

File Book

ELMS No 6244

Department of Primary Industries, Water and Environment, Tasmania

GPO Box 44A Hobart 7001

Issued under the Environmental Management and Pollution Control Act 1994

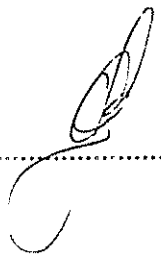
PERMIT CONDITIONS - ENVIRONMENTAL

In accordance with section 25(5) of the *Environmental Management and Pollution Control Act 1994* the Director of Environmental Management, under delegation from the Board of Environmental Management and Pollution Control, requires that the following schedule of definitions and schedules of conditions be included in the permit for the construction and operation of a municipal wastewater treatment facility, at the Boat Harbour Sewage Treatment Plant, Boat Harbour Beach.

In accordance with Schedule 2, 3(a) of the *Environmental Management and Pollution Control Act 1994*, this activity have been assessed as a level 2 activity.

Municipality:	Waratah Wynard Council
Map Name:	Wynyard 1:25 000 map, sheet 3846
Map Coordinates:	E383555, N5468250
File Reference:	083206
Client:	Waratah Wynard Council PO Box 168 WYNYARD TAS 7325

Date conditions approved:

Signed: 

Warren Jones, Director of Environmental Management 2/8/02

SCHEDULE 1

DEFINITION OF TERMS

In this Permit -

'accepted modern technology' means technology which has consistently demonstrated achievement of the desired effluent pollutant levels in economically viable situations, takes account of engineering and scientific developments in economically viable operations and pursues opportunities for waste minimisation;

'activity' means an advanced secondary sewage treatment plant at Boat Harbour Beach located at N5468250 and E383555 (see Attachment 2), on Shelter Point, which discharges treated wastewater into Bass Strait. The major components of the plant are a package treatment plant, biosolids storage, disinfection system, nutrient removal system and outfall.

'biosolids' means organic solid product produced by wastewater processing. Until such solids are suitable for beneficial use they are defined as *wastewater solids*, *sewage sludge* or *sludge*. The solids content of biosolids should be equal to or greater than 0.5%(w/v). Solid biosolids are defined as >17% solids;

'controlled waste' has the meaning described in section 1(3) of EMPCA;

'EMPCA' means the *Environmental Management and Pollution Control Act 1994*;
'environmental harm', 'material environmental harm' and 'serious environmental harm' each has the meaning described in section 5 of the EMPCA;

'the Director' is the Director of Environmental Management appointed under section 18 of the EMPCA (The Director is located within the Department of Primary Industries, Water and Environment);

'grab' means a single sample collected in a manner that ensures that it is a representative sample;


'incident' has the meaning described in Section 32 of the Environmental Management and Pollution Control Act 1994;

'the land' means the land on which the activity to which this notice relates may be carried out, situated at Boat Harbour Beach on unallocated Crown land, grid reference AMG E383500, N5468250, in the State of Tasmania.

'mass loading' means total mass of a pollutant expressed in kilograms;

'median' means a limit that must not be exceeded by more than 50% of all the samples required to be collected;

'person responsible for the activity' is any person who is or was responsible for the environmentally relevant activity for which this notice is issued and includes the officers, employees, agents and assigns of that person, and may be a body corporate; and

 2/8/02

'Tasmanian Biosolids Reuse Guidelines' means the latest guidelines published by the Director about the management of biosolids.

'90% limit' means a limit that must not be exceeded in more than 10% of all the samples required to be collected;

'50% limit' means a limit that must not be exceeded in more than 50% of all the samples required to be collected;

'representative sample' means a sample that, when analysed, produces data that accurately characterises the whole of the source from which it is drawn;

'wastewater reuse guidelines' means the 'Environmental Guidelines for the use of Recycled Water in Tasmania', published in April 2000 by the Division of Environmental Management, as amended from time to time;

'WWTP' means wastewater treatment plant

gj 2/8/02

SCHEDULE 2
PERMIT CONDITIONS

C. Construction

(To be complied with during construction of the proposed wastewater treatment plant and outfall)

C1 Construction supervision

Construction of all facilities of the outfall and Wastewater Treatment Plant system must be supervised at all times by personnel holding relevant technical qualifications or levels of competency consistent with any relevant standard defined by the Australian National Training Authority, unless otherwise approved by the Director.

C2 Locating new outfall

The outfall should be located and installed according to the standards laid out in the *Guidelines For Locating New Wastewater Treatment Plant Outfalls* and to the satisfaction of the Director. This guideline is included as Attachment 1.

C3 Biological Survey and Management Plan

Prior to the commencement of construction a flora and fauna assessment must be carried out on the land. A fauna and vegetation management plan that meets the requirements of the flora and fauna assessment, including any weed management strategies, must be made prior to construction and implemented during the construction period to the satisfaction of the Director.

C4 Stormwater management during construction

During construction activities stormwater runoff must be collected and treated as necessary to ensure that stormwater discharged from the site does not cause serious environmental harm, material environmental harm or environmental nuisance.

C5 Noise control

Unless otherwise approved in writing by the Director, construction shall take place only between the hours of:

0730 to 1730 hours, Monday to Friday; and

0800 to 1600 hours Saturday

Construction activities are not to be carried out on Sunday or Public Holidays which are observed Statewide.

C6 Dust control

Construction activities must be managed by such measures as are necessary to prevent dust emissions causing serious environmental harm, material environmental harm or environmental nuisance. Such measures may include but are not limited to:

(a) using a dust suppression method such as watering dust generating surfaces; and

2/5/10

- (b) ceasing construction activities in very windy weather when the wind direction causes dust to be blown in the direction of residences.

C7 Construction disturbance

- (a) The area cleared of vegetation must be limited to the minimum necessary to carry out construction works.
- (b) Sufficient topsoil must be retained on site to enable the vegetation of disturbed areas.
- (c) As far as is practical and consistent with the use of the site, disturbed areas must be revegetated with species native to the area.

C8 Operations manual

Prior to commissioning:

- (a) an operations manual that sets out essential operating procedures to ensure optimum environmental management of the treatment plant must be produced;
- (b) operators must be adequately trained such they are competent to operate the plant such that it meets the requirements of this permit and does not breach the *Environmental Management and Pollution Control Act 1994*; and
- (c) a copy of the operations manual must be provided to the Director.

G. General

Contact

G1 Within 14 days of the date on which these permit conditions take effect, the Director must be provided with telephone and/or pager contact details of a person who can respond to an incident relating to the Activity, at any specified time, 24 hours a day.

G2 The Director must be notified within 24 hours if:


- (a) the person who can respond to an incident relating to the Activity ceases to be the person who can respond to an incident relating to the Activity; or
- (b) there are changes to the telephone and/or pager contact details of the person who can respond to an incident relating to the Activity.

Volume

G3 The maximum volume of sewage permitted to be treated is 170 kilolitres per 24 hour day (average dry weather flow).

Operational Change

G4 Except with the prior written approval of the Director, none of the following may be changed in the course of the operation of the Activity, if the changes will, or are likely

 2/8/02

to, cause or increase the emission of a pollutant, or otherwise result in environmental harm:

- (a) the components or treatment process of the Activity;
- (b) the nature or quantity of materials dealt with or used or produced in the operation of the Activity; and
- (c) the construction, installation, alteration or removal of any structure or equipment used in the course of the operation of the Activity.

Plant and Equipment

G5 All plant and equipment used in the Activity:

- (a) must be maintained in accord with the manufacturer's specifications;
- (b) must be operated in a proper and efficient manner in accord with the manufacturer's specifications; and
- (c) must be operated by personnel holding technical qualifications or levels of competency consistent with any relevant standard defined by the Australian National Training Authority or unless otherwise approved by the Director.

F. Flow Monitoring

F1 Flow monitoring equipment must be installed at the inlet to the treatment plant.

F2 Equipment that is required to monitor flow must measure to +/-5% of true value.

F3 Flow monitoring equipment must be calibrated in accordance with the manufacturer's specifications or at least once every 12 months.

F4 Calibration details must be recorded and kept for a minimum of 2 years.

S. Waste


S1 The person responsible for the activity must not release controlled wastes for transport from the land for fee or reward unless he or she is satisfied that the transporter holds a current Waste Transport Business Environment Protection Notice (WTB-EPN) in force under the EMPCA.

S2 Controlled waste generated by the Activity may only be disposed of:

- (a) at a site and in a manner approved by the Director, or
- (b) in accordance with a management plan approved by the Director.

S3 A daily record of the quantities and nature of all solid wastes released for transport from the land must be maintained. The record shall be kept for a minimum period of 2 years and made available to any authorised officer on request.

Sewage Sludge/Biosolids Management

 2/5/02

- S4 A management plan for the removal of sewage sludge from the activity and storage, handling, reuse and/or disposal of the sludge, in a format approved by the Director must be provided to the Director prior to desludging and within 1 year of the issuing of these permit conditions.
- S5 Biosolids produced by the activity for re-use must be:
- (a) Graded and classified according to the system specified in the *Tasmanian Biosolids Reuse Guidelines 1999*.
 - (b) Sampled and analysed according to the procedures specified in the *Tasmanian Biosolids Reuse Guidelines 1999*.

E. Effluent Discharge

Authorised Discharge Location

- E1 Wastewater from the sewage treatment plant must only be discharged from the authorised discharge point. The authorised discharge point will be the point agreed to by the Director at the conclusion of the outfall location investigation.

Water quality at the discharge point

- E2 Treated wastewater discharged to the authorised discharge point must not cause:
- (a) odours which would adversely affect the use of the surrounding waters;
 - (b) any objectionable discolouration or visible oil, grease, foam, scum or litter;
 - (c) a barrier to the migration of fish or other aquatic organisms;
 - (d) mortality of fish or other aquatic organisms; or
 - (e) fish or other aquatic organisms to be unacceptable for human consumption as determined by Tasmanian health standards, and/or any standard in force from time to time, applying to the sale for human consumption of such fish or other aquatic organisms in Tasmania, interstate or overseas.

Effluent Quality Limits

- E3 Treated wastewater discharged from the Activity must not exceed the quality limits or ranges specified below:

Parameter	Unit	50%ile	90%ile	Max limit
pH				6.5 – 8.5
Biochemical Oxygen Demand	mg/L	10	15	20
Suspended Solids	mg/L	15	20	30
Ammonia Nitrogen	mg/L	2	3	5
Total Nitrogen	mg/L	7	10	15
Total Phosphorus	mg/L	3	5	8
Oil and Grease	mg/L	2	5	10

 2/5/02

Thermotolerant Coliforms	Orgs./100ml			200
--------------------------	-------------	--	--	-----

E4 The presence of the outfall must be signposted appropriately to discourage primary contact activities within a 5 metre radius at the designated discharge point.

O. Odour Emission

O1 Odour emissions shall not be objectionable beyond the boundary of the land or any other point specified in writing by the Director.

O2 Design odour emissions at the boundary of the land shall not exceed a ground level concentration of 2 odour units, 1 hour average, 99.5 percentile, DAS modelled using Ausplume or any other model approved in writing by the Director.

N. Noise Emission

N1 Noise emissions from the Activity on the land, when measured at any domestic premises in other ownership, must not cause the ambient noise normally existent in the area to be increased by more than 5 dB(A). Sound pressure level measurements must be adjusted in accordance with the relevant standards, and shall be determined over a time interval of 10 minutes.

N2 Condition N2 will not be considered to be breached unless the noise emissions from the land are audible and exceed 40 dB(A) at the domestic premises

N3 All methods of measurement must be in accordance with the most recent Australian Standards and the Tasmanian 'Code of Practice for Sound Pressure Level Measurement'.

M. Monitoring

Location of Monitoring Points

M1 Monitoring data must be collected at the following locations:

Site	Purpose	Description	Location
1	Volume	Records the total volume of waste passing through the WWTP	Plant inlet
2	Effluent quality	Monitors quality parameters of WWTP effluent at the discharge point	Plant outlet
3	Sludge/Biosolids quality	Monitors quality of wastewater sludge or biosolids	Sludge drawoff point

M2 Any changes to the location of monitoring points must be approved in writing by the Director.

 2/5

M3 With the exception of open water sampling, all monitoring points must be clearly marked by a sign that indicates the location, purpose and name of the monitoring point.

Effluent Monitoring


M4 Samples collected at the effluent monitoring site 2 must be analysed for the following parameters using the sampling frequency and methods specified:

	Units	Site	Sampling Method	Frequency
pH		2	Sample site test	Monthly
Temperature	°C	2	Sample site test	Monthly
Conductivity	µ Siemens/cm	2	Sample site test	Monthly
Dissolved Oxygen	mg/L	2	Sample site test	Monthly
Biochemical Oxygen Demand	mg/L	2	Grab	Monthly
Suspended Solids	mg/L	2	Grab	Monthly
Ammonia Nitrogen	mg/L	2	Grab	Monthly
Nitrate Nitrogen	mg/L	2	Grab	Monthly
Nitrite Nitrogen	mg/L	2	Grab	Monthly
Total Nitrogen	mg/L	2	Grab	Monthly
Total Phosphorus	mg/L	2	Grab	Monthly
Oil and Grease	mg/L	2	Grab	Monthly
Thermotolerant Coliforms	Orgs./100ml	2	Grab	Monthly
Enterococci	Orgs./100ml	2	Grab	Monthly
Ecoli	Orgs./100ml	2	Grab	Monthly
Arsenic	mg/L	2	Grab	Annually
Cadmium	mg/L	2	Grab	Annually
Chromium	mg/L	2	Grab	Annually
Copper	mg/L	2	Grab	Annually
Lead	mg/L	2	Grab	Annually
Mercury	mg/L	2	Grab	Annually
Nickel	mg/L	2	Grab	Annually
Selenium	mg/L	2	Grab	Annually
Zinc	mg/L	2	Grab	Annually

Sludge Monitoring

M5 Samples collected at the biosolids monitoring site 3 must be analysed for the following parameters and the sampling frequency specified below.

Parameter	Units	Site	Sampling Method	Freq
Moisture	%	3	grab sample	annual
Temperature	oC	3	sample site test	annual
Conductivity	Siemens/cm	3	sample site test	annual
Organic matter	%	3	grab sample	annual
Ammonia-Nitrogen	mg/kg	3	grab sample	annual
Nitrate-Nitrogen	mg/kg	3	grab sample	annual

 2/5/02

Nitrite-Nitrogen	mg/kg	3	grab sample	annual
Total Nitrogen	mg/kg	3	grab sample	annual
Total Phosphorus	mg/kg	3	grab sample	annual
Total Potassium	mg/kg	3	grab sample	annual
Total Arsenic	mg/kg	3	grab sample	annual
Total Cadmium	mg/kg	3	grab sample	annual
Total Chromium	mg/kg	3	grab sample	annual
Total Copper	mg/kg	3	grab sample	annual
Total Lead	mg/kg	3	grab sample	annual
Total Mercury	mg/kg	3	grab sample	annual
Total Nickel	mg/kg	3	grab sample	annual
Total Selenium	mg/kg	3	grab sample	annual
Total Zinc	mg/kg	3	grab sample	annual
DDT	mg/kg	3	grab sample	Once only
DDE	mg/kg	3	grab sample	Once only
DDD	mg/kg	3	grab sample	Once only
Aldrin	mg/kg	3	grab sample	Once only
Dieldrin	mg/kg	3	grab sample	Once only
Chlordane	mg/kg	3	grab sample	Once only
Heptachlor	mg/kg	3	grab sample	Once only
Lindane	mg/kg	3	grab sample	Once only
HCB	mg/kg	3	grab sample	Once only
BHC	mg/kg	3	grab sample	Once only
PCB	mg/kg	3	grab sample	Once only

Testing Methods

M6 All samples must be:


- (a) analysed at a laboratory with N.A.T.A. accreditation for the selected analyses or a laboratory approved in writing by the Director; and
- (b) collected and analysed in accordance with the relevant Australian Standards unless otherwise specified in writing by the Director.

Sample Information Required

M7 The following information must be recorded in relation to all sampling:

- (a) the date on which the sample was taken;
- (b) the time at which the sample was taken;
- (c) the monitoring point at which the sample was taken;
- (d) the measured or estimated daily flow of effluent at the time of sampling; and
- (e) the results of all monitoring.

M8 All sample information and monitoring results must be submitted to the Director within 2 months of laboratory results becoming available.

 2/8/c

- M9** All records of sampling and analysis required under these permit conditions must be retained for at least 2 years after the date of sampling and made available to the Director upon written request.

R. Records and Reporting


Complaints Monitoring

- R1** A record must be kept of any complaint received by the person responsible for the Activity alleging that pollution has occurred as a consequence of the Activity. The record must include the following details:
- (a) the date and time of the complaint;
 - (b) the name and address of complainant if known;
 - (c) the nature of the complaint;
 - (d) the approximate wind speed and direction and air temperature at the time of the complaint;
 - (e) the likely source of the alleged pollution; and
 - (f) the action taken in relation to the complaint, including any follow-up contact with the complainant.
- R2** The record of a complaint must be kept for at least 2 years after the complaint is made.

Notification of Incidents and Events

- R3** If an incident causing or threatening environmental nuisance, serious or material environmental harm from pollution occurs in the course of the activity to which this environment protection notice relates, then the person responsible for the activity must:
- (a) immediately take all practicable action to minimise any adverse environmental effects from the incident;
 - (b) as soon as reasonably practicable, but not later than 24 hours, after becoming aware of the incident, notify the Director of the incident by a telephone call to the 24-hour emergency telephone number 1800 005 171; and
 - (c) not later than 24 hours after becoming aware of the incident, provide details of the incident to the Director by facsimile to 62 333 800, or by hand delivery, outlining the nature of the incident, the circumstances in which it occurred and the action taken to deal with the incident.
- R4** Any notification given by a person in compliance with this condition will not be admissible in evidence against the person in proceedings for an offence or for the imposition of a penalty (other than proceedings in respect of the making of a false or misleading statement).

Annual Report


2/8/02

R5 An annual report must be submitted to the Director by 30 October of each year, in a form agreed with the Director.

R6 The annual report must contain the following:

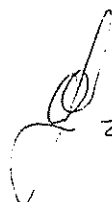
- (a) a summary of Sewage Treatment Plant performance and discharge compliance;
- (b) effluent quality monitoring data for all parameters required by permit conditions;
- (c) a summary of influent flows and loadings from all wastewater sources;
- (d) particulars of all wastewater sources including the names of major trade waste sources discharging into the sewage system;
- (e) particulars relating to solid waste including:
 - i) the quantities and methods of disposal or reuse of all solid waste including biosolids;
 - ii) the gradings of biosolids for re-use; and
- (g) a summary of complaints during the report period including:
 - i) the total number of complaints received by the person responsible for the activity;
 - ii) a breakdown of the total number of complaints into categories of 'odours', 'water pollution', 'aesthetic' and any other category indicated by the complaints; and
 - iii) a brief description of any significant unresolved issues arising from the complaints.

R7 Any raw data requested must be provided in an electronic format approved by the Director.

Environmental Management Plans

R8 An Environmental Management Plan (EMP) review, in a format approved by the Director, must be submitted 3 years after the commissioning of the plant has been finalised, and every 5 years thereafter.

R9 In each EMP review the person responsible for the Activity must prepare a report for submission to the Director which compares the environmental performance of the activity as predicted in the EMP with the actual performance of the premises during the review period.


 2/5/02

SCHEDULE 3

REHABILITATION PERMIT CONDITIONS (To be complied with when the activity ceases)

X Rehabilitation

- X1** The Director must be notified of permanent cessation of operations at least 30 days prior to the planned date of cessation.
- X2** Following permanent cessation of operations, rehabilitation of the land must be carried out in accordance with a decommissioning and rehabilitation plan approved by the Director. The plan must be prepared in accordance with guidelines to be provided by the Director, and by such date as the Director may specify in writing.


2/8/02

SCHEDULE 4

EXPLANATORY NOTES

POLICY OBJECTIVES

Wastewater Treatment Plants (WWTP) in Tasmania must comply with the requirements for best practice environmental management (BPEM) and move toward implementing accepted modern technology (AMT) under the *Environmental Management and Pollution Control Act 1994* (EMPCA) and the *State Policy on Water Quality Management 1999* (SPWQM). The management of pollutant discharge from point sources is governed by the principles defined in clause 16.2 of SPWQM, namely:

- Pollutant discharges must not prejudice water quality objectives (WQO) defined for the receiving waters.
- Pollutant discharges must be reduced to the maximum extent by Best Practice Environmental Management (BPEM) in accordance with the hierarchy of waste management.

The policy framework and guidelines relevant to implementation of policy are as follows:

- *Emission Limit Guidelines for Sewage Treatment Plants That Discharge Pollutants In To Fresh And Marine Waters, June 2001*
- *Accepted Modern technology Policy Framework for Wastewater Treatment Systems and New Permit Requirements, August 2001.*
- *Tasmanian Biosolids Reuse Guidelines; Aug 1999*
- *Environmental Guidelines for the Use of Recycled Water in Tasmania, April 2000*

POLICY IMPLEMENTATION

Environmental conditions attached to level 2 wastewater treatment plant permits are being revised and updated. The conditions contained in Schedule 4 (Requirements) of this document reflect the SPWQM objectives as follows:

- Emission limits based on up to date performance data and BPEM/AMT criteria.
- Adequate monitoring to maintain full compliance with emission limits and ensure WQOs are not prejudiced.
- Pro-active implementation of the BPEM waste management hierarchy with a focus on effluent re-use feasibility where appropriate.
- Self auditing/reporting requirements in line with industry best practice, including:
 - a) incident notification
 - b) event reporting at the Director's request
 - c) annual reporting
 - d) environmental management plan review.


2/8/02

GUIDELINES FOR LOCATING NEW WASTEWATER TREATMENT PLANT OUTFALLS

1 Desirable outcome:

Permanent outfall structures to be located away from sensitive habitat areas such as reefs or sea grass beds, and takes into account possible recreational contact with waters.

2 Outline of Suggested Requirements

The initial baseline survey for the pipeline development includes the following components:

1. Bathymetric profile - quantitative data
2. Seabed characteristics /habitat type profile - qualitative/quantitative data
3. Underwater video survey
4. Photographs - a recent aerial photo of the site (optional) and 35 mm photos from the boundaries of the site.
5. Preliminary design of outfall including construction techniques to minimise and mitigate environmental harm.

3 Environmental Baseline Survey Specifications

3.1 Bathymetric profile

A bathymetric profile is required to provide a reasonable indication of the depth contours in and adjacent to the development site for the outfall. Depth measurements should be made to the nearest metre from a boat equipped with an echosounder and differentially corrected GPS unit and should be obtained along the following tracks:

- (i) A series of sounding tracks at maximum distance of approximately 50 m apart.
- (ii) Soundings at a minimum distance of 200m from the development area.

Any distinct depth features such as trenches, channels and holes should be identified on the map. The depths should be tidally corrected and provided as 2m depth contours on a map showing the coastline (using the 1:25,000 Tasmanian coastline in AGD66).

3.2 Seabed characteristics and habitat profile

Location and boundaries of subtidal habitat type(s) should be detailed on the site map and include the bathymetric contours. The data for the map can be collected by echosounder, diving or underwater video to classify the major habitat types on the seabed in the area :

- hard bottom - rock, limestone reef, boulders, rubble
- soft bottom - sand, mud/silt

- seagrass/algae - species composition of the dominant species present. Density measurements may be required in some development sites.

The distribution of intertidal habitats should also be presented from a combination of information on tidal zones available from the LIST and through the site assessment.

3.3 Underwater video survey

An intertidal and subtidal survey of the seabed should be recorded by video camera along transect lines. The main transect line will run from a point at the high tide mark along the position of the proposed pipeline to a distance of at least 20m past the outfall position. Additional transects may also be required at specific distances (.e.g. at 20m intervals) either side of the proposed pipeline. Further details of the underwater video survey methodology are presented in Appendix 1. A short report summarising key features including marine flora/fauna observable along the transects should be submitted, to accompany the video.

3.4 Photographs

3.4.1 Aerial photograph (optional):

A recent vertical aerial photograph of the site is required, if it is available from DPIWE.

3.4.2 Standard 35mm camera photographs:

Daytime photos at low tide are required along the proposed pipeline site, together with photos of the adjacent shoreline. Each photo location should be clearly identified on the back of the photo and on an accompanying map.

3.5 Preliminary Design of Outfall Structures

Using the previously prepared environmental baseline survey, a final alignment for the outfall structures will be proposed and supported by detail such as habitat types, favorable currents and tides, wind effects, recreational requirements, and visual impacts.

3.5.1 Construction Methods

The outfall should be buried across the shoreline to below low tide with in-situ materials replaced to minimise visual impact.

The outfall and anchor weight blocks should be constructed on shore and floated into position prior to establishing on the ocean floor.

Appendix 1 - Methods

Underwater filming procedure

The start of the video transect can be located by either GPS or by using the bearings and distances shown on the baseline map. Video filming (either digital or Hi-8) is to be conducted by diver, remotely operated vehicle (ROV) or a towed camera, with the transect cable or scale bar in view. Each transect should be identified on the film with the appropriate transect

number e.g. T1, T2 etc. Filming needs to be conducted slowly along the transect to ensure clear well-lit images are recorded. Stationary video footage of the bottom should be provided for at 50m intervals along the transect.

Equipment:

- Clear, well lit images on high quality tapes (e.g. Sony Hi-8) or CD-ROM are required. The video is required to give both a general overview and quantitative data.
- Colour camera capable of operating at minimum 1 lux. Recording with date and time visible at all times. Underwater housing to suit camera fitted with minimum of 2 x 50W lights.

