7. Management of potential impacts – Construction phase

7.1 EMP Structure

This EMP acknowledges the environmental impacts associated with the development and details strategies to mitigate them.

Each control strategy is based upon proven environmental management methods and is presented as a commitment. The commitments made within this document will form the basis of future assessments, which will be made available to the Ballina Shire Council for review.

The EMP is based on a series of tables for both the construction and operational phases of the development. The person responsible for the implementation of the measures detailed is written on the table itself. The tables then detail the Issue, the performance criteria, the Implementation strategy, monitoring, auditing, reporting, failure identification and the corrective action. The detachable pages within each section detail the provisions of the EMP. The format is presented below for reference purposes;

#.# Title

Person responsible	This is the person who has accepted the responsibility of implementing the EMP provisions detailed on this page

Issue	The Issue that the table deals with
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies or tasks (to nominated operational design standards) that will be implemented to achieve the performance criteria
Monitoring	The monitoring requirements which will measure actual performance (i.e. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements, which will verify implementation of, agreed construction and operation phase environmental management strategies and compliance with agreed performance criteria.
Reporting	Content, timing and responsibility for reporting and auditing of monitoring results.
Identification of incident or failure	The circumstances under which the agreed performance criteria are unlikely to be met and environmental harm is likely to result.

Corrective Action	The action to be implemented in case a performance requirement is not reached and the company(s) responsible for action.

Commitment #
What the management has committed the company to.

An objective of the tabular format is to allow for change and allow the EMP to be a *working* document. If items need altering, changes may be made, (after the appropriate consultation with the statutory authorities) to the individual tables.

7.2 General Commitments

Commitment 1

The Proponents undertake to comply with the environmental Implementation strategy as contained within the approved Soil and Water Management Plan (EMP) on a stage by stage basis.

Commitment 2

The Proponents undertake to fulfil all commitments made in this EMP and to carry on their activities on the project site in accordance with relevant current statutory requirements and approved amendments.

7.3 Definitions

In this EMP the terms have the following meanings;

- **EMP** means the approved Stormwater Management Plan and includes any amendments that may be approved from time to time,

- **development** means the development of the site for the purposes of dwelling houses

- **BSC** means Ballina Shire Council and;

- **Proponent** means the person undertaking the development of the land and includes the person nominated by the Proponent as having the responsibility for implementing the provisions of the EMP.

7.4 Dust Management

Person responsible	Contractor's Site Manager

Issue	Minimisation of movement of dust offsite
Operational policy	To achieve acceptable air quality standards through the control of the movement of dust offsite from site works.
Performance criteria	The target level for complaints by nearby residents is no more than one in any seven day period. Ambient air quality should not deteriorate by more than 30% over a period of seven consecutive days. Dust deposition at any nearby residence should not exceed 100mg/m^2/day.
Implementation strategy	The minimisation of the movement of dust offsite will be achieved through the following onsite practices: 1. All permanent bunds and reshaped areas will be revegetated within 10 days after completion of earthworks (including excavation and backfilling of services trenches). 2. Stockpiling onsite will be minimised where possible. 3. An on-site water cart will be available at all times. 4. All dust creating activities to cease if wind speed exceeds 10m/sec. 5. Contractors staff to be trained to implement dust minimisation measures.
Monitoring	Daily inspections will be carried out to verify that dust mitigation measures are being implemented. Dust monitoring will be conducted upon receipt of complaints by residents. If dust monitoring is to take place, the following will occur: • Temporary dust deposition gauges will monitor the movement of dust offsite at the nearest residences adjacent to the proposed stages and within the predominant wind directions . • Monitoring will be undertaken in accordance with AS 3580.10.1 (1991).
Auditing	Management to examine the complaints register weekly and review corrective action taken.

Reporting	• The contractor to notify NSW EPA of a possible environmental nuisance on receipt of 3 or more dust complaints in any 24 hour period. • Reports will be provided to BSC upon request. • Complaints by residents are to be recorded in a Complaints Register and notified to BSC.
Identification of incident or failure	Any dust-related complaints by residents will indicate a failure of the dust control measures.
Corrective Action	Locate the source of the dust and implement the following measures: • apply water sprays to vegetation • cover or water exposed areas • if dust persists, cease the dust creating activities All dust complaints to be addressed in consultation with Council Officers.

Commitment 3

Dust generated during the construction of the subdivision works will be managed to ensure that dust movement offsite is controlled.

7.5 Sediment and Erosion Controls

Person responsible	Contractor's Site Manager, Consulting Engineer

Issue	Sediment and Erosion Controls
Operational policy	To prevent the displacement of sediment and soil across and offsite during storm events.
Performance criteria	• Off-site discharges to comply with requirements for suspended sediments as detailed in Section 7.6 of the EMP. • No visual indication of erosion on stages under construction, including evidence of rilling (an indicator of sheet erosion).
Implementation strategy	1. Erosion and sediment control devices shall be installed prior to commencement of work in each stage in accordance with the approved engineering plans and to the reasonable satisfaction of BSC. 2. Temporary erosion measures (e.g. hay bales, silt fences) are to be employed onsite during construction where reasonably deemed necessary by BSC from an assessment of slope and soil type. Such measures should be in accordance with the recommendations in the Dept. Housing, NSW, Managing Urban Stormwater – Soils and Construction Guidelines. 3. Stockpiled soil should be stored/bunded in a manner to prevent soil being washed offsite (i.e. bunding where necessary). 4. Outside the construction area of each stage existing surface water conditions should be maintained wherever possible.
Monitoring	• Carry out visual inspections weekly and after rainfall events to ensure that erosion measures are in place and operational to suit the activities taking place at the time, • Surface water quality to be monitored during rainfall events (refer to the section titled 'Surface Water Monitoring' which details monitoring of surface water and stormwater quality including during storm events).
Auditing	Visual inspections to be carried out monthly and after rainfall events to verify that control measures are in place and properly maintained.
Reporting of Monitoring Results	Reporting only required if insufficient sediment and erosion measures are identified.

Identification of incident or failure	1. Signs of erosion on site. 2. Damaged or failed erosion control devices. 3. Falling water quality as identified by Environmental Consultant. 4. Build-up of sediment.
Corrective action	Apply remedial measures to Improve sediment and erosion measures, for example; Hay bales, silt fences and flocculation of water quality control ponds.

Commitment 4

Best management practices will be implemented into work practices throughout the construction of the subdivision works to minimise erosion and sediment transport offsite.

7.6 Surface Water Monitoring

Person responsible	Contractor's Site Manager, Environmental Consultant

Issue	Surface water controls
Operational policy	To establish background water quality conditions and maintain these conditions wherever practicably possible during the construction phase.
Performance criteria	All water discharged from the site will comply with the following criteria:

Water Quality Parameter	Release Criteria	Criteria Type
pH	6.5 – 8.5	Range
Suspended Solids	< 50 mg/L	Maximum
Total Nitrogen	0.75 mg/L	Maximum
Total Phosphorus	0.1 mg/L	Maximum
Dissolved Oxygen (field measured)	> 6.5 mg/L	Minimum
Oil and Grease	No visible film, No detectable odour	–

Implementation strategy	• During rainfall events (defined as > 25mm in any 24 hours period) samples are to be collected from the water quality control pond discharge point and analysed at NATA registered laboratory to establish background conditions • Stormwater control will be achieved by directing as much runoff as practicable to the water quality control ponds as shown on the approved plans • Where sediment problems are identified, settling in the water quality control ponds shall be aided by dosing with flocculation agents. • During disturbance of the site, surface water runoff shall be directed to the enclosed water quality control pond.
Monitoring	Surface water monitoring will be conducted at the monitoring points for pH, EC, Suspended Solids, Dissolved Oxygen and Oil & Grease during rainfall events. Flow rates are to be estimated and recorded at the time of sampling.
Auditing	Management to audit water quality results to ensure all discharges comply with the performance criteria.

Reporting	• Result sheets to be compiled for monitoring results relating to water quality of water bodies. These results to be kept on site for inspection by local and state government officers. • Monthly reports to BSC until completion of works.
Identification of incident or failure	Degradation of surface water quality at the monitoring points to below background level or below pH 6.5, or greater than pH 8.5 immediately prior to discharge.
Corrective action	If a pH is detected outside the criteria range, then such waters will be contained, and the pH adjusted to within the range of 6.5 to 8.5 prior to release. If total suspended solids exceed the water quality criteria for this parameter, then water will be contained on site for a period sufficient to allow suspended solids to settle out prior to release, or treated with a flocculent. Erosion control devices will be immediately inspected and cleaned if necessary. Additional devices will be installed if a need is detected to prevent future breaches of the suspended solids criteria. The placement of stockpiles and management of disturbed areas will be reviewed with regard to sediment and silt control.

Commitment 5

Surface water quality will be maintained during the construction of the subdivision works in accordance with the criteria agreed with BSC based on the background data.

7.7 Acid sulfate soil identification

Person responsible	Contractor's Site Manager, Environmental Consultant

Issue	Acid sulfate soil identification
Operational policy	Identify actual and potential acid sulfate soils (ASS & PASS) and determine their potential prior to treatment.
Performance criteria	All ASS & PASS are appropriately identified prior to treatment.
Implementation strategy	The soils excavated from below the current surface level of the floodplain will be sampled according to the following protocol during excavation. **Frequency:** Take minimum of 1 soil sample collected at each colour or texture change with a minimum of sample every 1000m^3 of all excavated soils analysed by the POCAS method either from the excavated profile face or in the bunded treatment pads. **Sample size:** Soil samples approximately 0.3kg each to be collected from each soil horizon with a soil profile description. **Sampling:** Soil samples to be tested on site or collected in sealed containers that exclude air. **Handling and storage**: Sent to laboratory or dried within 24 hours.
Monitoring	Laboratory analysis will employ the Peroxide Oxidation Combined Acidity and Sulfate Method (Method 21) as per ASSMAC Guidelines.
Reporting	Test results to be forwarded to management as they become available.
Corrective action	Adjust sampling rates as necessary.

7.8 Acid sulfate soil treatment

Person responsible	Contractor's Site Manager, Environmental Consultant

Issue	Acid Sulfate soil assessment & treatment
Operational policy	No acid sulfate soils are to be disturbed or excavated without appropriate treatment.
Performance criteria	No material will be covered until validation tests indicate compliance with acceptance criteria based on the action levels of oxidisable sulfur as stated in the QASSIT Guidelines
Implementation strategy	Acid sulfate soil excavation to be conducted according to the schedule detailed in the earthmoving contract and one of the following treatment measures **LIME TREATMENT.** • Soils selected for treatment using this method will be treated with lime or neutralising agent to neutralise their equivalent TPA or equivalent oxidisable sulfur based on sample testing at the rate of one sample per 1,000m^3 of excavated material. In calculating the amount of lime or neutralising agent to be added, a mixing factor of safety of 1.5 will be used. If it can be demonstrated that this safety factor is not needed, this may be reduced with the agreement of BSC and NSW EPA. • Material will be placed in spatially tracked lots within bunded areas. • Material will be placed to a depth of <300mm, limed at the determined rate (or the rate indicated by the soil testing performed on or prior to excavation) and mixed with a rotary hoe or disc plough to a minimum depth of 300mm. • Materials used to construct the bunds will be free from acid sulfate soils and the bunded area will be prepared with surface lime at a rate of 5kg/m^2/metre depth of material to be placed. **EXPOSED SIDES OF OPEN DRAINS ARE TO BE TREATED WITH LIME IMMEDIATELY AFTER EXCAVATION.**
Monitoring	Verification testing will be performed by assessing oxidisable sulfur (or an equivalent method agreed with NSW EPA) sampled at the rate of one sample per 1,000m^3 of treated material. Collect lime delivery dockets and compare with calculated amounts required.

Reporting	Records kept on site during construction phase and available for inspection at all times. Records sent to NSW EPA on completion of the works.
Identification of incident or failure	Examination of works for evidence of; • Yellow efflorescence on soil surface, • Iron staining of soils or water, • Sulphurous odour and; • Low pH in water bodies. The acceptance criteria for the placed materials will be; • If any single sample exceeds the ASSMAC Guideline threshold then the average of any four consecutive samples shall be equal to or less than the ASSMAC Guideline threshold for that material texture or should exhibit an equal or greater acid neutralising capacity.
Corrective action	• Retesting of materials in vicinity of excavation using POCAS method. • Any need for additional lime in specific lots would be assessed, confirmed with the NSW EPA and applied with thorough mixing.

7.9 Contractor Management

Person Responsible	Consulting Engineer

Issue	Contractor management
Operational policy	To ensure the proponents Duty of Care is met by ensuring the Contractor is aware of his responsibilities under the terms of the EMP and the Protection of the Environment and Operations 1997
Performance criteria	Contractor is fully aware of his responsibilities under the terms of the EMP.
Implementation strategy	• Review of the EMP and the construction phase contracts by the proponent. • Periodic checks to be made by an independent Environmental Consultant; • Training for construction staff in implementation of EMP provisions.
Monitoring	Weekly site inspections to be carried out
Auditing	Inspections will be carried out monthly during the construction phase by an Environmental Consultant for every stage of development.
Reporting	Full details to be available to the contractor together with suggested corrective actions if required
Corrective action	To be detailed at the time

Commitment 6

A proactive program of contractor management will be implemented.

7.10 Investigating and reporting fish kills

Person Responsible	Contractor's Site Manager, Environmental Consultant

Issue	Fish Kills
Operational policy	To ensure that the appropriate authority has been notified of fish kills as per the Protocol for investigating and reporting fish kills, NSW EPA and NSW Fisheries, October 2000
Performance criteria	Contractor is fully aware of his responsibility to investigate and notify appropriate authorities of any significant fish kill event within any water bodies on site.
Implementation strategy	Ensure contractor has appropriate information and understanding of and pertaining to the reporting of fish kills on site (as outlined in Protocol for investigating and Reporting Fish Kills, NSW EPA and NSW Fisheries, October 2000). • On becoming aware of a fish kill, a Part A Notification Form (included in Appendix 5) is to be completed and forwarded to NSW Fisheries on Fax No 66862018. • Water and fish samples are to be collected and stored in accordance with the instructions contained in the Protocol for investigating and Reporting Fish Kills, NSW EPA and NSW Fisheries, October 2000 included in Appendix 5.
Monitoring	Daily inspections to be carried out to check for dead fish.
Reporting	Part A Notification Form (included in Appendix 5) is to be completed and forwarded to NSW Fisheries on Fax No 66862018.
Corrective action	Information of corrective action to be obtained from EPA or Fisheries Department depending on nature of fish kill.