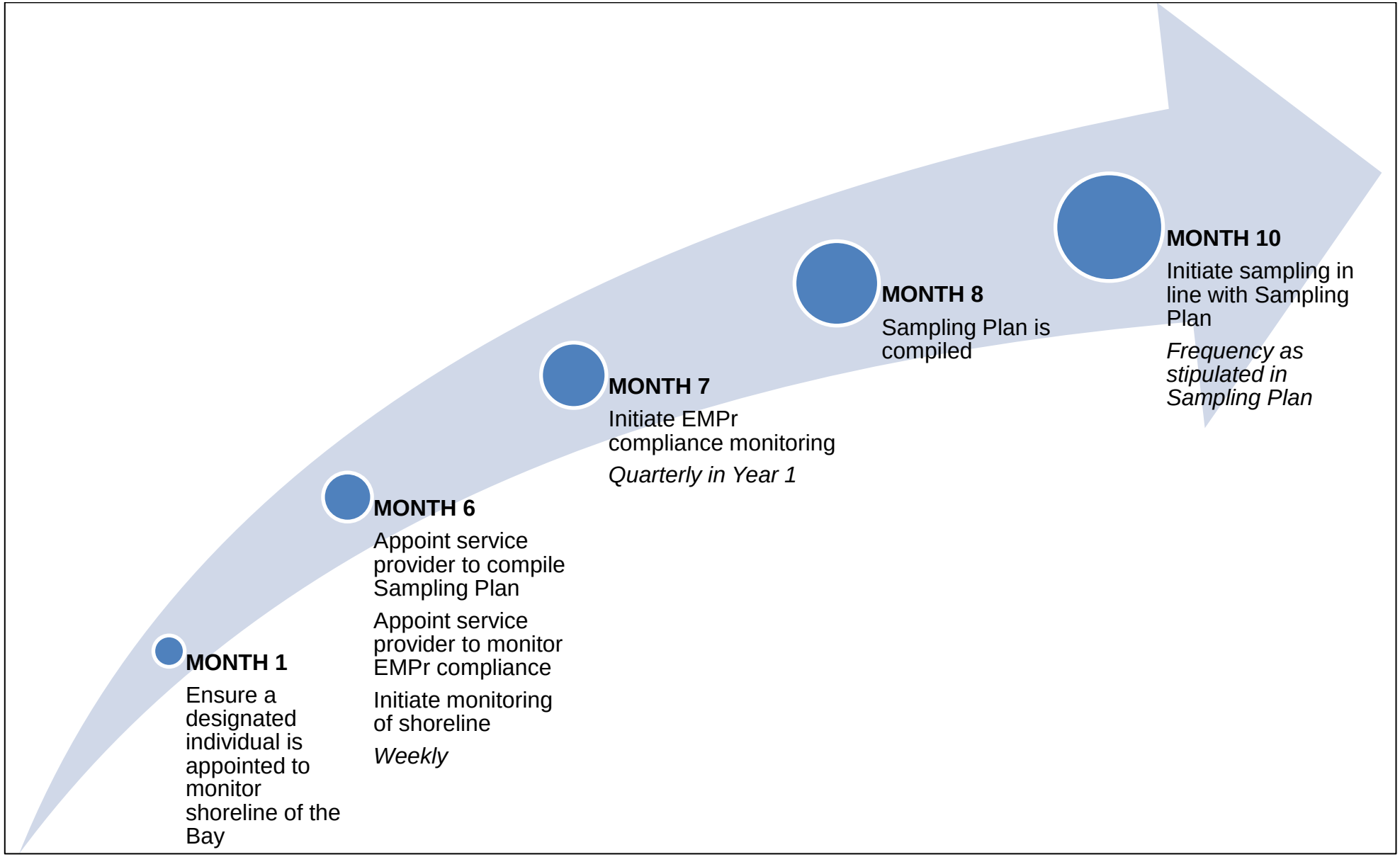

Figure 7-1: Timeline for initial implementation of monitoring at the ADZ

Table 7-3: Farm-level monitoring requirements that must be implemented by individual operators

Farm-level Monitoring Measures				
Aspect	**ID**	**Monitoring measure**	**Frequency**	**Standard / target**
Equipment	1.	Establish an effective monitoring protocol to ensure that longline / raft / net integrity and supporting infrastructure are maintained. Ensure that: - Primary longline / raft / net is secured appropriately so that it is kept taut and rigid at all times. Nets of fish cages should be weighted; - Ropes and anchor lines are taut, especially after rough seas; - Ropes are routinely inspected for wear, especially after rough conditions, and replaced as and when required; and - There is adequate separation between rafts and longlines, even during strong currents and rough seas; *or* - There is adequate separation between the primary and secondary nets of fish cages, even during strong currents and rough seas.	Surface infrastructure: Daily Subsurface infrastructure: Weekly and after storm events	Zero system failure resulting in loss of farm structure integrity. Fewer than 10 entanglements of any species per year and zero mortalities.
	2.	Maintain a comprehensive and detailed register of the quantities of chemicals, antibiotics, antifoulants and hormones etc. that are utilised.	Throughout operations	All substances are accounted for.
Water quality	3.	Monitor water quality and sediment quality as required for operations and/or by other authorisations.	Throughout operations	Produce is suitable for human consumption.
Biosecurity	4.	Establish a traceability protocol of the cultured finfish / shellfish and its products.	Continuous as required by marine compliance officers, at processing, distribution and retail outlets.	100% traceability of cultured fish product
	5.	Develop and implement a stock health monitoring programme, including regularly inspecting stock for disease and parasites, in collaboration with DAFF.	Throughout ADZ	Stock is free of disease and parasites.
	6.	Ensure that facilities are inspected by an aquaculture veterinarian to allow for monitoring of the health status of cultured stock.	Every two years	Overall health of stock should be of a suitable quality to promote and ensure efficient growth rates of particular species being cultured
Fish farming	7.	Monitor culture-fish mortalities to ensure dead fish are quickly removed, to minimise contamination and fluxes in waste production.	Daily	Zero mortalities left in cages for a period exceeding 24 hours.
	8.	Monitoring feed input and uptake to ensure feed waste is limited (i.e. prevent overfeeding by maximising the feed conversion ratio of cultured fish).	Daily	Achieve Food Conversion Ratio of 1.2 or better.
	9.	Develop and implement a protocol to monitor escapes from finfish farms.	Daily	Target = Zero escapees. AMC to decide on standard.
	10.	Adopt the MOM management system (or similar) for monitoring.	Throughout operations	

Farm-level Monitoring Measures				
Aspect	**ID**	**Monitoring measure**	**Frequency**	**Standard / target**
	11.	Ensure adequate genetic monitoring of brood stock rotation.	Throughout operations	No inbreeding / genetic interference.
Marine animals	12.	Keep a log of all cetaceans, seabirds and predators recorded in the vicinity of fish farms, including behavioural observations. These data should be periodically compiled and analysed by experts.	Daily	Behaviour is not significantly altered to the detriment of the species.
	13.	If predator deterrents are used, closely monitor cetacean, seal, shark and seabird behaviour.	Daily	Zero predation of cultured stock. Zero cases of physical harm to any predator caused by deterrents.
	14.	Record all marine vertebrate mortalities resulting either directly or indirectly from aquaculture operations. Where appropriate modify equipment and/or implement other measures to reduce mortalities.	Daily	Target = zero mortalities. Acceptable level to be determined by EMPr advisory committee

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Appendix A:

Farm Monitoring Report Pro Forma

FARM MONITORING REPORT – PRO FORMA TEMPLATE

FARM: …….. **DATE:** ……

REPORTING PERIOD:	Start Date:	End Date:

AREA (Provide coordinates of outer boundaries of actively farmed area):

-

SPECIES CURRENTLY FARMED:

-

PRODUCTION METHOD(S) (number of rafts, longlines, cages, feed, stock volume, production cycle):

-
-

MAINTENANCE ACTIVITIES (equipment repairs and maintenance, health checks, treatments etc):

-
-

STAFF (number, skill level, origin):

-
-

ISSUES ENCOUNTERED (e.g. disease, pollution events, damage, dislodging of infrastructure, collisions. Provide outcome of issues, where possible):

-
-
-
-
-

SIGHTING OF MARINE ANIMALS (e.g. mammals, birds, sharks, etc.; frequency, location, behaviour):

-
-
-
-
-

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