Samoa Codes of Environmental Practice

Approved by

Planning and Urban Management Board

04 April 2007
Samoa Codes of Environmental Practice

Prepared by BECA International Consultants Ltd

Approved by Planning and Urban Management Board

Date: 04 April 2007
Table of Contents

1 COEP 1 - Administrative Procedures ....................................................... 4
   1.1 Intent of Codes ................................................................................................4
   1.2 Authority for Codes .........................................................................................4
   1.3 Definitions .........................................................................................................4
   1.4 Code Format ...................................................................................................5
   1.5 Objectives and Targets ..................................................................................5
   1.6 Preparation of Codes .....................................................................................5
   1.7 COEP Development and Implementation ...................................................5
   1.8 Review of COEP ..............................................................................................6
   1.9 Monitoring of Implementation .......................................................................6
   1.10 Training .............................................................................................................6

2 COEP 2 - Road Planning, Design and Construction ............................... 7
   2.1 Objective .........................................................................................................7
   2.2 Principles ..........................................................................................................7
   2.3 Sustainable Development ..............................................................................7
   2.4 Road Design and Construction .....................................................................8
   2.5 Consent .............................................................................................................14

3 COEP 3 - Consultation ............................................................................. 15
   3.1 Objective .......................................................................................................15
   3.2 Principles .........................................................................................................15
   3.3 Consultation Procedure and Directives .....................................................15

4 COEP 4 - Land Acquisition and Compensation.................................... 38
   4.1 Objective .......................................................................................................38
   4.2 Principles .........................................................................................................38
   4.3 Legislation .......................................................................................................38

5 COEP 5 - Construction Camps ................................................................. 40
   5.1 Objective .......................................................................................................40
   5.2 Planning Stage ..............................................................................................40
   5.3 Design .............................................................................................................40
   5.4 Consent ..........................................................................................................44

6 COEP 6 - Road Construction Erosion Control ........................................ 46
   6.1 Objective .......................................................................................................46
   6.2 Planning and Design .......................................................................................46
   6.3 Construction ..................................................................................................49

7 COEP 7 - Slope Stability ........................................................................... 57
7.1 Objective ...............................................................................................................57
7.2 Planning..................................................................................................................57
7.3 Design .....................................................................................................................57
7.4 Construction .........................................................................................................58

8 COEP 8 - Quarry Development and Operations.............................................. 59
8.1 Objective ..............................................................................................................59
8.2 Planning and Design .........................................................................................59
8.3 Construction .......................................................................................................60
8.4 Consent .................................................................................................................67

9 COEP 9 - Gravel Extraction ........................................................................... 69
9.1 Objective ..............................................................................................................69
9.2 Planning................................................................................................................69
9.3 Construction .......................................................................................................70
9.4 Consent .................................................................................................................73

10 COEP 10 - Coastal Protection ........................................................................ 75
10.1 Objective ..........................................................................................................75
10.2 Design................................................................................................................75
10.3 Construction .....................................................................................................76
10.4 Consent ..............................................................................................................77

11 COEP 11 - Drainage ......................................................................................... 79
11.1 Objective ..........................................................................................................79
11.2 Design................................................................................................................79
11.3 Construction .....................................................................................................80
11.4 Consent ..............................................................................................................82

12 COEP 12 - Traffic Control During Construction ....................................... 83
12.1 Objective ..........................................................................................................83
12.2 Clothing..............................................................................................................83
12.3 Signs....................................................................................................................83
12.4 One Way Traffic ..............................................................................................83

13 COEP 13 - Earthworks .................................................................................. 85
13.1 Objective ..........................................................................................................85
13.2 Earthworks Plan...............................................................................................85
13.3 Erosion and Sedimentation Control Measures and Facilities ............... 86
13.4 Cultural Preservation .......................................................................................89
13.5 Restoration .......................................................................................................90
13.6 Consent ..............................................................................................................90
14 COEP 14 - Cellular Telecommunications Facilities ......................... 93
14.1 Introduction .......................................................................................... 93
14.2 Background .......................................................................................... 93
14.3 Assessment Criteria .............................................................................. 93
14.4 Health Effects ...................................................................................... 93
14.5 Visual Amenity Considerations ............................................................ 94
14.6 Proximity to Sensitive Land uses ......................................................... 94
14.7 Location Relative to Identified Risk and Hazard Zones .................... 95
14.8 Applicable Standards and other Useful References ........................ 95
14.9 Positive Effects .................................................................................... 95
1 COEP 1 - Administrative Procedures

1.1 Intent of Codes
These Codes of Environmental practice (COEP) have been prepared to define methods and/or procedures to be followed by consultants, designers and contractors for the avoidance or mitigation of adverse environmental effects that may arise out of infrastructure development projects or maintenance work. Each of the COEP shall be read in conjunction with COEP 1 – Administrative Procedures. The definitions of terms used in the COEP are set out in Section 1.3 below.

1.2 Authority for Codes
The authority for COEP is given in the Planning and Urban Management Act 2004 (PUM ACT). Section 46(e) allows the Planning and Urban Management Agency (PUMA), when assessing a development application, to consider:

“Any strategic plan, policy statement, development standards, guideline, or the like, which has been adopted by a public authority;”

Section 9(b)(iv) of the PUM Act allows the PUM Board to meet its objectives by:

“preparing and approving Planning Provisions and any requirements, development standards or guidelines provided for by this Act, or which may facilitate its implementation or advance its objectives;”

These COEP came into effect on 4 April 2007 when adopted by the PUM Board.

1.3 Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>The body that engages the principal consultant to design and/or supervise the construction of a development or maintenance project. Client shall include a public authority or corporation, and the private sector.</td>
</tr>
<tr>
<td>Project</td>
<td>Shall include development, new construction, upgrading, reconstruction and maintenance.</td>
</tr>
<tr>
<td>Consultant</td>
<td>The firm or design team engaged by the client to undertake either the investigation, the design or the construction supervision of the project.</td>
</tr>
<tr>
<td>Designer</td>
<td>The person, group or groups that undertake the various phases of project preparation and/or construction supervision.</td>
</tr>
<tr>
<td>Engineer</td>
<td>A registered member of the Institute of Professional Engineers of Samoa.</td>
</tr>
<tr>
<td>Contractor</td>
<td>The firm engaged by the client to construct the project or direct the labour team if construction is to be carried out directly by the client.</td>
</tr>
<tr>
<td>MNRE</td>
<td>Means the Ministry of Natural Resources, Environment.</td>
</tr>
<tr>
<td>MWTI</td>
<td>Means the Ministry of Works Transport and Infrastructure.</td>
</tr>
<tr>
<td>EIA</td>
<td>Means the comprehensive study or detailed environmental impact assessment.</td>
</tr>
<tr>
<td>PEAR</td>
<td>Means preliminary environmental assessment report.</td>
</tr>
<tr>
<td>PUMA</td>
<td>Planning and Urban Management Agency.</td>
</tr>
</tbody>
</table>
1.4 Code Format

These COEP are presented in the following format:

**Administrative Procedures**

As set out in COEP 1 and which shall be read in conjunction with each code of practice.

**Codes of Environmental Practice**

Each code is identified by a reference number e.g; COEP 2 – Road Planning, Design and Construction.

Each code sets out its objective and contains a description of practices that are to be applied to the planning, design, construction and maintenance phases of development and maintenance projects.

Where applicable the COEP also present sample design directives for inclusion in terms of reference for planning and design and suggested specification clauses for insertion in project construction specifications.

1.5 Objectives and Targets

The objectives and targets of these COEP are to ensure that all people involved in development project planning, design, construction and maintenance are aware of the need for the COEP practice the procedures, and implement the systems for the prevention or mitigation of adverse environmental effects of those projects. The COEP shall be followed for the planning, design and construction of all development works, where a development consent is required under the PUM Act 2004.

1.6 Preparation of Codes

Interim COEP were prepared in August 2000 as a requirement of the loan agreement between the International Bank for Reconstruction and Development (IBRD) and the Government of Samoa for the Infrastructure Asset Management Programme (IAMP) (Cr. 3193 –O- WSO). The intention was that the interim COEP, which were drafted specifically for roading works, would be applied to all works undertaken by the Government of Samoa, regardless of whether they come under the IAMP. The interim COEP became one component of the environmental assessment framework outlined in the draft EIA Regulations 1998 for Samoa.

As part of Contract No. C4.01 – Environment, Risks and Resource Management (Task EM 3.1), the interim COEP were revised and broadened to cover mainstream construction activities in general, in particular those for infrastructure works, where there is the potential to have adverse environmental effects on the environment.

1.7 COEP Development and Implementation

Development and refinement of COEP, specifically for Samoan conditions, is an on-going process. These COEP have been introduced to the Government Ministries, infrastructure providers and the construction industry through a series of training workshops.

There are three implementation mechanisms for the COEP:

1) Use of the COEP is specified in the Terms of Reference for the design of works. The relevant design directives stated in the COEP should also be incorporated in the Terms of Reference;
2) Use of the COEP is specified in the specifications for the construction of physical works. The relevant suggested specifications stated in the COEP should also be incorporated in the specifications.

3) Environmental approvals are granted with the condition that works proceed under the provisions of the COEP.

1.8 Review of COEP
The training workshops have brought together a wide range of people interested in the continued development and use of the COEP. The intention is that this “COEP User Group” will continue to monitor the introduction and application of the COEP and review the COEP at 3-yearly intervals, or at such time that circumstances require the revision of, or addition to the COEP.

1.9 Monitoring of Implementation
PUMA personnel will monitor the implementation of these COEP through development consents. All other authorities will monitor the implementation of the COEP through normal contract administration procedures e.g. MWTI through routine maintenance and minor works.

1.10 Training
PUMA will be responsible for the training of PUMA staff on the application of these COEP and on how to apply COEP requirements in a consistent manner to assist in preventing or mitigating adverse environmental effects.

PUMA will also be responsible for implementing a training programme for Government Ministries, infrastructure providers, private sector consultants and contractors on the use of COEP in project planning, design, construction and maintenance.
2 COEP 2 – Road Planning, Design and Construction

2.1 Objective

The objective of this Code of Environmental Practice (COEP) is to establish general guidelines for managing and minimising potential environmental (including social) impacts of roading projects by outlining principles and minimum standards which shall be taken into account in the planning, design, and construction of roads. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures.

2.2 Principles

In general road rehabilitation or upgrading works for existing roads, and the road alignment planning, design, and associated earthworks for new roads shall:

- Avoid as far as is practicable the disturbance, and or the resettlement of, villages, or individual buildings including houses;
- Avoid areas of land, foreshore, wetlands, waterways or other areas of habitat which have been set aside for the conservation of flora and fauna, and biodiversity;
- Avoid sites of archaeological, heritage, historical, traditional, and cultural importance;
- Avoid wherever possible National Parks, eco-tourism areas, foreshore reserves, forest reserves, nature reserves, riverbank reserves, traditional reserves, water catchment reserves, wetlands, and heritage and archaeological sites;
- If road user safety is not compromised, relax specified design standards in areas of steep and heavily vegetated slopes, sensitive coastal areas, and roads which could be part of a Scenic Roads Programme;
- Incorporate design features for the general improvement of environmental quality;
- Incorporate design features for the protection and enhancement of coastal margins and other areas that require particular sensitivity; and
- Incorporate measures and design features for the mitigation of adverse environmental effects.

2.3 Sustainable Development

To maximise the goals of sustainable development, during the planning and design phase for road construction, the designer shall:

- Take into account the issues and concerns of affected communities and stakeholders;
- Decide, in consultation with stakeholders, the values which should be given priority;
- Identify and discuss any mitigation measures which could have a major cost implication;
- Consider in the design, construction methods which will minimise environmental risk while taking into account the goals of sustainable development. The most practicable methods for minimising the release of sediment and other pollutants into the environment shall be selected;
 Specify that construction phases are sequenced, timed, and managed to minimise disturbance to the environment. This includes the minimisation of the extent of the area to be worked, and any areas of bare earth exposed at any one time;

 Specify that the programme of construction shall be prepared to show that areas to be revegetated are completed progressively as sections of the work are completed;

 Identify and set out the relevant clauses of the contract requirements and construction details that ensure environmental standards and guidelines are implemented;

 Provide in the contract documentation the operational and maintenance procedures to preserve the mitigation measures in good condition and effective operation.

2.4 Road Design and Construction

For the planning and design phases of roading projects, the designer shall follow the general guidelines as set out below:

Environmental Management Plans

The consultant shall prepare the basis of an Environmental Management Plan (EMP), to be completed by the contractor. The EMP shall set out the management, mitigation measures, and monitoring requirements that will be put into place during the project. The EMP shall:

- Identify the personnel who have clearly defined roles and responsibilities in the implementation of the EMP.
- Establish the chain of responsibility for managing the environmental aspects of the project.
- Identify the records to be maintained which demonstrate compliance with the EMP.
- Establish the mitigation and contingency measures for at least the following:
  - oil spills;
  - material loss;
  - erosion control
  - failure of protection works or earthworks;
  - litter control;
  - dust control;
  - water collection management;
  - noise control;
  - traffic management.

- Specify the temporary stormwater treatment devices, their locations, and the maintenance programme for all such devices.
- Specify and detail sedimentation control measures to be implemented.
- Specify control methods to be used, and identify how these will minimise the amount of sediment released into the environment.
Specify compliance with COEP 12 with regard to construction and road safety training programmes for personnel.

**Survey**

- Follow the process for consultation and land access for survey and investigation as set out in COEP 3 - Consultation and COEP 4 - Land Acquisition and Compensation.
- Minimise branch trimming, tree felling, or other environmental disturbance to that necessary to establish line of sight.

**Cuts and Fills**

- In addition to any requirements to alter the alignment for ecological or social impact reasons, the road design and alignment should determine the best practicable option for:
  - minimising the extent of cuts and fills;
  - minimising the transportation of spoil through or over ecologically sensitive areas (refer to COEP 6);
  - minimising excess cut requiring disposal;
  - minimising the impact of sediment generation in the design of and protection systems for cut and fill batters;
  - establish appropriate factors of safety against failure of battered slopes while maximising batter slopes (refer to COEP 7).

**Disposal of Excess Material**

- In consultation with the affected community, identify and implement the best practicable option for the disposal of excess cut and unsuitable materials. In this context materials means non toxic materials. Any toxic materials shall be disposed of by a method or methods that comply in all respects with the laws of Samoa.
- Specify that all excess cut disposal areas shall be subject to the same environmental controls and guidelines as the overall project, as set out in the relevant COEP.
- Specify that all excess cut disposal areas are designed to maximise embankment stability, minimise erosion, are shaped to conform with the general topography, and are vegetated appropriately.

**Water Crossings**

- Design water crossings to use low impact structures intended to minimise disturbance to the stream/river/estuarine environment, and shall:
  - incorporate any design features required to protect particular ecologically sensitive areas;
  - permit the passage of fish;
  - permit/retain existing navigational requirements;
  - encourage minimal construction time;
- incorporate construction sediment control;
- minimise clearance of vegetation.

**Drainage**

Refer to COEP 6 and 11. In general the design of drainage systems and devices shall:

- Where practicable reduce channel flows through the use of cross drains and turn outs;
- Encourage minimum construction times;
- Minimise the clearance of vegetation;
- Ensure that design details and specifications minimise the discharge of water borne soil particles to natural water courses.

**Temporary Stormwater Treatment**

- Design and specifications for stormwater treatment shall comply with COEP 6 and 11.

**2.4.1 Road Design**

The general guidelines listed above and the following directives shall apply to the design of new or upgrading/rehabilitation road works. For all other aspects of roading projects the directives and standards set out in the COEP shall apply.

**General Environmental Management Contract Clause**

MNRE and/or MWTI shall ensure that a clause is included in all contract documentation related to its roading projects, which sets out the premise for environmental management as envisaged in these COEP.

The Contractor shall be instructed to enter into the spirit of the project regarding the environment, namely, wherever possible to act in such a way that the environmental resources of the site or area are protected, conserved, and sustained at all times.

**Design Standards**

The standards to be used by designers will have been stipulated in the terms of reference issued by the Client. If on analysis of all relevant factors including data on topography, rainfall, soils, tourism potential, traffic volumes, environmental considerations (such as the sensitivity of the adjacent environment), and social factors (such as the location of villages or groups of households), it is considered by the designer that a variation to the design standards should be sought, the designer shall advise the Client accordingly.

A variation in design standards should be considered where a reduction in adverse environmental and social impacts can be achieved without compromising road function or safety.

If, as a result of detailed consideration of all design and environmental factors, the designer considers that there should be a revision of specified standards then the designer shall seek approval to vary the design standards.
**Road Alignment Selection**

If on analysis of all relevant factors including topography, land use, tourism potential, environmental considerations (such as the sensitivity of the adjacent environment), and social factors (such as the location of villages or groups of households), it is considered by the designer that a variation in road alignment should be sought, the designer shall advise the Client accordingly.

If as a result of detailed consideration of all design and environmental factors the designer considers that there should be a variation to the road alignment then the designer shall seek approval to such variation. A variation in road alignment should be considered where such a variation would result in minimising environmental and social impacts.

**Visual Aspects**

Road designs shall incorporate landscape aspects to fit the road shape into surrounding topography. Cut batters should be shaped or rounded to conform with adjacent landform. Horizontal and vertical geometry shall coincide to avoid the development of 'broken back' alignments.

**Rest Areas**

In the design of roading projects through scenic areas, and particularly in locations offering a view of broad vistas, designers shall give consideration to the development of roadside rest areas. Such rest areas shall be developed with the minimum disturbance to vegetation and shall incorporate all environmental protection measures defined in the relevant COEP. They shall be located such that they are in full view of the adjacent road and shall be of such size as to provide for the parking of vehicles of a nature likely to use the road.

The design of such rest areas shall be discussed with MNRE and/or MWTI.

### 2.4.2 Road Construction

For the construction phase, the contractor or constructor shall follow the general guidelines set out below:

**General**

- All reasonable steps shall be taken to ensure minimum nuisance to adjacent land during construction.
- At all times reasonable and useable access be maintained to private land and villages not directly affected by construction.
- Plants, seedlings, and cutting used for revegetation and landscaping should wherever possible be taken from the immediate area, and from as close as possible to the restoration site.
- Management and mitigation plans shall be prepared for project activities that are considered to create adverse impacts.
Environmental Management Plans
No equipment shall be moved onto a site, or works undertaken, prior to the completion of the EMP established by the contract documents.

Haul Roads
Refer to COEP 8.

- Construction and establishment of haul roads shall be kept to a minimum.
- Minimise the extent of traffic and construction impacts on adjacent villages and other residential areas.
- Wherever possible avoid water crossings.
- General noise control measures set out in the EMP shall apply to haul roads.
- Shall be constructed with cut off drains and runoff passed through stormwater treatment devices.
- Haul roads and associated temporary structures shall be removed upon completion of the works and the area reinstated.
- Revegetate the area as soon as is possible in line with this guideline.

Dust Control
- Dust control measures by dampening shall be detailed in the EMP, and shall include where the water shall be collected from (i.e. whether from rain storage tanks or local watercourses), and the number of watering trucks required. All care shall be taken to ensure excess water does not find its way to waterways.
- Hydrocarbons shall not be used as a method of dust control.

Cut Disposal and Management
Shall be as set out in COEP 6 and shall include:

- Temporary stockpiles shall be restricted to within the actual alignment wherever possible.
- Cut disposal shall be designed to ensure embankment stability and to minimise erosion.
- Cut off drains and temporary silt ponds to remove sediment shall be installed prior to the disposal site receiving material.
- Cut disposal areas shall only receive clean fill.

Stockpiles
- Ensure that stockpiles of top soil, humus, mulch, clean-fill, waste materials, and roading aggregates are not located within 10m of a watercourse, or in ecologically sensitive areas.
- Stockpiles of materials shall not be permitted to generate dust.
- Ensure that any stockpile is equipped with cut off drains or similar.
- Ensure that runoff from stockpiles is directed through a stormwater treatment device.
- Ensure that all stormwater treatment devices are adequately maintained.

**Refuelling and Maintenance Areas**

Refer to COEP 5.

- Ensure that refuelling and maintenance facilities are not located, or activities do not take place, within 30 m of a watercourse, or in ecologically sensitive areas wherever practicable. If a 30 m limit is impracticable then a lesser limit may be adopted provided approval is obtained. On no account shall the limit be less than 10 m.
- Ensure that vehicles and plant are not stored within 30 m of a watercourse, or in ecologically sensitive areas, overnight or when not in use.

**Site Facilities**

Site facilities shall be established as set out in COEP 5. Site facilities include offices, ablutions, and areas designated for workers, and as such are activities that have the potential to generate litter and other waste material. These facilities shall not be located within 30 m of a watercourse, or in an ecologically sensitive area. Site facilities include:

- Site offices, buildings, and facilities as necessary;
- Covered rubbish bins; and
- Regular disposal of rubbish off site at an appropriate location.

**Water Crossings**

Refer to COEP 11.

- Minimise disturbance of watercourses; excavations or disturbance of the bed of any waterway shall not occur unless required as part of construction.
- Exposed surfaces shall be minimised and revegetated or sealed as soon as practicable.
- Weather conditions should be taken into account in programming earthworks.

**Temporary Silt Control**

Refer to COEP 6.

- Temporary stormwater devices and associated cut off drains/bunds shall be installed prior to any earthworks commencing on site.
- Construction of temporary treatment devices shall minimise environmental disturbance.
- All temporary treatment devices shall be removed and appropriately reinstated upon completion of the associated earthworks.
- All temporary treatment devices shall be maintained to ensure optimum operating efficiencies.
Planting and Revegetation

Grassing and replanting of trees and shrubs progressively throughout construction of roads is the most effective means of preventing or minimising erosion. Consequently contractors shall programme and execute their work such that:

- Revegetation of all exposed surfaces shall be specified and shall be undertaken as soon as practicable after completion of earthworks.
- Stockpiles of top soil and mulch comply with the requirements for stockpiles (refer to COEP 6).
- Erosion protection measures shall be specified as COEP 6.
- Maintenance of vegetation and erosion control measures shall be specified.

2.5 Consent

2.5.1 Consent Required

In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in road construction shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

2.5.2 Application for Consent

Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the road construction. In the case of land development, the land developer rather than the contractor or agent shall submit the application.

Applications shall be made no later than one month before the proposed construction is scheduled to begin.

Applications shall be accompanied by such other documents as PUMA may require.

2.5.3 Public Hearing

At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

2.5.4 Special Conditions

PUMA may, upon issuance of a consent, impose any conditions or special requirements on the road construction as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

2.5.5 Consent Expiration and Renewal

A road construction consent issued by PUMA shall expire two years from the date of issuance. If the construction activity is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
3 COEP 3 - Consultation

3.1 Objective
The objective of this Code of Environmental Practice (COEP) is to establish the process and protocols for meaningful participation of stakeholders and affected communities in all aspects of development projects. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures.

3.2 Principles
The basic principles of consultation, which should be applied to all development projects, are as follows:

- At the earliest opportunity, a community should be advised of potential projects and how the community can receive information about, and become involved with, such projects.
- The intentions/objectives of the consultation should be clearly and openly stated.
- Stakeholders and affected communities should have timely and meaningful inputs to, and participation in, any phases or aspects of projects that directly affect them and all inputs should be treated equitably and with respect.
- Consultation should be a two-way process, there should be an exchange of information where both the proponent and the affected communities should put forward their points of view and to consider other perspectives.
- Consultation is best undertaken at early stages in and throughout the decision making process or at least on going communication after a decision has been made.
- All parties do not have to agree to a proposal, however as a result of undertaking consultation at least points of difference will become clearer or more specific.

Project proponents must comply with the requirements of the Planning and Urban Management (Environment Impact Assessment) Regulations 2007 as they pertain to consultation during the environmental impact assessment process.

3.3 Consultation Procedure and Directives

3.3.1 Identification of Affected Persons or Parties
The project proponent should identify persons or parties involved in, or affected by, the proposed works.

Affected person or parties’ are people who may experience an effect generated by the proposed project which is significantly greater than or different from the effect on the general public.

Those ‘affected persons or parties’ who should be consulted include:

- Owners, occupiers and users of the affected land and adjacent and nearby land;
3.3.2 Identification of Stakeholders

The project proponent should identify stakeholders or interested persons or parties involved in, or affected by, the proposed works.

The term ‘interested persons or parties’ refers to a broader group than ‘affected persons or parties’. It covers all persons who may have an interest in an application, geographic area or issue. Examples of ‘interested persons or parties’ include village committees and groups, commercial enterprises (shops), schools etc.

3.3.3 Consultation Framework

Public participation is one of the key principles underlying the Planning and Urban Management Act 2004. The Agency will generally require people applying for development consent to submit a record of and response to any consultation undertaken. If consultation has not been undertaken, applicants should demonstrate why consultation has not been undertaken or why the circumstances of the application render consultation unnecessary. The process of consulting differs depending on the nature of the proposed development and the implications to the environment and community.

Prior to any consultation, consideration should be given to the nature, extent and size of potential effects which includes the type of effect (e.g. visual, traffic, noise, dust), how far (e.g. adjoining properties, whole neighbourhood, stream catchments) and how large in the context of the environment (e.g. minor, moderate, significant).

When to consult

- The best time to engage in consultation is before the submission of a development consent application. Consultation outcomes should be incorporated into the development application before lodging it with the Agency.
- The proponent must also consider the relevance of conducting any consultation. In identifying this, the proponent should identify:
  - the situation/issue that needs to be addressed by consulting and why;
  - outcome as a result of consultation;
  - any external aspects of the situation/issue which should be considered;
  - significance of the decision to the stakeholders and whether it is contentious; and
  - implications of not consulting.

How to consult

- The project proponent should prepare consultation materials which must include a brief description of the project and plans of the proposed development. These
materials should also state any proposed measures to reduce the extent or impact of possible effects generated from the proposed development.

- Consult with identified persons and groups by:
  - Letter with an offer of follow-up contact to discuss the proposal.
  - Telephone contact (where possible) to confirm that they have received the information sent and to arrange further communication to determine any issues.
  - On-site meeting.
  - Conducting surveys.

- Consultation with customary authority through the village fono. Proponent should generally keep in mind that there maybe more than one customary owner for an area.

- A written record of consultation undertaken should be kept. This should record:
  - What consultation was undertaken, with who and when.
  - The information provided.
  - The response/comments from consultation parties.
  - If the project has been amended to take consultation outcomes into account. If not, an explanation of why not.

- Provide feedback to parties consulted. Continue communication as necessary and particularly on decision reached and where decision differs from the input provided.

3.3.4 In a situation where a project proponent declines to undertake consultation

The Planning and Urban Management Agency in processing the development consent may undertake its own consultation with affected persons or parties. In such cases, results from such consultation may be provided to the project proponent or may be a material factor taken into consideration in deciding to approve, reject or approve conditions on any application. In the event that the Planning and Urban Management Agency decides to undertake consultation it may invite the project proponent to first undertake consultation itself, or to be involved in any such consultation meetings undertaken.
The following are extracts from the World Bank Final Report: Social Assessment and Consultation Framework Study (1998) which identifies key stakeholders, assesses their importance, degree of influence and interest in roading and infrastructure projects.

### Road System

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Their Importance for Successful Design and Implementation of Project Component</th>
<th>Their Degree of Influence on Project Without Special Attention</th>
<th>Their Interests in Relation to Project Component</th>
<th>Probable Impact (from + + + to - - - or ?) of Project Component on Their Interests Without Special Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cabinet</td>
<td>Very High</td>
<td>Very High</td>
<td>Project advances SES goals</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields net fiscal gains</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source of funds</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Political fallout from attempting to widen Coast Road</td>
<td>- - -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts party</td>
<td>+ +</td>
</tr>
<tr>
<td>2. Ministry of Finance</td>
<td>High</td>
<td>High</td>
<td>Project proceeds on track</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields visible benefits</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts careers</td>
<td>+ +</td>
</tr>
<tr>
<td>3. Ministry of Works</td>
<td>High</td>
<td>High</td>
<td>Project proceeds on track</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields visible benefits</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts careers</td>
<td>+ +</td>
</tr>
<tr>
<td>4. Ministry of Transport</td>
<td>High</td>
<td>High</td>
<td>Project proceeds on track</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields visible benefits</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts careers</td>
<td>++</td>
</tr>
<tr>
<td>5. World Bank Officers &amp; Consultants</td>
<td>High</td>
<td>High</td>
<td>Project proceeds on track</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields net benefits</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts careers</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source of consulting income</td>
<td>++</td>
</tr>
<tr>
<td>6. Project Management Unit</td>
<td>High</td>
<td>High</td>
<td>Project proceeds on track</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields net benefits</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source of income</td>
<td>+</td>
</tr>
<tr>
<td>7. Private Sector Contractors, Supervisors and Consultants</td>
<td>High</td>
<td>Low</td>
<td>Business opportunities</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project-initiated training</td>
<td>++</td>
</tr>
<tr>
<td>8. Transport Control Board</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Improved traffic flow</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clarify institutional status</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reduce accidents &amp; fatalities</td>
<td>++</td>
</tr>
<tr>
<td>9. Road Safety Committees</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Reduce accidents &amp; fatalities</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source of funds</td>
<td>++</td>
</tr>
<tr>
<td>10. Village Fono, Leoleso, and Reed &amp; Education Committees</td>
<td>Moderate</td>
<td>Low</td>
<td>Ability to direct village affairs</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintain peace &amp; harmony</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Safety of school children</td>
<td>--</td>
</tr>
<tr>
<td>11. Villages Where Sealed Roads are Widened Substantially</td>
<td>Moderate</td>
<td>Low</td>
<td>Increase in traffic casualties</td>
<td>- - -</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Destruction of or infringement on chiefly mana and leoo</td>
<td>- - -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Road further splits community</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible loss of bathing pools</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Substantial reduction to or complete loss of cricket pitch</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Increased traffic noise</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Increase cost &amp; effort of restraining livestock</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further loss to village milo</td>
<td>-</td>
</tr>
</tbody>
</table>

| 12. Owners of Roadside Property Where Roads Widened | Moderate | Low | Compensation for losses to high status roadside property | - - -  |

| 13. Families Tending Roadside Graves Where Roads Widened | Moderate | Very Low | Possible removal of graves | - - -  |

| 14. MP's and other Owners of Freehold Plantations Inland of Coast Road in Area of Proposed Road | Low | Moderate | Road reduces transport time & cost & increases land value | + + +  |
| | | | Compensation for land | +  |
| 15. Bus & Taxi Owners & Drivers | Low | Low | Targeted for education, licensing & enforcement | ? 5  |
| 16. Government Vehicle Drivers | Low | Low | Targeted for education, licensing & enforcement | + 1 |
| 17. Traffic Police | Low | Low | Reduce accidents & fatalities | + |
| | | | Increase capabilities | ++ |
| 18. Villages to be Connected by New Sealed Roads | Low | Low | Increase ease and speed of travel to and from village | ++ |
| | | | Increase traffic danger | + 2 |
| 19. Ministry of Internal Affairs | Low | Low | Advocate for village interests and facilitator of consultations | + |
| 20. Ministry of Education | Low | Low | Changes to curriculum & teacher duties | + 1 |
| 21. School Teachers | Low | Low | Training for new content | - 3 |
| | | | Act as road crossing guard | - 3 |
| 22. Corporate Services Division, DLSE | Low | Low | Processing government land acquisition and compensation | + 1, 7 |
| 23. Technical Services Division, DLSE | Low | Low | Construction surveys | + 1, 7 |
| 24. Environment Division, DLSE | Low | Low | Environmental monitoring | + 1, 7 |
| 25. Samoa Water Authority | Low | Low | Road widening disturbs pipes | - 1 |
| 26. Post & Telecommunications | Low | Low | Road widening disturbs telephone lines | - 1 |
| 27. Electric Power Corporation | Low | Low | Road widening disturbs power lines | - 1 |
| 28. Local Members of Parliament | Low | Low | Deliver benefits to local voters | + + |
| 29. Environmental NGOs | Low | Very Low | Environmental disturbance | - |
| 30. Owners of Customary Land Inland of Coast Road, NW Upolu, in Area of Any Proposed New Road | Low | Very Low | New or improved inland road saves time and expense | + |
| 31. Asia Merchants | Low | Very Low | Footpaths affect business | - |
| 32. Chamber of Commerce | Low | Very Low | Survey and represent interests of members & their customers | + |
| 33. National Health Promotion Campaign | Very Low | Very Low | Reduce non-communicable illness through education | + |
| 34. Land & Titles Court | Very Low | Very Low | Increase case load | - |
| 35. Travelling Public | Very Low | Very Low | Increase safety | - |
| 36. Agricultural & Industrial Producers & Consumers | Very Low | Very Low | Reduce road transport time & cost | + |
| 37. Paliefa in Affected Villages | Very Low | Very Low | Increase work load | - |
### Samoa Codes of Environmental Practice

<table>
<thead>
<tr>
<th>38. Schools and Owners of Shops and Residences Near Proposed Bridges</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Construction inconveniences and safety risk</th>
<th>-12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible property condemnation</td>
<td>-13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>39. Schools and Owners of Shops and Residences Near Proposed Road Work</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Construction inconveniences and safety risk</th>
<th>-12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible property condemnation</td>
<td>-13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>40. Schools and Owners of Shops and Residences Near Proposed Footpaths</th>
<th>Very Low</th>
<th>Very Low</th>
<th>Construction inconveniences and safety risk</th>
<th>-14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible property condemnation</td>
<td>-13</td>
</tr>
</tbody>
</table>

| 41. Accident Compensation Board | Very Low | Very Low | Provide statistical information on accident rates and locations | + |

α Depends partly on party affiliation.

- Depends partly on location and extent of road widening and of new road construction. A preliminary social impact analysis is presented in the matrix above and in Sections 2.2.2 and 2.2.4 below of a proposal to widen the Coast Road on NW Upolu. Such a proposal is apparently under informal consideration by government in relation to the IAM Project.
# Coastal Infrastructure

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Their Importance for Successful Design and Implementation of Project Component</th>
<th>Their Degree of Influence on Project Without Special Attention</th>
<th>Their Interests in Relation to Project Component</th>
<th>Probable Impact (from + + + to - - - or ?!) of Project Component on Their Interests Without Special Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cabinet</td>
<td>Very High</td>
<td>High</td>
<td>Visible benefit to villages</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project yields net fiscal gains</td>
<td>+ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source of funds for villages</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good project boosts party</td>
<td>+</td>
</tr>
<tr>
<td>2. Village Councils of <em>Metai</em></td>
<td>Very High</td>
<td>Low</td>
<td>Enact and enforce co-management plans and laws</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible threat to its authority or possible demonstration of its effectiveness</td>
<td>?</td>
</tr>
</tbody>
</table>

*Note: ? indicates uncertainty or ambiguity.*
### 3. World Bank Officers & Consultants

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project proceeds on track</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Achieve institutional goals for number of environmental projects</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Project yields net benefits</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Source of consulting income</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Good project boosts careers</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

### 4. Ministry of Lands, Survey & Environment

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel and training needed to provide extension advice and leadership for co-management plans developed by villages</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Provide surveys for infrastructure</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Help develop coastal hazard zone laws</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Conflict between extension, monitoring and enforcement roles</td>
<td>- - ²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Commission / NZODA</td>
<td>High</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Project Management Unit</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Coastal Property Owners</td>
<td>High</td>
</tr>
<tr>
<td>8.</td>
<td>Coastal Villages Identified for Participation in Coastal Zone Infrastructure Strategy (140)</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>9. Public Works Department</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>10. Office of the Attorney General</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>11. Police</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>12. Courts</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>13. Private Surveyors and Contractors</td>
<td>Moderate</td>
<td>Low</td>
</tr>
</tbody>
</table>
| 14. Ministry of Internal Affairs | Low | Low | Advocate for village interests and facilitator of consultations | ?
|   |   |   | Coordinate program with village through *palenu* u | + |
| 15. Fisheries Division, MAFIM | Low | Very Low | Overlap between Coastal Management programs | -
| 16. SPREP | Very Low | Low | Implementation of coastal works yields sustainable protection of coastal zone | + |
|   |   |   | Overlap in environmental programs | ? |
| 17. Participants in CZIS Participating Villages | Very Low | Very Low | Increase work load | - 5 |
|                                            |         |         | Opportunity for personal gain or to improve influence and position in village | +  |
| 18. Eco-Tourism Operators & Clients         | Very Low| Very Low| Environmental protection | +  |
|                                            |         |         | Aesthetic beauty of coast | - 6 |
| 19. Environmental NGOs                      | Very Low| Very Low| Protection of coastal zone | +  |
|                                            |         |         | Source of funds | ? |
| 20. U.S. Peace Corps                        | Very Low| Very Low| Possible contribution of volunteer in CZIS | +  |
| 21. Land & Titles Court                     | Very Low| Very Low| Possible increase in case load | - 7 |

Annexure 2 (Note: Users are advised to check with PUMA for the current names/titles of the relevant agencies)

Road System

1.5.5 Community Consultation Framework for Road System Assets Component

The existing consultation program within PWD appears to be limited to its own restructuring issues. PWD appears to have little or no formal consultation program with the wider community in the planning, design, or construction of infrastructure. Little or no community input or information appears to have been sought to date, for example, in identifying or prioritizing sites for footpath construction. Road construction or surfacing is commonly arranged, and notice to local residents given, by a district’s Member of Parliament, but such notices are rather more frequent than actual construction. PWD itself does commonly give a kind of notice to nearby residents when construction is planned or when it begins, but then only informally when the survey or road crews arriving on site are questioned by residents.

Similarly, TCH appears to have little or no formal consultation program with the wider community in identifying problem areas and then seeking and prioritizing practical solutions. The Road Safety Committee is carrying out an aggressive community information and education program—which will be helped significantly by the project—but again its outreach program appears to be largely one way. In attempting to help solve traffic problems on Upolu, for example, it approached over 30 villages in turn and tried to convince them to accept the installation of four turn-out stations (two on each side of the road) for buses to stop along the main road in each village. Even though the bus stops would have been funded entirely by government, only two villages could be convinced to accept them. With that kind of lesson to build on now, it appears that a more successful approach would be to consult with communities first to find out what their interests, ideas and concerns are, and then work with them to come up with practical solutions.

The process of identifying, prioritizing, designing, and constructing roads, bridges, footpaths, seawalls, and other infrastructure should be preceded by community notices and information sessions, and thorough community consultations should be carried out when impacts are significant or where community information or co-management might contribute significantly to successful outcomes.

Somewhat different consultation frameworks are appropriate for the four different sub-components of the Road Systems Asset Component, and somewhat different procedures are appropriate for the Apia town area than for peri-urban and rural villages. These frameworks will be discussed in turn below.

Bridges

People want bridges, or improved bridges, and everyone recognizes that government owns and has primary (but not exclusive) control over the main roads, so the consultation procedures here are simple and straightforward.

In Apia Town Area

In Apia proper, residents, shop owners, and schools near a proposed bridge should be notified of the proposal and invited to a short workshop where they can express their interests and provide information that will be of use in designing the bridge. Similarly, a general notice should be placed in local papers and on the local radio informing the general public of such plans and inviting interested parties to the workshop. Relevant parties include bus lines and businesses that do now or would come to rely heavily on the bridge. Practical agreements can be reached at the workshop concerning the timing and manner of construction, special design requirements such as local access ramps (e.g., those on the new Leone bridge), and safety precautions to be taken during construction. Such meetings and their agreements should be minuted and copies of the minutes sent to the participants, including the PMU. See Item 8, Section 1.4.2, for consultation requirements for taking land.

In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 8-9, 24, 25 (if water pipes involved), 32, 35, and 38 in the above matrix.

In Villages

For bridge construction in peri-urban and rural villages, the streamlined notification and consultation procedures for villages (see, Section 2.3.5 under Coastal Infrastructure) should be added to those described above for Apia. See Item 8, Section 1.4.2, for consultation requirements for taking land.

In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 8-10, 19, 25 (if water pipes involved), 35, and 37-38 in the above matrix.

Responsible Party: PWD
Roads

In Apia Town Area

No new roads are planned in the Apia town area under the project.

In Villages

For road construction in peri-urban and rural villages, the notification and consultation procedures for villages and districts should be employed (see, Section 2.3.5 under Coastal Infrastructure). Note that schools, businesses, landowners, and residents in rural areas that are not formally part of a recognized village (i.e., they are not represented on the village council) should be contacted individually if roadwork is to be carried out in their area. Actual notification and consultation procedures will be somewhat different depending on what is proposed. The four main options and their respective consultation frameworks are described below.

1. Improve and Tar-Seal Existing Road.

Written notification through palenu'au. Notification should include an offer to consider special conditions such as timing (e.g., restrict grading to dry season), method (e.g., precautions to avoid lagoon siltation, handling of road tar, protection of roadside trees) and safety (e.g., designation or preparation of alternate footpaths prior to road construction). If such requests are received, a follow-up consultation meeting should be held with interested parties.

In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 8-10, 19, 25 (if water pipes involved), 35, and 37-39 in the above matrix.

2. Resurface or Re-Construct an Existing Road as Maintenance or to Improve Safety.

In addition to the notification procedures listed above under Item 1, consultations should be arranged with local residents, police, and bus and taxi drivers to gain information about local conditions. Consultations with villages can be made through the Roads Committee of the respective village councils.

In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 8-10, 19, 25 (if water pipes involved), 35, and 37-39 in the above matrix.

3. Substantially Widen Existing Sealed Road (e.g., the Coast Road).

In addition to the notification procedures listed above under Items 1 and 2, an Environmental Impact Assessment (including a Social Impact Assessment) should be carried out during the early planning stage. Such an assessment should include the assessment of options, including the do-nothing option. See Item 8, Section 1.4.2, for consultation requirements for taking land.

In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 5-13, 17, 19, 22-29, 33-35, 37 and 39 in the above matrix.

4. Build New Road.

Same protocol as Item 3, above.
In addition to advertised tender notices, stakeholders to be consulted by PWD include those numbered 5-10, 15, 17-19, 22-24, 29-30, 34-35, and 37 in the above matrix.

Responsible Party: PWD

**Road Safety**

**In and Around Apia Town Area**

The Road Safety Committee (RSC) and its parent body, the TCB, already have a well-structured consultation program thoroughly under way. The main governmental stakeholders are represented on the RSC itself or on the TCB. It is doubtful that expanding the membership of either body would prove beneficial. With help from the project Road Safety consultant, the RSC has developed a comprehensive and wide-ranging approach to improving road safety. The road safety issues and solutions in the Apia area are generally those that are common to similar areas, including those in Fiji and in small towns in more industrialized countries, where a fairly standard set of solutions has already been worked out. RSC also has an ambitious community awareness and education program under way in the Apia area that targets the most relevant stakeholders. It is doubtful whether much would be gained at this point from involving RSC in other community consultations or notices. Two exceptions should be noted, however. The first is minor, the second more significant.

1. RSC might take somewhat more care to ensure that PWD provides advance notification to the travelling public before installing new speed bumps or other such structures. PWD should ensure that all such structures are clearly marked at the moment they are installed, rather than a couple of days later.

2. More general community consultations should be held for identifying and prioritizing pedestrian facilities and “soft” solutions to pedestrian safety problems in and around the town area, as recommended below under Pedestrian Facilities.

Other than these two recommendations for notifying and consulting with the travelling public, RSC should focus on carrying out its action plan in and around Apia.

Responsible Party: TCB

**In Villages**

The situation is somewhat different in the peri-urban and rural villages. As described below (see Villages under the heading Pedestrian Facilities), working out an appropriate range of road safety solutions may require a more consultative approach that is tied into the RSC’s travelling public awareness and education campaign. Much like the co-management approach recommended in Section 2.3.5 for the Coastal Zone Infrastructure Strategy, the travelling RSC education show can lead to a broad range of solutions with shared responsibility. Under such a participatory approach, RSC road safety extension officers (which is really what they are) would help the community identify local problems and then prioritize a set of practical solutions—some of which might be the responsibility of the community and some the responsibility of government.

Responsible Party: TCB
Pedestrian Facilities

In and Around Apia Town Area

Stakeholders 2, 3, 8-10, 17, 19, 22-23, 32, and 40 should be consulted to help identify and prioritize areas in and around Apia that require new or improved pedestrian facilities (including clearing hedges and other obstacles from pathways). The best way to do this is probably for the Road Safety Committee to tender a contract for an initial survey of stakeholders to identify problem areas and suggest solutions. To help in making a priority list, the survey should include quantitative information on pedestrian loads and accident rates at critical sites. The survey should be followed by a workshop with stakeholder representatives to act on a priority list and schedule of implementation. The workshop should be guided by realistic information about likely or actual budget allocations for pedestrian facilities. Workshop members should present with a prepared option list drawn from the survey information, with appropriate cost estimates presented and budget limitations clearly stated. The Chamber of Commerce and NUS are likely candidates to take on this survey and to organize the workshop. PWD, TCB, and the Road Safety Committee should sponsor and participate in the workshop. Minutes of the workshop should be copied to the participants and to the PMU.

Once areas and viable solutions are chosen and prioritized, notice should be given to the public concerning any proposed changes in their area. These changes may include notices to remove obstacles from pathways or notices of land confiscation for conversion to pedestrian facilities. See item 8, Section 1.4.2, for consultation requirements for taking land.

Responsible Parties:
- Read Safety Committee (Survey and Workshop)
- DLSE (Notices to remove obstacles and notices of land confiscation)
- PWD (Notices of pending construction)

In Rural Villages

Since pedestrian facilities in rural villages will generally involve the use of customary land, those facilities are best planned and implemented as a partnership between government and the respective village councils—much as the Coastal Zone Infrastructure Strategy would be implemented as a partnership (see below, Section 1.5.7). This is best accomplished as the second stage of the Road Safety Committee's public awareness and education campaign. Such a two-way partnership will require more of the Road Safety Committee and more of the local villages, but the results are likely to be more appropriate and more sustainable.

Solutions in rural villages will only rarely involve construction. More often they will involve better arrangements of roadside plantings and household structures to make them more friendly to pedestrian traffic. Just as villages take active pride in beautifying their roadsides, they can and very likely will take active pride in making their roadsides safer for their residents. In some cases, cooperative solutions may require the realignment or re-grading of roads.

If the solutions worked out in discussions between the Road Safety Committee and a village requires specific action by government, then the agreement should be made and signed by the responsible parties in the village council meeting. One original of the agreement should be retained by the council, and one should be retained by the Road Safety Committee. Copies should be sent within two weeks to DLSE, MLA, to any agency that entered into the agreement, plus the PMU.

Stakeholders to be consulted by the Road Safety Committee include those numbered 4, 8, 10, 15, 17, 19, 37, and 40 in the above matrix.

Responsible Party: Road Safety Committee

Coastal Infrastructure

1.6.5 Community Consultation Framework for Coastal Infrastructure Component

The consultation framework for this component depends partly on what government and the project want villages to do. Where the goal is simply to have villages look after coastal protection infrastructure assets, such as rock seawalls, constructed by government primarily to protect government assets, such as roads, then the consultation process can be fairly simple. Where the goal is to initiate a broader co-management regime with villages for coastal infrastructure assets and natural coastal features in their areas, then villages should be approached from the outset as equal partners, and the consultation process needs to be somewhat longer and more involved. The first type of approach might be more appropriate in one case, while the other type of approach might be more appropriate in another case. The two possibilities are discussed in turn below.
Consultation Framework for Village Seawall Installation

Following the recent experiences with cyclones Ofa and Val, many coastal villages want seawalls. At least one village (Saleimoa) has already been successful in getting a seawall built with direct overseas aid. Others (e.g., Fagali'i) have requested such assistance, but have not yet been successful in obtaining it. Thus, there should be no difficulty in getting villages to accept an offer by government or the project to build a seawall in their areas.

A top-down approach to implementation is generally appropriate where:

- the primary purpose of the infrastructure is to protect government assets, such as roads and power lines; and
- village responsibilities are limited largely to monitoring the coastal infrastructure and avoiding actions that would erode or undermine it.

In such cases, consultations with villages will have five primary functions:

- notify villages of any work or intention to begin work on coastal protection infrastructure assets (including initial coastal surveys);
- gather local environmental knowledge and historical overviews to help technicians in site selection and infrastructure design;
- learn of local interests that help technicians design infrastructure that balances technical and cost requirements with local needs, such as the height and composition of a seawall and the requirement for special access areas for easy foot access and for canoes or aluminium boat haulage;
- explain to the village any requirements for maintaining the structural soundness of coastal protection infrastructure, such as preventing erosion from drainage ditches from undermining the structure or banning sand and gravel mining near it; and
- reach a formal agreement with the village council of matai to enforce any relevant restrictions in return for construction of the coastal protection infrastructure assets and for any other benefits that might be offered.

Consultation requirements are straightforward for installing a village seawall or other coastal protection infrastructure. Government now requires that initial approaches to villages, including those surrounding Apia town as well as those in rural areas, be made first through the Ministry of Internal Affairs (MIA) and then through village palenua.

Note that the office of palenua (literally “village authority”) is not in any sense the office of village “mayor,” but instead the office of government/village liaison officer. The title and the position itself are relics of German colonial attempts to monitor and manipulate village affairs and to deal systematically with the hundreds of generally autonomous village councils. Palenua today are elected by their respective village councils and paid by the government. Thus, they operate under the oversight and direction of both their respective village councils and MIA. The position carries no formal authority, little prestige, and only a very restricted leadership role in itself, though chiefs of relatively high local rank sometimes happen to hold the position.
Consequently, while it is appropriate to make the first approach to a village through the *palenu’a*, it is not appropriate to attempt to make any sort of agreement or deal with a *palenu’a* that would appear to bind either the village or the project. Instead, it is appropriate to explain first to the *palenu’a* what business the project wishes to discuss with the village, and then to ask the *palenu’a* to make scheduling arrangements for the project to present the matter directly to the *fono* or council.

Where the matters to be discussed are difficult or sensitive, it is wise to discuss them in private, either individually or collectively, with the *aliit mataita*, or senior chiefs (senior in rank, but not necessarily in age), of the village before taking the matters to an open council meeting. This is to allow the senior chiefs to consider the matters and to discuss them among themselves and with their principal advisers before the matters are taken up in the public council meeting, or before the senior chiefs allow the matters to be taken up in the public council meeting. As in any political hierarchy, the heads of village councils do not like to be surprised at public meetings.

Note that it is not appropriate to attempt to make any sort of agreement or deal privately with the senior chiefs that would appear to bind either the project or the village as a whole. Senior chiefs sometimes claim to have that authority, but with very rare exceptions (e.g., the title of Malietoa in the village of Malie), they do not. Each village family, led by the chief or chiefs that represent it in the village council, is itself semi-autonomous, and it is necessary to get each one’s public agreement, or the village council’s overall public agreement, in order to bind village families and their members to some course of action.

Note also that in some cases, it may also be necessary to ask village councils to convene a district council in order to discuss district-wide matters, such as coastal works that would span or affect more than one village.

Once a case has been presented to a village council and the council has agreed to proceed, one or more information and consultation meetings can be arranged to gather the types of information required for technical design, as listed in the bullet points above. In the relatively simple case presented in this section, the information needs can probably be achieved in a single meeting with eight to twelve senior men and women who are:

- known in the village for their knowledge and expertise in the matters under discussion [these people might be agreed by general consensus], or
- spokespersons for families whose land would be especially affected [these people should be selected by the families at their discretion, and would likely include both men and women depending on the marital status of the household head and the tenure status of the land], or
- members of the village council’s Development Committee.

Once the structural design has been completed, it should be presented in a general format to the village council together with any proposal the government might have to involve the village in its maintenance. This meeting should be minuted and any agreement signed by both parties. One copy of the agreement or minutes should be sent to or retained by MIA, one should be sent to or retained by DLSE (if it involves any permits or leases), one should be retained by PWD, and two or more copies should be sent to or retained by the village.

Once an agreement is reached, notice should be provided to the village concerning the approximate arrival dates, purposes, and special requirements (if any) of survey and other work parties entering the village.

Note that carrying out the process described above will require PWD, perhaps acting with some partner agency (e.g., DLSE), to carry out what is essentially a modest village extension role. Such a role would be new to PWD, but it is not difficult in this case, and selected mid-level officers and technical personnel
should have no trouble carrying it out. It will also require some very modest long-term monitoring and village liaison by PWD, especially if government wishes to compensate villages for their efforts (the project itself should not).

Responsible Party: PWD

Additional Consultation Requirements for Co-Management Approach with Villages

Where the goal is to initiate a broader, co-management regime with villages for coastal infrastructure assets and natural coastal features in their areas, and where the assets to be protected are substantially their own rather than government’s, then a village extension and consultation framework is required.

With very few exceptions, only village matai councils have the authority and ability to make and enforce agreements involving aggregate village labor or village lands and lagoons. Thus, co-management of village roads or coastal infrastructure requires a formal decision and follow-up action by the village council. The decisions themselves, and the consultations leading up to such decisions, are best recorded in some detail. Attempts to enforce new environmental regulations are unlikely to succeed without such co-management, and anything less than co-management is likely to be interpreted as a challenge to the council’s authority and more broadly to the fa’aSamoa and its fa’amatalai, or matai, system.

The general consultation framework recommended here is that carried out successfully by Fisheries in the AusAID-funded Fisheries Extension & Training Project, of which the present consultant was a primary designer. This model calls for the same basic set of notification and consultation steps listed above, but with more education and extension work leading in many cases to villages drafting and then implementing a management plan of their own. Such management plans are formally backed by the village fono as a matter of village law and are registered by the national government as a matter of the country’s new marine resource co-management laws. A similar format appears to be appropriate for government/village co-management undertaken as part of a Coastal Zone Infrastructure Strategy (CZIS).

Thus, a CZIS co-management approach would call for government to engage in an extension program to educate and inform selected villages about government’s interests in coastal hazard zone management and about potential hazards and possible or recommended solutions in the respective villages. This extension process would lead in many cases to villages drafting and then implementing a management plan of their own. Such management plans would be backed by the village fono as a matter of village law and would be registered by the national government. These coastal hazard management plans might control:

- resource extraction,
- construction of drainage ditches, stone wharfs, or jetties;
- land reclamation;
- coastal land development;
- beach replenishment;
- beach planting;
- location of new structures; or
- relocation of existing roads, buildings, or other assets.

---

The three primary reasons that such a format is appropriate are the same in both cases:

- government has more money than villages, and
- government has a broader reach and broader technical expertise than villages, but
- villages have more authority over and knowledge of resource management within their areas than government.

The basic consultation framework for preparing and implementing a Coastal Zone Hazard Strategy in a village (or district) would involve:

- initial contact and preliminary discussions as described above;
- explanation and discussion at one or more fono meetings leading to a decision by the fono to accept or reject the extension process;
- group meetings of the three main councils in the village (i.e., matai, Women’s Committee, and untitled men) to identify problems and propose solutions, including carrying out a participatory survey of the environment and relevant resources;
- formation of a temporary village management advisory committee of both men and women to prepare a proposed plan to solve any problems or potential problems that have been identified;
- discussion and final agreement by the fono of matai on a formal management plan for the village (or district); and finally,
- formation of a permanent management committee to monitor implementation of the plan.²

The entire process is facilitated by trained extension personnel. In the present case, the extension personnel might come from the restructured Environment Division of what is now DLSE, though care would have to be taken that it fits in with (or perhaps piggy-backs on) the Fisheries operation, which generally involves marine resources below the high water mark. This fisheries project is about to enter its second phase of three years duration, funded again by AusAID. The Environment Division was running a similar, but much smaller extension program in several villages and protected areas, but it appears to be in a holding phase now that project funding has run out. In contrast, the Fisheries marine resource extension program relies primarily on government fisheries extension officers who are on government-funded FSC contracts.

Responsible Party:  Restructured Environment Division of the present DLSE

4  COEP 4 - Land Acquisition and Compensation

4.1  Objective
The objective of this Code of Environmental Practice (COEP) is to confirm the underlying principles for systematic resolution of land acquisition, compensation or other land related issues and to facilitate better understanding of legal and other procedures between the various stakeholders involved in the planning, design, construction, operation and maintenance of development projects in Samoa. This COEP applies primarily to the acquisition of land for Government projects. For private development projects, the general principles outlined shall also apply. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures.

4.2  Principles
- Land acquisition shall be minimised. Where unavoidable, land acquisition shall be carried out in such a manner so as to minimise the adverse impacts on the affected people.
- Avoid, wherever possible, the need to relocate graves and/or burial sites. Where this cannot be avoided, such relocation shall be carried out in a manner that will minimise duress on the relatives of the deceased.
- Land acquisition and compensation issues should be clearly distinguished from labour and industrial related matters in following the procedures established in this COEP.
- Any acquisition of land shall be carried out in consultation with the people to be affected and in accordance with the project consultation strategy (as set out in COEP 3 – Consultation).

4.3  Legislation
The relevant law governing land acquisition and compensation is the Taking of Land Act 1964. This Act applies to freehold and customary land, including land of this type that is currently under leasehold, and provides for the taking of land for public purposes. The Act provides the procedures for land acquisition, sets out the circumstances in which compensation is payable, methods for assessing such compensation and dispute resolution procedures.
5 COEP 5 - Construction Camps

5.1 Objective
The objective of this Code of Environmental Practice (COEP) is to provide guidelines on the selection, development, maintenance and restoration of construction campsites in order to avoid or mitigate against significant adverse environmental effects, both transient and permanent. This COEP shall be read in conjunction with COEP 1 - Administrative Procedures.

5.2 Planning Stage
During planning of the works, consideration shall be given to the location of construction camps for development projects. In the course of public consultation, the subject of construction camps shall be raised and areas identified that may be suitable for the development of such camps. Areas that are not suitable for reasons such as cultural or social sensitivity shall also be identified.

As a result of public consultation a schedule of sites that are inappropriate for such use in terms of social or cultural values or in terms of their physical environment shall be identified. A schedule of such sites shall be prepared and supplied to the designer and/or contractor. Location of construction camps within flood plains, coastal hazard, and landslip prone areas shall be avoided.

Wherever possible construction camps shall be planned in areas that will have minimal adverse environmental effects. In identifying such areas particular care shall be taken to evaluate the adverse affects of noise and air pollution, which, although transient, will preclude the use of some areas as construction campsites.

5.3 Design

5.3.1 Location
During the design of the work, the consultant shall consider appropriate locations for construction camps. The consultant shall specify a schedule of sites identified during the planning stage as unsuitable as well as sites that are unsuitable in terms of topography, proximity to watercourses, and environmental sensitive areas such as forests, swamps, or coastlines.

The consultant may specify the actual site of the construction camp or may specify the conditions that are to be met by the contractor in selecting, developing, maintaining and restoring such campsites.

Construction campsites shall be located on a site such that permanent adverse environmental effects can be avoided or mitigated against and transient adverse environmental effects are minimised. Campsites shall not be located in areas identified during the planning stage as unsuitable for such use.

The site or sites shall be selected such that mitigation measures stipulated in this COEP can be implemented with reasonable facility.
5.3.2 Private Land

Environmental protection measures established by this COEP shall apply to all land regardless of ownership.

Where construction camps are to be located on private land the contractor shall obtain the approval of the landowner to establish the campsite on such land and pay agreed compensation.

The following is a suggested specification for inclusion in the contract documents:

*Unless otherwise specified, the contractor is at liberty to make his own arrangements with landowners to establish construction camps. Prior to the development of such camps the contractor shall submit to the engineer the signed authority of the landowner for the contractor to establish the construction camp on any land, after proceeding as COEP 4.*

The contractor shall also submit to the engineer the following information signed by the land owner and the contractor:

- Details of compensation to be paid
- Agreed period of tenure
- Any specific requirements of the land owner
- Photographs of the site in its original condition
- Details of proposed and agreed site restoration after completion of the project works.

At the completion of the contract works the contractor shall submit to the engineer a signed statement from the landowner confirming that the compensation has been paid and that the landowner is satisfied with the restoration of the site. If such a statement is not submitted, the engineer may withhold moneys owing to the contractor in a sum sufficient to pay for the compensation and the site restoration if necessary.

5.3.3 Construction Camp Facilities

The construction camp shall be provided with the following minimum facilities:

- A perimeter security fence, at least 2 metres in height, constructed from materials fit for the purpose.
- Canteen, dining hall and dormitories as required shall be constructed of suitable materials to provide a safe healthy environment for the workforce and which facilitate regular cleaning and the provision of ventilation and illumination.
- Ablution block with a minimum of one water closet toilet, one urinal and one shower per 10 personnel engaged either permanently or temporarily on the project. Separate toilet and wash facilities shall be provided for male and female employees.
- A sickbay and first aid station.
- Areas for the storage of fuel or lubricants and for a maintenance workshop. Such areas shall be bunded to prevent the escape of accidental spillages of fuel and or lubricants from the site. Surface water drainage of such bunded areas shall be discharged through purpose designed and constructed oil traps. Empty fuel or oil drums may not be stored on site.
- Sewage treatment facilities to provide treatment for wastewater discharge from toilets, washrooms, showers, kitchens, laundry and the like.
- Stormwater drainage system to discharge all surface run off from the camp site to a silt retention pond which shall be sized to provide a minimum of 20 minutes retention for stormwater flow from the whole site that will be generated by a 20 year return period rainfall having a duration of at least 15 minutes. The run off coefficient to be used in the calculation of the silt pond volume shall be 0.9. Silt ponds shall be maintained in an efficient condition for use throughout the construction period with trapped silt and soil particles being regularly removed and transported and placed in waste material disposal areas as per COEP 6.
- All discharge from the silt retention pond shall be channelled to discharge to natural water via a grassed swale at least 20 metres in length with suitable longitudinal gradient.
- All camp facilities shall be maintained in a safe clean and or appropriate condition throughout the construction period.

5.3.4 Construction Camp Development Plan

A development plan of the construction camp shall be prepared describing the following:

- Perimeter fence and lockable gates
- Workshop
- Accommodation
- Canteen and dining areas
- Ablutions
- Water supply
- Wastewater treatment and disposal system
- Bunded fuel storage area
- Proposed power supply
- Proposed all weather surfaced areas
- Silt retention pond.

The following is a suggested specification for inclusion in the contract documents:

*Within 14 days of the commencement date the contractor shall submit to the engineer for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, storage areas and drainage facilities. The contractor shall also submit brief specifications for the materials to be used for the construction of all buildings and facilities and defining the standard of construction for all works to be undertaken on the campsite.*

*In preparing such drawings and specifications the contractor shall incorporate the following minimum requirements:*
The site shall be completely fenced with a security fence, at least 2 metres in height, the design of which shall be entirely suitable for its purpose. The fence shall be constructed from galvanised posts and wire.

Areas for the storage of fuel or lubricants or where machinery or equipment is to be serviced shall be bunded to prevent the escape of accidental spillages of fuel or lubricants from the site. Drainage of such bunded areas shall be through purpose designed and constructed oil traps.

A minimum of one water closet toilet, one urinal and one shower shall be provided per 10 personnel employed either permanently or temporarily on the works. Separate toilet and wash facilities shall be provided for male and female employees.

All discharge from toilets, washrooms, showers, kitchens, laundry facilities and the like shall be piped to a purpose designed approved sewage treatment plant for treatment prior to discharge to a natural water course.

All dormitories, dining halls and other accommodation shall be ventilated and illuminated to ensure the safety and health of the contractor’s workforce.

All stormwater drainage from the site shall be channelled or piped to a silt retention pond prior to discharge from the site. The retention pond shall be sized to provide a minimum of 20 minutes retention for stormwater flow from the whole site that will be generated by a 20 year return period rainfall having a duration of at least 15 minutes. The run off coefficient to be used in the calculation of silt pond volume shall be 0.9.

All discharge from the silt retention pond shall be channelled to discharge to natural water via a grassed swale at least 20 metres in length with suitable longitudinal gradient.

All camp facilities shall be maintained in a safe clean and or appropriate condition throughout the construction period. The silt retention pond shall be maintained in efficient condition throughout the construction period. Trapped silt and soil shall be periodically removed and transported and placed in waste material disposal areas.

The contractor shall provide, equip, and maintain adequate first aid stations and erect conspicuous notice boards directing where these are situated and provide all required transport. The contractor shall comply with the government medical or labour requirements at all times and provide, equip and maintain dressing stations where directed and at all times have experienced first aid personnel available throughout the works for attending injuries.

Throughout the period of the contract the employer, the engineer, or their representatives shall have uninterrupted access to and from the contractor’s construction camp for the purpose of carrying out routine inspections of all buildings, facilities or installations of whatever nature to ensure compliance with this specification.

5.3.5 Campsite Restoration

At the completion of the construction work all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a condition in no way inferior to that that pertained prior to the commencement of the works. The site shall be grassed and if trees originally grew on the site they shall be replaced with similar tree species.
All oil or fuel contaminated soil shall be removed from the site and transported and buried in waste soil disposal areas.

The following is a suggested specification for inclusion in the contract documents:

At the completion of the construction work the contractor shall dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates. The whole of the construction campsite shall be grassed and if trees originally grew on the site they shall be replaced with similar tree species. At the completion of restoration the site shall be in no way inferior to the condition that pertained prior to commencement of the works.

All oil or fuel contaminated soil shall be carefully removed from the site and transported and buried in waste soil disposal areas.

5.4 Consent

5.4.1 Consent Required

In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in the development of a construction camp shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

5.4.2 Application for Consent

Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the camp construction. In the case of land development, the land developer rather than the contractor or agent shall submit the application.

Applications shall be made no later than one month before the proposed camp construction is scheduled to begin.

Applications shall be accompanied by such other documents as PUMA may require.

5.4.3 Public Hearing

At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

5.4.4 Special Conditions

PUMA may, upon issuance of a consent, impose any conditions or special requirements on the camp construction as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

5.4.5 Consent Expiration and Renewal

A camp construction consent issued by PUMA shall expire two years from the date of issuance. If the construction activity is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
6 COEP 6 - Road Construction Erosion Control

6.1 Objective

The objective of this Code of Environmental Practice (COEP) is to define measures for the prevention of erosion of exposed earth surfaces as a result of road construction activities, including post construction period, and to prescribe measures to be taken to avoid erosion of channels and drainage outlets. It also prescribes measures to be taken to mitigate significant adverse effects of the discharge of water containing suspended soil particles into natural watercourses or onto land adjacent to road works. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures.

6.2 Planning and Design

6.2.1 Road Alignment

The planning and design of the alignment of any roading project is to be undertaken to avoid, so far as is possible, the disturbance of existing vegetation and as a consequence minimise the implementation of erosion control measures defined in this COEP.

Planners and designers of road upgrading and reconstruction projects shall, wherever possible, avoid the removal of vegetation from existing road batters by careful selection of the road alignment and vertical profile. If, by minor adjustment to the design standards contained in the terms of reference, significant reduction in adverse environmental effects can result then the planner/designer shall discuss such adjustment with the client. Provided the resulting road project will be “fit for its purpose” then the client may approve adjustment to such design standards.

6.2.2 Catch Drains

Catch drains shall be installed above cut batters where it is necessary to intercept overland flow of water to prevent it causing scour of batters or triggering instability of such batters. They shall be constructed a minimum of 2 metres beyond the top of any cut batter and shall be of adequate dimension to discharge the assessed flow of water, calculated from the contributing catchment and design rainfall, without overtopping. They shall be appropriately lined to prevent scour of the drain and shall be accessible for maintenance purposes.

They will normally discharge to road side drains but wherever the discharge location it shall be effectively protected against scour preferably by dispersion across a grassed area having a relatively flat gradient.

The Designer shall detail and specify the construction of catch drains where required to provide erosion control. Depending on flow velocities in such drains they shall be lined with appropriate vegetation (refer Annexure 1) or, where necessary to prevent scour, cemented rock lined or concrete lined channels or equal alternative lining materials shall be used.
6.2.3 **Bench Drains**

Where cut batters or fill batters include intermediate benches, each bench shall be drained to prevent the collection or ponding of surface water on the bench. Benches in cut batters shall slope away from the road at a minimum slope of 1 in 6 while benches in fill batters shall slope towards the road at a minimum slope of 1 in 6.

Bench drains shall be located on the low side of each bench and shall be of sufficient dimension and longitudinal slope to adequately discharge the design flow. Bench drains shall be protected against scour by appropriate lining and the discharge location shall be protected against scour as for Catch Drains.

The designer shall detail and specify the construction of bench drains to provide erosion control. Depending on flow velocities in such drains they shall be lined with appropriate vegetation (refer Annexure 1) or where necessary to prevent scour cemented rock lined or concrete lined or equal alternative lining material shall be used.

In the event of excessively long benches, water from bench drains may be discharged to road side drains by way of adequately designed concrete lined cascade drains. The discharge location of cascade drains to road side drains shall be protected against scour.

6.2.4 **Toe Drains**

In order to minimise the risk of water ponding adjacent to the toe of fill batters with the consequent risk of saturating fill materials with resulting batter failures it is often necessary to construct toe drains.

Where toe drains are to be installed adjacent the toe of fill batters to prevent ponding of water against fill batters they shall be designed with adequate capacity to fulfil their function and shall be lined with appropriate vegetation (refer Annexure 1). Prior to the discharge to natural water the drains shall be shaped to disperse the flow across a grassed area.

6.2.5 **Road Side Drains**

Wherever they are installed road side drains shall be designed for their purpose and shall be protected against the effects of scour. The minimum protection shall be the establishment of suitable grasses (refer Annexure 1). Where flow velocities are anticipated to be high, scour protection shall be afforded by rip rap, concreted stone pitching, concrete dished channels or equally effective protection.

Frequent turn outs of road side drains shall be provided to discharge flow across grassed areas where ever practicable prior to entering natural water courses. In steep country and elsewhere as necessary flumes shall be constructed to discharge water from road side drains to undisturbed vegetated ground beyond the road formation. Effective scour protection shall be provided at flume discharge locations. The maximum distance between turn outs shall be 100 metres unless this limitation is demonstrated to be impracticable.

If necessary and practicable, to provide the maximum distance between turnouts of 100 metres, appropriately sized culverts shall be installed to transfer flow from one side drain to the opposite side drain. Inlets and outlets to such culverts shall be protected from the effects of scour.
6.2.6 Batter Protection

All batters in soil, both cut and fill, shall be protected from the effects of scour by water flow. Batter protection shall be installed as soon as practicable after the completion of any batter or in the case of benched batters the completion of any one bench.

6.2.7 Silt Traps and Silt Ponds

Throughout the construction period and if necessary the maintenance period it is intended that the discharge of silt-laden water from construction sites to natural water courses is minimised. In ecologically sensitive areas and along any foreshore, untreated discharge must be prevented.

Where discharge from catch, bench, toe and road side drains is relatively low in volume and discharge over a grassed area is impracticable silt fences, shall be utilised to prevent or minimise the discharge of silt laden water to natural water courses.

For high volumes of discharge silt retention ponds shall be used to prevent or minimise the discharge of silt laden water.

Silt traps and ponds shall be utilised throughout the construction period and if necessary silt ponds shall be operational throughout the contract maintenance period. At the completion of construction works or the maintenance period as applicable, silt traps and ponds shall be cleaned out and ponds filled to suit surrounding topography and levels.

The designer shall detail and specify the construction and maintenance of silt traps. The designer shall specify the design of silt retention ponds having regard to the desired retention period and the method of operation. The disposal of material that is periodically cleaned from traps or ponds shall also be carefully specified to ensure that it does not re-enter any natural watercourse. During the design of the works, the need for silt retention ponds shall be assessed and sufficient land allocated within the site of the works for their construction.

6.2.8 Shoulder Protection

In order to protect the surface of road shoulders against erosion from surface water flows it is necessary to surface the shoulder with non-erodible material. Such surfacing has the secondary benefit of minimising the occurrence of edge break of adjacent sealed pavements.

All shoulders should be grassed integral with the selected road side drain erosion protection system. Suitable grass species are identified in Annexure 1. To assist the establishment of grasses the road shoulder may be surfaced with a mixture of sub-basecourse and humus (3:1).

On heavily trafficked roads where severe attrition of grassed shoulders is likely to occur, consideration should be given to surfacing the road shoulder with at least a single bituminous surface treatment.
6.3 Construction

6.3.1 General
All project work shall be undertaken with a conscious approach to the need for preventing or minimising erosion of any exposed earth surface. In addition to permanent drainage or erosion control systems that are required to be constructed, temporary measures to prevent erosion are to be implemented whenever these are clearly necessary to mitigate against the erosion of exposed surfaces.

A suggested specification is:

The contractor is required to enter into the spirit of environmental protection and conservation and to construct works in terms of agreed programmes, methods and sequences that will prevent or mitigate against erosion. The contractor shall employ such temporary measures as are necessary to prevent or mitigate against erosion or siltation of any natural water course in addition to permanent drainage or erosion control systems that are detailed in the contract documents.

6.3.2 Programme of Works
The programming of works shall demonstrate that the sequence of operations shall be such as to minimise the amount of time over which exposed surfaces are subject to potential erosion. It shall clearly demonstrate the sequential operations of drainage installation, erosion protection measures, earthworks, drainage facilities, pavement construction and revegetation to minimise the exposure of erodible surfaces.

A suggested specification is:

The contractor shall programme the works to demonstrate that the sequence of operations involving drainage installation, earthworks, drainage facilities, erosion protection measures, pavement construction and revegetation are implemented to minimise the period over which earth surfaces are exposed to the potential for erosion.

On no account will the contractor be permitted to extend earthworks including vegetation clearing and topsoil stripping 500 metres beyond concurrent pavement construction and revegetation works without the approval of the engineer.

6.3.3 Clearing Vegetation
Vegetation is nature’s way of preventing soil erosion and existing vegetation clear of project works should always be protected.

Consequently only vegetation that is within the site of the works, construction camp, borrow area or waste material disposal areas shall be cleared. Cleared vegetation shall be mulched and stockpiled with topsoil for use in revegetating batters and other exposed surfaces.

Large logs and branches that cannot be mulched shall be stockpiled for use in erosion prevention or control.

Stormwater run off from areas stripped of vegetation shall be collected in temporary or permanent drains which shall be fitted with silt retention devices prior to discharge to natural waters.
On no account shall cleared vegetation be burned.

A suggested specification is:

The contractor shall only clear vegetation from between the batter limit lines shown in the drawings, the net agreed area for the construction camp and the agreed area of proposed waste material disposal areas or borrow area. On no account is the contractor to damage vegetation outside the above areas or borrow area. Should such damage occur the contractor shall forthwith take such steps as are necessary to prevent erosion and to re-establish vegetation. On no account is cleared vegetation to be burned. Such vegetation shall be mulched and stockpiled with stripped topsoil for use in revegetating batters and other exposed surfaces. Large logs and branches that cannot be mulched shall be stockpiled for use in erosion prevention or control.

The contractor shall install such temporary or permanent drainage systems as are required to collect stormwater runoff from stripped areas. Silt traps or silt retention ponds as detailed or specified shall be constructed at appropriate locations in such temporary or permanent drains which traps or ponds shall be maintained in efficient operation throughout the contract period.

6.3.4 Topsoil Stockpiles

Topsoil stockpiles shall be sited such that stormwater runoff from such stockpile areas can be collected, controlled and discharged through devices to remove suspended solids prior to discharge to natural water courses.

A suggested specification is:

The contractor shall locate topsoil stockpiles clear of future works in locations agreed with the engineer. They shall be located on terrain which is suited for the construction of toe drains around the topsoil stockpile in order to minimise topsoil laden water discharging directly into natural water courses or onto adjacent land. After each day’s work and before rain the stockpiles shall be smoothed off and rolled with suitable rubber tyred equipment to minimise the amount of loose material on the stockpile at any time.

The topsoil stockpiles shall be surrounded by a toe drain of sufficient dimension to be able to trap water discharged from the stockpile and such water shall be conducted to silt traps located at the appropriate location in the toe drain. Silt traps shall be discharged through grass swales prior to water entering natural water courses wherever this is possible. Alternatively erosion protection measures such as rip rap shall be installed at the discharge end of the toe drains prior to their discharge to natural water courses.

6.3.5 Waste Excavation Disposal

The disposal of waste excavated materials from construction sites must be undertaken in such a way as to minimise adverse effects on the environment and to avoid the possibility of waste materials being disguised as competent materials such as occurs when waste material is side cast. There are many examples of road failures where roads have been unwittingly widened over side cast materials.

Consequently, all waste excavated soil, which is unsuitable for incorporation into embankment construction as a result of organic content, moisture content, and the like, shall be disposed of in areas specifically designated for such purpose. On no account shall excavation to waste be disposed of by side tipping or the widening of fill batters.
Disposal sites shall not be located within environmentally sensitive areas, within the flood plain of any watercourse, within 30 m of the bank of any watercourse with a flood hazard, coastal erosion hazard or landslip hazard area. Such disposal sites shall be stripped and the stripped material stockpiled as in 6.3.4. Excavated waste material shall be placed and compacted by track rolling in the waste disposal area. Waste excavation disposal areas shall be shaped to conform with the adjacent topography. At the completion of the disposal of such material waste excavation disposal areas shall be covered with topsoil and vegetated. Such vegetation shall be similar in nature to the material originally cleared from the site.

Throughout the period of use of such disposal areas perimeter drains, silt traps and or silt retention ponds shall be installed in a specifically designed drainage system to prevent silt-laden water discharging into natural watercourses.

A suggested specification is:

The contractor shall locate waste excavation disposal areas as agreed with the engineer. All excavated material which by virtue of its organic content, moisture content, or other characteristics, which is unsuitable for incorporation into embankment construction shall be transported and placed in such waste excavation disposal areas. On no account shall waste excavated material be disposed of by side tipping or flattening of fill batters unless specifically directed by the engineer.

After agreement with the engineer on the location of waste excavated disposal areas the contractor shall strip the topsoil from such sites and stockpile this material for later restoration work. Material excavated to waste shall be placed in such areas and compacted by track rolling, and shaped to conform with the adjacent topography.

Surface water discharged from such areas shall be collected into perimeter drains which shall discharge through silt traps and or silt retention ponds in order to minimise the discharge of silt laden water to natural water courses. At the completion of use of waste excavation disposal areas they shall be resurfaced with topsoil previously stripped from the area and revegetated as specified.

6.3.6 Batter Protection

The establishment and maintenance of vegetation on cut and fill batters at the earliest possible time in the sequence of construction events is the most positive step that can be taken to minimise surface erosion. This fact must be recognised in the development of construction programmes.

All batters in cut areas and all embankment batters shall be revegetated and protected against the effects of scour from surface water run off. A table of suitable grasses and shrubs for establishment on batters is presented in Annexure 1.

A suggested specification is:

The contractor shall establish vegetation and erosion protection measures on all cut and fill batters as soon as possible during the construction period. In benched cut batters the establishment of vegetation and erosion protection measures shall be undertaken on the bench and upper batter as soon as it is completed. Such work shall not wait until the completion of the total excavation. The contractor shall maintain the vegetation and erosion control measures throughout the construction and maintenance period.
6.3.7  Traps, Bench, Toe, and Road Side Drains

All such drains shall be established as soon as practicable during the construction of the works and in terms of the programme as in 6.3.2. Vegetation and the installation of erosion protection measures shall be as detailed and specified and shall be established in the minimum possible time to mitigate against erosion from surface water run off. Outlets shall be discharged through silt traps or to silt retention ponds prior to the discharge of run off to natural water courses.

The discharge from silt traps or silt retention ponds shall flow over grass swales wherever possible prior to the discharge to natural water courses. Alternatively such water courses shall be protected against erosion at the discharge location by the installation of rip rap, drop structures, flumes, and the like.

A suggested specification is:

The contractor shall establish all such drains as soon as practicable during the construction of the works and in terms of the programme which has been agreed by the engineer. Erosion protection and sediment control measures as detailed and specified shall be established as soon as possible to minimise erosion. Outlets to all drains shall be passed through silt traps and or silt ponds prior to their discharge to natural water courses all as detailed and specified.

6.3.8  Silt Fences

Silt fences shall be located in all temporary or permanent drains. They shall be maintained in sufficient operating condition throughout the construction and maintenance of the works. Material periodically cleaned from silt fences shall be deposited in waste disposal areas as in 3.5.

A suggested specification is:

Throughout the construction of the works the contractor shall install silt fences in all temporary and permanent drains. Silt fences shall be constructed of appropriate materials as detailed and or specified.

Silt fences shall be maintained in sufficient operating condition throughout the construction and maintenance of the works. Material periodically cleaned from such drains shall be transported and disposed of in waste disposal areas established as detailed and specified.

6.3.9  Silt Retention Ponds

Wherever necessary and practicable, silt retention ponds shall be installed at the outlets to drainage systems constructed as a result of the works. They shall be designed to have a retention volume of at least 1% of the contributing catchment area multiplied by a depth of 2 metres. The length to width ratio shall be 2:1. Ponds shall be cleaned out each time retained sediment reaches a depth of 1 metre.

Discharges from silt retention ponds shall be preferably across grass swales and in any case shall be designed to avoid erosion of natural watercourses.

A suggested specification is:

The contractor shall construct silt retention ponds wherever necessary and practicable to minimise the discharge of silt-laden water to any natural watercourse. Ponds shall be constructed to the
details presented in the drawings and shall have the minimum volume ascribed to them by the contract documents. They shall be maintained in efficient operation throughout the construction and maintenance period of the works. Material periodically cleaned from the pond shall be disposed of to the waste disposal areas that have been established in terms of the contract.

6.3.10 Borrow Areas

Approval to develop borrow areas shall be obtained as COEP 4.
Annex 1: Plant Species List

**Plant, Orchid**

<table>
<thead>
<tr>
<th>Scientific Names</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulbophyllum betchei</td>
<td>Betche's Bulbophyllum</td>
</tr>
<tr>
<td>Bulbophyllum longiflorum</td>
<td>Umbrella Cirrhopetalum</td>
</tr>
<tr>
<td>Bulbophyllum longiscapum</td>
<td>Long Scaped Bulbophyllum</td>
</tr>
<tr>
<td>Bulbophyllum pachyanthum</td>
<td></td>
</tr>
<tr>
<td>Bulbophyllum polypodiodes</td>
<td></td>
</tr>
<tr>
<td>Bulbophyllum rostriceps</td>
<td></td>
</tr>
<tr>
<td>Bulbophyllum samoanum</td>
<td>The Samoan Bulbophyllum</td>
</tr>
<tr>
<td>calanthe alta</td>
<td></td>
</tr>
<tr>
<td>calanthe holoeuca</td>
<td></td>
</tr>
<tr>
<td>calanthe triplicata</td>
<td></td>
</tr>
<tr>
<td>calanthe ventilabium</td>
<td></td>
</tr>
<tr>
<td>ceologyne lycastoides</td>
<td></td>
</tr>
<tr>
<td>luisia teretofolia</td>
<td></td>
</tr>
<tr>
<td>microtatorchis samoensis</td>
<td></td>
</tr>
<tr>
<td>Phaius famboinensis</td>
<td></td>
</tr>
<tr>
<td>Phaius flavus</td>
<td></td>
</tr>
<tr>
<td>Phaius tankervillea</td>
<td></td>
</tr>
</tbody>
</table>

**Plant, Herb**

<table>
<thead>
<tr>
<th>Scientific Names</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acalypha lanceolata</td>
<td>Prickly chaff-flower</td>
</tr>
<tr>
<td>Achyranthes aspera</td>
<td>Aloe vera</td>
</tr>
<tr>
<td>Aloe Vera</td>
<td></td>
</tr>
<tr>
<td>Boerhavia repens</td>
<td>Pennywort, Marsh Penny, Gotu cola</td>
</tr>
<tr>
<td>Centella asiatica</td>
<td>Garden spurge</td>
</tr>
<tr>
<td>Chamaesyce hirta</td>
<td>Sensitive plant, sleeping grass</td>
</tr>
<tr>
<td>Mimosa pudica</td>
<td>creeping plant, wood sorrel</td>
</tr>
<tr>
<td>Oxalis corniculata</td>
<td>Longrunner</td>
</tr>
<tr>
<td>Rorippa sarmentosa</td>
<td></td>
</tr>
</tbody>
</table>

**Plant, Shrubs**

<table>
<thead>
<tr>
<th>Scientific Names</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capsicum frutescens</td>
<td>Chili pepper, red pepper</td>
</tr>
<tr>
<td>Ardisia Elliptica</td>
<td>Shoeblock ardisia</td>
</tr>
<tr>
<td>Clerodendrum Chinense</td>
<td>Stickbush</td>
</tr>
<tr>
<td>Clerodendrum inerme</td>
<td></td>
</tr>
<tr>
<td>Hibiscus Rosa-sincensis</td>
<td>Garden Hibiscus</td>
</tr>
</tbody>
</table>
**Plants, Vines**

<table>
<thead>
<tr>
<th>Scientific Names</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coccinia grandis</td>
<td>Ivy gourd, Scarlet fruited gourd</td>
</tr>
<tr>
<td>Ipomoea pes-caprae</td>
<td>Beach morning-glory, Railroad vine, banyops</td>
</tr>
<tr>
<td>Merremia Peltata</td>
<td>Merremia</td>
</tr>
<tr>
<td>Mikania Micrantha</td>
<td>Mile-a-minute-weed</td>
</tr>
</tbody>
</table>

**Plants, Trees**

<table>
<thead>
<tr>
<th>Scientific Names</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleurites moluccana</td>
<td>Candlenut tree</td>
</tr>
<tr>
<td>Anacardium occidentale</td>
<td>Cashew</td>
</tr>
<tr>
<td>Barringtonia asiatica</td>
<td>Fish poison tree</td>
</tr>
<tr>
<td>Bischofia javanica</td>
<td>Bishopwood, Java wood, Toog, Koka</td>
</tr>
<tr>
<td>Broussonetia papyrifera</td>
<td>Paper mulberry</td>
</tr>
<tr>
<td>Calophyllum inophyllum L.</td>
<td>Calophyllum, Alexandrian laurel</td>
</tr>
<tr>
<td>Calophyllum neo-eubudicum</td>
<td></td>
</tr>
<tr>
<td>Cananga odorata</td>
<td>Ilangilang</td>
</tr>
<tr>
<td>Canarium vitiense</td>
<td></td>
</tr>
<tr>
<td>Carica papaya</td>
<td>Papaya, pawpaw</td>
</tr>
<tr>
<td>Castilloa Elastica</td>
<td>Panama Rubber Tree</td>
</tr>
<tr>
<td>Citrus medica</td>
<td>Citron</td>
</tr>
<tr>
<td>Citrus sinensis</td>
<td>Sweet orange, Orange</td>
</tr>
<tr>
<td>Cocos nucifera</td>
<td>Coconut palm, Coco palm</td>
</tr>
<tr>
<td>Dysoxylum huntii</td>
<td></td>
</tr>
<tr>
<td>Dysoxylum samoense</td>
<td></td>
</tr>
<tr>
<td>Ficus obliqua</td>
<td></td>
</tr>
<tr>
<td>Flueggea flexuosa</td>
<td></td>
</tr>
<tr>
<td>Funtumia elastica</td>
<td>African Rubber Tree</td>
</tr>
<tr>
<td>Garuga floribunda</td>
<td></td>
</tr>
<tr>
<td>Inocarpus fagiferus</td>
<td>Tahitian chestnut, Polynesian chestnut</td>
</tr>
<tr>
<td>Intsia bijuga</td>
<td>Ibil</td>
</tr>
<tr>
<td>Macaranga harveyana</td>
<td></td>
</tr>
<tr>
<td>Manilkara samoensis</td>
<td></td>
</tr>
<tr>
<td>Neonauclea forsteri</td>
<td></td>
</tr>
<tr>
<td>Palaquium stehlinii</td>
<td></td>
</tr>
<tr>
<td>Pandanus tectorius</td>
<td>Screwpine, pandanus</td>
</tr>
<tr>
<td>Planchonella garberi</td>
<td></td>
</tr>
<tr>
<td>Planchonella samoensis</td>
<td></td>
</tr>
<tr>
<td>Pometia pinnata</td>
<td>Island lychee</td>
</tr>
<tr>
<td>Psychotria insularum A. Gray</td>
<td>Island wild coffee</td>
</tr>
<tr>
<td>Rhus taitensis</td>
<td></td>
</tr>
<tr>
<td>Schizostachyum glaucifolium</td>
<td>Polynesian bamboo</td>
</tr>
<tr>
<td>Spathodea campanulata</td>
<td>African tulip</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Syzygium dealatum</td>
<td></td>
</tr>
<tr>
<td>Syzygium inophyloides</td>
<td></td>
</tr>
<tr>
<td>Terminalia catappa</td>
<td>Tropical almond</td>
</tr>
<tr>
<td>Terminalia richii</td>
<td>Malili</td>
</tr>
<tr>
<td>Thespesia populnea</td>
<td>Milo, Pacific rose wood</td>
</tr>
</tbody>
</table>
7 COEP 7 - Slope Stability

7.1 Objective
The objective of this Code of Environmental Practice (COEP) is to prescribe the investigation of and design procedures for earth batter slopes as well as the protective measures to be installed to minimise erosion during development projects. So far as is possible, batter slopes and hence batter limits should be determined at the design stage so that land acquisition advised at the Environmental Impact Assessment stage is adequate. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures and COEP 13 - Earthworks.

7.2 Planning

7.2.1 Alignment and Gradients
With reference to COEP 2 - Consultation, and with particular reference to road upgrading, alignments and gradients for projects shall be selected to minimise the formation of earth batters. So far as it is possible, existing vegetation shall remain undisturbed during development works.

7.3 Design

7.3.1 Geotechnical Engineer
All geotechnical investigations, analysis and reporting shall be undertaken under the control of a certified Engineer (registered member of the Institute of Professional Engineers of Samoa) who is experienced in the practice of geotechnical engineering.

7.3.2 Soils Investigations
During the design of the work, sufficient soils investigation and testing shall be undertaken to enable appropriate slope stability analysis to be undertaken. The investigations shall determine the depth of soils overlying rock where cut batters are likely to expose rock. The depth of organic material and/or weak materials that will require undercutting prior to embankment construction shall also be determined. Rock defects and jointing shall be determined to evaluate the risk of rock fall and/or mass movements.

The existing groundwater levels shall be determined in cut and fill locations.

In particular circumstances where access to batter sites is impractical during the design stage contract documents should require contractors to provide access for soils investigation to be undertaken prior to the commencement of earthwork so that batter limits can be confirmed.

7.3.3 Slope Stability Analysis
All cut batters in residual soils in excess of 3 metres in height shall be analysed to determine an appropriate batter slope to provide a factor of safety against failure of 1.5.
In areas of high ground water level, stability analysis shall be undertaken for the conditions that will pertain during construction as well as for the assessed future conditions and long term ground water level.

The analysis of cut batters in excess of 3 metres shall be used to guide the selection of batter slopes in lesser depths of cut. Fill batter slopes shall be such as to provide a factor of safety against failure of 1.5. Analysis of fill batters shall take into account the remoulded soil characteristics of the fill material and the characteristics of the soil underlying the fill material.

The following specification is suggested:

On submission of designs for development projects to PUMA for consent, the Consultant shall submit a report on soils investigations, soil test results and stability analysis. The report shall contain at least the following information:

- Topographical description
- Geological setting and implication on proposed batter slopes
- Location and log of all bores including ground water level
- Results of laboratory testing
- Details of slope stability analyses
- Conclusions and recommendations.

### 7.3.4 Soils Investigation Report

A soils investigation report shall be submitted to MWTI and PUMA at the time of submission of any batter slope design for approval.

The geotechnical engineer responsible for the soils investigation work shall sign the report.

### 7.4 Construction

#### 7.4.1 Erosion Control

Erosion protection measures, as prescribed in COEP 6 – Road Construction Erosion Plan and COEP 13 – Earthworks, shall be implemented as soon as practicable both prior to and on completion of each and every batter slope.
8 COEP 8 - Quarry Development and Operations

8.1 Objective
The objective of this Code of Environmental Practice (COEP) is to prescribe the safety requirements for the development and operation of quarries as well as to define procedures and works that shall be used to mitigate against adverse environmental effects. COEP 8 shall be read in conjunction with COEP 1 – Administrative Procedures and COEP 13 - Earthwork.

8.2 Planning and Design

8.2.1 Quarry Sites
During the planning of a development project which will involve earthwork, potential quarry sites shall be identified. The potential sites shall be discussed during public consultations in regard to the project.

8.2.2 Land Acquisition
The purchase or lease of land for quarry development shall be undertaken in terms of the procedures defined in COEP 4 – Land Acquisition and Compensation.

The consultant shall define potential quarry sites that may be used for the construction of the project. Such potential sites shall be identified on plans drawn to an appropriate scale and the plans shall be displayed and discussed during public consultations.

8.2.3 Site Plans
Site plans for quarry development shall be included in drawings issued for tender and the specification shall define the requirements of the contract in relation to quarry development and operation. The following design directives shall apply:

It is desirable that no quarry boundary is located within 500 metres of a public area or town or village nor within 300 metres of any isolated dwelling. The designer shall provide site plans of potential quarry sites in the tender documents. Such plans shall show existing level contours, access road, natural watercourses and other relevant topographical features.

The area defined for quarry operation shall be based on the volume of aggregate to be quarried and hence the extent of quarry operation. It shall also provide the area necessary for stockpiling stripped overburden, the establishment of a crusher and screening plant, the stockpiling of crushed aggregate and the installation of stormwater cut off drains, silt retention ponds and staff amenities.

In the construction specification the designer shall draw the contractor’s attention to the need for consideration of the visual environment in the development of the quarry management plan, and to adopt progressive restoration work as quarry development proceeds.
8.3 Construction

8.3.1 Quarry Management Plan

Prior to commencing any physical works on site, a quarry development plan shall be prepared and approved. The quarry management plan shall have due regard for the following:

- All operations shall comply with the laws of Samoa.
- Show the extent of overburden stripping and the stockpiling of same for later site restoration.
- Show the details and location of surface water drainage from the quarry site and the silt retention pond that will be constructed to settle silt and soil contaminated water prior to its discharge to a natural water course.
- State details of pond maintenance and the method of loading and transporting settled material to a waste soil disposal site as per COEP 6.
- Show details of catch drains installed to intercept overland flow of surface water to prevent its discharge into the quarry area. Details of catch drains shall be as COEP 6.
- State safety precautions to be implemented.
- Show facilities such as guardhouse, amenities block and other facilities to be constructed.
- Show location of aggregate stockpiles.
- List plant and equipment to be used in the development and operation of the quarry.
- Show the site of the proposed magazine for the storage of explosives.

The following specifications are suggested:

Prior to commencing any physical works on site the contractor shall prepare a Quarry Management Plan and shall submit this to the engineer for his information and comment. The Quarry Management Plan shall have due regard for the following -

- All operations shall comply with the laws of Samoa. Show the extent of overburden stripping and the stockpiling of same for later site restoration.
- Show the details and location of surface water drainage from the quarry site and the silt retention pond that will be constructed to settle silt and soil contaminated water prior to its discharge to a natural water course.
- State details of pond maintenance and the method of loading and transporting settled material to a waste soil disposal site as per COEP 6.
- Show details of catch drains installed to intercept overland flow of surface water to prevent its discharge into the quarry area. Details of catch drains shall be as COEP 6.
- State safety precautions to be implemented.
- Show facilities such as guardhouse, amenities block and other facilities to be constructed.
- Show location of aggregate stockpiles.
- List plant and equipment to be used in the development and operation of the quarry.
Show the site of the proposed magazine for the storage of explosives.

On no account shall physical works be commenced for development of the quarry until an agreed Quarry Management Plan has been submitted to the engineer. Thereafter all quarry operation shall be the entire responsibility of the contractor and shall be carried out in terms of the agreed management plan.

8.3.2 Visual Impacts

The visual impact of quarry development on the environment shall be taken into account when preparing the Quarry Management Plan. So far as is possible the quarry shall be screened from view by the use of existing topography and trees.

The following specification is proposed:

In preparing the Quarry Management Plan the contractor shall so far as is possible minimise the visual impact of quarry development. Existing topography and vegetation shall be used to screen quarry operations as indicated in the typical details shown in the drawings.

During development and operation of the quarry the contractor shall progressively reinstate areas of the quarry as they are worked out utilising overburden and topsoil previously stripped from the quarry area to landscape and reinstate appropriate vegetation.

8.3.3 Safety Provisions

The following provisions shall be made in the operation of any quarry for the safety of all employees or persons on site:

- A daily register is to be maintained identifying all personnel who are engaged in or about the quarry.
- All persons engaged in the operation of the quarry shall be trained and have sufficient knowledge of and experience in the type of operation in which they are engaged.
- All persons engaged in the operation of the quarry shall be adequately supervised.
- Approved lighting shall be provided in inside working places where natural lighting is inadequate to provide safe working conditions.
- All personnel engaged in quarry operations shall wear a protective helmet of approved type at all times when on the quarry site.
- All personnel shall wear protective footwear while engaged in quarry operations.
- All employees engaged in operations on a quarry face at a height greater than 1.5 metres above the level of the quarry floor or bench floor shall be attached at all times to a properly secured safety rope by means of a safety belt.
- All persons whose duty it is to attend to moving machinery in or about any quarry shall wear close fitting and close fastened garments. Their hair shall be cut short or securely fixed and confined close to their head.
- All boilers, compressors, engines, gears, crushing and screening equipment and all moving parts of machinery shall be kept in a safe condition. Every flywheel and exposed moving parts of machinery shall be fitted with safety screens or safety fenced as appropriate.
- All elevated platforms, walkways and ladders shall be provided with adequate hand or safety rails or cages.
- Machinery shall not be cleaned manually while it is in motion nor oiled or greased while in motion.

Should any of the above safety measures be ignored or inoperative at any time then the engineer shall direct that quarry operations cease until all safety measures are provided and are in operating order.

8.3.4 Provision of First Aid

At every quarry there shall be provided the following first aid equipment:
- A suitably constructed stretcher with a warm, dry blanket.
- A first-aid box equipped to a standard acceptable to the Ministry of Health.

The quarry manager shall at least once every working week personally inspect the first-aid equipment to ensure that it complies with the requirements of this specification. Any supplies used from the first-aid box shall be replaced forthwith.

A person trained in first aid to the injured shall be available at the quarry during all operational periods of whatever nature.

8.3.5 Health Provisions

At every quarry a sufficient number of toilets and urinals shall be provided for the use of employees and shall be properly maintained and kept in a clean condition.

At every quarry a supply of potable water, sufficient for the needs of the persons employed, shall be provided. If persons are employed in places remote from the source of water supply, suitable clean containers of potable water shall be provided for their use.

Suitable facilities for washing shall be provided and maintained in a clean and tidy condition to the satisfaction of the employer, and those facilities shall be conveniently accessible for the use of persons employed in or about the quarry.

8.3.6 Quarry Manager

A manager who is experienced in all aspects of quarry operation and in particular safety procedures shall control every quarry. The manager shall be personally responsible for ensuring that all safety facilities are available and that safety procedures are followed.

A suggested specification is as follows:

The contractor shall nominate an experienced quarry manager in the submission of the tender for the works. The quarry manager shall have a recognised current “A” grade quarry manager’s surface certificate and a recognised current quarry shot firer’s certificate.

In the submission of the quarry manager’s credentials with the tender documents, the contractor shall ensure that the credentials include certified true copies of the following documents:

- Grade quarry manager’s surface certificate
- Quarry shot firer’s certificate
References from previous clients or employers demonstrating experience in:

- The design and layout of quarries including the layout of benches, faces, access roads, drainage and crushing plant.
- The methods of working quarry faces with particular reference to face stability and the safety of persons employed in or about the quarry
- The safety of the public at large
- The provision for and application of first aid.

The quarry manager’s duties shall include:

(a) The manager, or an approved person appointed by the manager in writing, shall daily, within two hours immediately before the commencement of the first working shift of the day in any part of the quarry, inspect every working place and travelling road, and all adjacent places from which danger might arise, and shall forthwith make a true report of the inspection in a record book kept for the purpose at the quarry. The record book shall be accessible to the engineer and the persons employed in or about the quarry.

(b) The manager, or an approved person appointed by the manager in writing, shall at least once in every 24 hours examine the state of the safety appliances or gear connected with quarrying operations in the quarry, and shall record the examination in the record book.

(c) The manager shall once in each week carefully examine the buildings, machinery, faces, benches, and all working places used in the quarrying operations, and shall forthwith after every such examination record in writing in the record book his opinion as to their condition and safety and as to any alterations or repairs required to ensure greater safety of the persons employed in the working of the quarry. The manager shall then ensure that any such alterations or repairs are carried out.

8.3.7 Vegetation

Vegetation shall be stripped from the proposed quarry development area. Before stripping any vegetation a survey shall be undertaken to determine the presence of any rare plant species. All necessary steps shall be taken to save plants classified as important. Care shall be taken to avoid damage to any vegetation outside the defined quarry area. On no account shall burning of vegetation be permitted.

A suggested specification is:

Before stripping any vegetation a survey shall be undertaken to determine the presence of any rare plant species. All necessary steps shall be taken to save plants classified as important.

Prior to commencing vegetation clearance of the quarry site the contractor shall define the perimeter boundary of the proposed work as shown in the agreed quarry management plan. Vegetation shall then be stripped from the proposed quarry development area. Care shall be taken to avoid damage to any vegetation outside the defined quarry perimeter.

Stripped vegetation shall be mulched and stockpiled for use in the later restoration of the site.

Logs and large branches shall be stockpiled for use in the construction of erosion protection works for batters in quarry overburden.
8.3.8 Overburden Stripping
Overburden stripped from any proposed quarry area shall be stockpiled clear of the quarry operation to be used for site restoration at the completion of operations. Stockpiles shall be shaped and smoothed to minimise ingress of rainwater.

Surface water run off from stockpiles shall be intercepted by perimeter drains which shall be discharged to silt retention ponds.

Batters in overburden excavation shall be sloped to ensure they are safe and stable against failure.

The maximum height of any batter in overburden shall be 3 metres. Any higher batter in overburden shall have an intermediate bench at least 3.5 metres in width. Such benches shall be shaped and drained as COEP 6 – Road Construction Erosion and Control.

Suggested specifications are:

The working of the face, sides, tops, or overburden of a quarry shall be carried out in such a manner as will prevent danger from falls of ground.

The overburden or tops of a quarry, and all loose ground or material, shall be cleared far enough back from the edge of the quarry to prevent danger to the persons employed.

The toe of all batters and intermediate benches shall be drained and such drains shall discharge to a silt retention pond.

As soon as practicable after completion of overburden excavation all exposed batters shall be protected from the effects of surface erosion.

8.3.9 Blasting Operations
Blasting operations shall be conducted in a manner that will not cause danger to life or property.

All explosives shall be stored in purpose built locked magazines on a site within the quarry boundary but remote from blasting operations. Detonators shall be stored in a separate locked magazine but similarly sited.

A blasting operations manual shall be prepared for any quarry and such manual, which shall be maintained by the quarry manager, shall stipulate procedures for at least the following:

- Operation of magazines for the storage of explosives and for the storage of detonators.
- The quantity of explosive that may be removed from a magazine at any one time.
- The procedure for quarry explosive cases.
- Persons allowed to fire shots.
- Explosives to be carried in securely covered containers.
- Tamping of explosives.
- Diameter of drill holes.
- Time when charges are to be fired.
- Detonation delay.
Firing warnings.

Blasting shelters.

Treatment of misfired charges

Inspection of work site after each detonation by the quarry manager or an approved person appointed in writing by the quarry manager.

Suggested specifications for blasting are as follows:

Blasting operations shall be undertaken in terms of the laws of Samoa.

Blasting operations shall be conducted in such a manner as will not cause danger to life or property.

While blasting operations are being carried out within 500 metres of any road or thoroughfare, such number of persons as may be necessary shall be stationed thereon with warning notices to warn travellers of danger and to prevent access to the danger area.

A blasting operations manual shall be prepared and a copy shall be available on site at all times. The manual shall stipulate at least the following requirements or procedures:

**Magazines**

Detonators shall not be stored in the same magazine as other explosives.

Explosives and detonators shall be stored in purpose built magazines with two different locks.

A person specially appointed in writing by the quarry manager for the purpose shall be in charge of every magazine, and shall have keys to one of the locks. That person shall be responsible for the safe storage of explosives contained therein, for the distribution of explosives therefrom, and for the keeping of accurate records of stocks and issues in a book provided for the purpose. A second person, appointed by the employer shall have keys to the second lock. Both persons shall be present to unlock the magazine, and note the removal of stock and ensure both locks are subsequently secured.

Explosives shall be used in the same order as that in which they were received into the magazine.

Naked lights shall not be introduced into a magazine or into any working place in a quarry where explosives are temporarily stored.

**Quantity of Explosives to be taken from Magazine**

Explosives shall not be taken from a magazine in quantities exceeding that required for use during one shift, and any surplus explosives shall be returned to the magazine at the end of that shift.

**Opening of Explosives Cases**

No case or carton containing explosives shall be opened in the storage area of any magazine.

Instruments made solely of wood, brass, or copper shall be used in opening cases or cartons of explosives, and the contractor shall provide and keep suitable instruments for that purpose.

**Persons Allowed to Fire Shots**

The preparation of charges and the charging, tamping, and firing of all explosive charges in or about a quarry shall be carried out under the personal supervision of the quarry manager.
When a charge of ammonium nitrate/fuel oil mixture has misfired an attempt may be made to wash out the mixture in addition to any stemming down to the primer. The mixture shall be collected for safe disposal.

The stemming of a charge of gunpowder that has misfired may be withdrawn with a copper pricker and the charge reprimed and fired.

A charge of any other compound which has misfired shall not be withdrawn but, if the charge is bottom primed, the stemming shall be carefully removed by the use of water passed through a copper, plastic, or rubber hose to the outer end of the charge and a sufficient charge or charges shall be inserted and fired for the purpose of exploding the original charge until it can be seen by a competent person, after the hole has been washed out, that no explosive remains. A thorough search shall be made for unexploded charges in the resulting rock piles.

Where it is not possible to remove a misfire by refiring, a relieving hole shall be drilled as nearly parallel as possible with the original hole in such a manner as will prevent it meeting the misfired hole. The relieving hole shall then be charged and fired.

8.3.10 Dust Suppression

Operation of any quarry shall incorporate dust suppression measures. Dust generation during blasting operations shall be minimised. All haul roads shall be regularly dampened by spray bars fitted to water tankers or similar systems in order to minimise dust generation by traffic movements. Crushers, screens and stockpiles shall be dampened by appropriate water sprays to minimise dust generation.

The following specification is proposed for dust suppression:

The contractor shall provide and operate plant and equipment for maintaining all surfaces in a damp condition and hence minimise the generation of dust. All haul roads shall be kept continually damp and appropriate water spray systems shall be available to dampen crushing and screening operations and stockpiled material as appropriate.

8.3.11 Archaeological Sites and Fossils

Should any archaeological sites be discovered during any stage of quarry development or operation all work shall immediately cease and MWTI/PUMA be notified forthwith. On no account shall extraction work continue until authorised by MWTI/PUMA.

MWTI/PUMA shall arrange an evaluation of the site in association with archaeologists before making any decision as to whether or not extraction works may proceed.

The following specification is suggested:

If the contractor locates any archaeological site or suspected archaeological site he shall immediately cease operations and notify the engineer forthwith. On no account shall extraction work continue until authorised by PUMA.
8.4 Consent

8.4.1 Consent Required
In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in quarry development or operations shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

8.4.2 Application for Consent
Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the earthwork activity. In the case of land development, the land developer rather than the contractor or agent shall submit the application.
Applications shall be made no later than one month before the proposed earthwork activity is scheduled to begin.
Applications shall be accompanied by such other documents as PUMA may require.

8.4.3 Public Hearing
At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

8.4.4 Special Conditions
PUMA may, upon issuance of a consent, impose any conditions or special requirements on the quarry development or operation as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

8.4.5 Consent Expiration and Renewal
A quarry development or operation consent issued by PUMA shall expire two years from the date of issuance. If quarry development or operation is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
9 COEP 9 - Gravel Extraction

9.1 Objective
The objective of this Code of Environmental Practice (COEP) is to provide planning and construction guidelines for the extraction of river gravels for development projects with particular regard for the need to avoid or mitigate adverse environmental impacts from such work. In each case a proposal to extract river gravel for a development project must be compared in terms of economic cost and environmental cost with the alternative of obtaining gravel aggregates from existing or new quarries. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures and COEP 13 - Earthwork.

9.2 Planning

9.2.1 Extent of Extraction
Where river gravel extraction is considered for the production of aggregates including concrete aggregates, the total quantity of gravel to be extracted shall be estimated and the corresponding volume of river gravels shall be identified in terms of length, breadth, and depth of river over which gravel extraction is likely to be undertaken. This information shall be made available to the public during consultation.

The following design directive is suggested:

The consultant shall identify the total volume of gravel extraction to be undertaken for any one project in order to produce the required volume of pavement and concrete aggregates that are required. The corresponding length, breadth and depth of river over which gravel extraction is likely to be undertaken shall be made available to the public during consultation.

9.2.2 Aggregate Quality
Prior to scheduling river gravel extraction for any project, sufficient physical and/or chemical tests on representative samples of aggregate shall be undertaken to ascertain that gravel deposits within reasonable proximity to the project will in fact yield gravel of sufficient quality for the proposed end use.

The constituents of river gravel, including igneous, metamorphic and sedimentary rock, sand and silt shall be determined in order to assess the percentage of material contained within a gravel deposit that is in fact useable for the road project.

The feasibility of separating useable material from unsuitable material shall be assessed and the percentage of useable material shall be taken into account in assessing the extent of extraction as required in 9.2.1 above.

The following design directive is recommended:

The consultant shall undertake such investigation and testing as is necessary to ascertain the quality of river gravels located within reasonable proximity to the site of the project and shall estimate the quantity of useable aggregates as a percentage of the total volume of gravel to be extracted. This information shall be documented and used in the compliance with 9.2.1 and 9.2.2 of this COEP.
The results of the analysis to comply with 9.2.1 and 9.2.2 shall be compared with the environmental and economic cost of obtaining aggregate from land based quarries in order to select the most appropriate aggregate source in terms of total economics including environmental economics.

9.3 Construction

9.3.1 Consents and Permits

No gravel shall be extracted from any river unless the required consents and permits are obtained. Gravel extraction shall not proceed when a river is in flood or during periods of heavy or seasonal (cyclonic) rains. No gravel extraction may proceed other than during daylight hours.

The following specification is suggested:

*The contractor shall apply for and obtain any licence or permit to extract gravel from any river or river mouth, prior to commencement of any extraction work. The contractor shall pay any relevant fees or royalties. Despite the issue of a consent and permit, no gravel extraction shall proceed when a river is in flood or during periods of heavy or seasonal (cyclonic) rains. No gravel extraction may proceed other than during daylight hours.*

9.3.2 Extraction Management Plan

For every project where gravel is to be extracted, an extraction management plan shall be prepared. The plan shall identify the extremity of the river over which extraction is to be undertaken and shall define the depth of excavation and the proximity to the banks of the river of the proposed excavation. It shall define all existing trees and vegetation within 10 metres of the riverbank and all other topographical features including buildings and fences.

The management plan shall define the condition of all plant and machinery to be used in the extraction process. It shall also describe likely short-term downstream effects including any effect on potable water supplies.

The plan will define proposed stockpiles of extracted materials and the proposed working area for loaders and trucks. It shall also define the location of vehicular access from any public road to the gravel deposit.

The plan shall be submitted to and approved by the MNRE and MWTI.

The following specification is recommended:

*The contractor shall prepare a gravel extraction management plan for the extraction of gravel from any river. Where the extent of any river from which gravel is to be extracted is specified the extent of extraction shall be limited by the specified length. Where the extent is not specified the contractor shall define the required extent and show same on the management plan.*

*The plan shall define the depth of excavation, proximity of excavation to any riverbank, and all topographical features including houses, fences and vegetation within 10 metres of any riverbank. It shall also define the location of proposed stockpiles of extracted materials, and the proposed working area for loaders and trucks. The plan shall also show the location of vehicular access from any public road.*
road to the gravel deposit. All temporary drains and silt retention fences installed to trap sediment run off from the stockpiles and working area shall be shown.

Where crushing of the aggregate is to be undertaken in proximity to the river, the location of the crusher shall be shown. The location of stockpiles of crushed materials together with all temporary drains and silt fences for sediment retention shall be detailed. Reject crushed material shall not be returned to the river. It shall be disposed of in waste excavation disposal areas.

The plan shall be submitted to and approved by MNRE and MWTI.

9.3.3 Vegetation Protection

All vegetation within a band 10 metres wide measured from the river bank on each side of the river shall be carefully protected throughout gravel extraction activity. No trees shall be removed from such a band.

The following specification is suggested:

The contractor shall protect all vegetation from damage or disturbance by gravel extraction works within a 10 metre wide band measured from the riverbank on each side of the river at any extraction site. The removal of any trees within the 10 metre wide band is prohibited without the written direction of the MNRE.

9.3.4 Protection of River Banks

Throughout gravel extraction activities all riverbanks shall be protected from damage. No excavation of gravel material shall be undertaken in proximity to a riverbank such that instability of the bank will occur. In any case no excavation shall be undertaken closer to the toe of any bank than a distance equal to twice the height of the adjacent bank.

Riverbanks may not be excavated to form access ramps into the river. If such ramps are necessary they shall be formed by ramping excavated river gravel against the river bank to form such an access ramp. At the completion of extraction any access ramp shall be removed and the material spread evenly over the adjacent riverbed. Any damage to riverbanks shall be forthwith repaired.

A suggested specification for this is:

The contractor shall protect river banks from damage throughout the conduct of gravel extraction works. Should any damage occur it shall be immediately repaired with permanent materials to the complete satisfaction of the engineer.

No excavation of growth shall be undertaken in proximity to a riverbank such that instability of the bank will occur. In any case no excavation shall be undertaken closer to the toe of the bank than a distance equal to twice the height of the adjacent bank.

Riverbanks may not be excavated to form access ramps into the river. If such ramps are necessary they shall be formed by ramping excavated river gravel against the river bank to form such an access ramp. At the completion of extraction any access ramp shall be removed and the material spread evenly over the adjacent riverbed.
9.3.5 Condition of Plant and Machinery

All plant, vehicles or machinery used within the river or on access roads to the river or in working areas for stockpiling or crushing shall be in good condition with no leaking fuel and/or lubricants including oil and grease.

A suggested specification for plant and machinery is:

*The contractor shall ensure that all plant, vehicles and machinery used in relation to gravel extraction works are in good condition with no leaking fuel and/or lubricants including oil and grease.*

The contractor shall submit to the Engineer a spill contingency action plan and shall have on site at all times an oil spill emergency containment kit.

If any leak of fuel, oil or grease occurs the contractor shall immediately remove any relevant item of plant, vehicle or machinery from the site of the works and may not return such item to the site until all leaks have been repaired.

9.3.6 Minimise Downstream Adverse Environmental Effect

All practicable steps shall be taken to prevent an increase in the level of turbidity downstream of the extraction works. Such steps may include the construction of diversion channels, bunds with upstream settling areas or other screening systems that will minimise increased downstream turbidity.

9.3.7 Potable Water Supplies

No gravel extraction works shall be undertaken within a distance of 1000 metres upstream or 200 metres downstream of any town or village water supply intake system.

9.3.8 Fuel Storage and Refuelling

No fuel storage area or refuelling of plant, vehicles or machinery shall be located within or adjacent to any river or within any river flood plain. All fuel storage areas shall be bunded to prevent the escape of spilled fuel or lubricants. All oil traps, drains and site restoration procedures shall be as for COEP 5 - Construction Camps.

A suggested specification for fuel storage is:

*The contractor shall ensure that fuel storage areas are located at an elevation above any likely flood level. All fuel storage areas and refuelling activity shall be undertaken within a bunded area to prevent the escape of spilled fuel or lubricants. Access to the bunded area shall be protected by an appropriate concrete lined drain which shall discharge through a purpose built oil or grease trap prior to discharge into a grassed swale that shall lead to a natural water course.*

9.3.9 Site Restoration

At the completion of gravel extraction for any one project the riverbed is to be restored to an even profile. All gravel heaped up during the process of removal shall be spread evenly over the riverbed, or spread into any diversion channel. All access ramps shall be demolished and the material spread evenly over the riverbed.
All plant, machinery and vehicles and any temporary structures shall be removed from the riverbed immediately on completing operations.

**9.3.10 Warning Sign**
A warning sign shall be erected at each extraction site where as a result of extraction the site is or is likely to be a danger to the public. Such signs shall be erected whenever the riverbed is likely to be a danger to fishers and others who may use the riverbed from time to time.

**9.3.11 Archaeological Sites**
Should any archaeological sites be discovered during any stage of gravel extraction works such work shall cease immediately and MNRE notified forthwith. On no account shall extraction work continue until authorised by MNRE.

MNRE shall arrange an evaluation of the site in association with archaeologists before making any decision as to whether or not extraction works may proceed. A suggested specification is:

*If the contractor locates any archaeological site or suspected archaeological site he shall immediately cease operations and notify the engineer forthwith. On no account shall extraction work continue until authorised by the PUMA.*

**9.3.12 Safety at River Mouths**
Any gravel or sand extraction work at or near river mouths that are subject to tidal influence shall not be undertaken at any time without the presence on site of a trained observer whose function will be to warn workmen against tidal surges. The observer shall be stationed in an appropriate vehicle or temporary structure located at an elevation above likely tidal surges.

The observer shall be equipped with a battery operated loud speaker with sufficient volume to be able to warn plant operators or other personnel of approaching tidal surges. The observer shall also be in constant radio contact with the appropriate authorities.

**9.4 Consent**

**9.4.1 Consent Required**
In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in gravel extraction shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

**9.4.2 Application for Consent**
Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the gravel extraction activity. In the case of land development, the land developer rather than the contractor or agent shall submit the application. Applications shall be made no later than one month before the proposed extraction is scheduled to begin.
Applications shall be accompanied by such other documents as PUMA may require.

9.4.3 Public Hearing
At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

9.4.4 Special Conditions
PUMA may, upon issuance of consent, impose any conditions or special requirements on the gravel extraction operation as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

9.4.5 Consent Expiration and Renewal
A gravel extraction consent issued by PUMA shall expire two years from the date of issuance. If extraction is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
10 COEP 10 - Coastal Protection

10.1 Objective
The objective of this Code of Environmental Practice (COEP) is to prescribe the basis of design for hard coastal protection works, and to define construction procedures for those works. Hard works comprise seawalls, revetments and the like. Soft coastal protection works include planting, managed retreat and the like. For more details see the Coastal Infrastructure Management Strategy (2006 Revision MNRE). This COEP shall be read in conjunction with COEP 1 – Administrative Procedures and COEP 13 - Earthwork.

10.2 Design

10.2.1 Design Procedure
Estimation of design wave heights and design procedures and methods used for coastal protection works shall generally be in terms of the United States Army Corps of Engineers Shore Protection Manual (4th Edition, Vols I and II, 1984) or subsequent editions as applicable.

Where practicable road embankments shall be located shoreward of anticipated maximum erosion of any coastline. This will minimise construction cost, and the natural process of beach erosion and replenishment will be unaffected. The potential erosion of a coastal system shall be determined after consideration of previous studies, aerial photographs, historical surveys and discussions with local residents.

The construction of embankments in mangrove areas shall be avoided wherever possible. Where embankments are to be constructed within a beach system (including surf zone) they shall be protected from erosion and shall be designed such that fine materials shoreward of the erosion protection cannot be leached out through the erosion protection system. Any protective structure shall be designed to maintain the littoral drift of sediment without downdrift erosion.

The preferred erosion protection system is sloping rock revetments and these shall be used wherever practicable. Particular care shall be taken to detail effective measures to prevent erosion of the toe of any revetment.

The use of vertical walls with or without curved faces and tied back bulkheads should be avoided if at all possible. If they are used, careful detailing of measures to minimise erosion at the base of the wall and adverse effects of wave reflection to adjacent areas shall be included in the design.

In some cases due to other design factors it may not be possible to design revetments or walls to prevent overtopping by design waves or wave run up. In such cases care shall be taken to provide sufficient capacity and erosion protection in drainage systems to rapidly drain water from the road surface without causing scour.

The design of drainage systems for coastal roads shall be wherever practicable such as to drain road surface water for treatment across grassed swales prior to discharge to a natural drainage system. Direct discharges onto beaches shall be avoided.
All road shoulders, berms, and side drains on coastal roads shall be grassed or otherwise protected from erosion as set out in COEP 6 – Road Construction Erosion Control.

10.3 Construction

10.3.1 Storage of Materials
All construction materials such as aggregate stockpiles, cement, formwork, and the like shall be stored in areas above the effects of tidal and wave action. Temporary drains or bunds shall surround such stored materials as set out in COEP 6 so as to prevent the discharge of stormwater from the storage areas direct to coastal waters.

10.3.2 Construction Camps
Construction camps shall be sited above the effects of tidal and wave action and shall be developed in terms of COEP 5 – Construction Camps.

10.3.3 Construction Sequence
The construction of any revetment or sea wall or other coastal protection works inclusive of filter cloth or other filtration systems shall at all times be at a higher elevation than fill materials that are to be placed and compacted on the shoreward side of such protection works.
The discharge of surface water runoff from any earthwork directly to tidal waters is to be avoided at all times.

10.3.4 Drainage Channels
Temporary or permanent channels together with silt fences or silt retention ponds shall be constructed and maintained in efficient operating condition throughout the construction and maintenance period as set out in COEP 6.
All channels shall discharge to grassed swales prior to water entering natural water courses or being discharged to culverts.

10.3.5 Grassed Surfaces
All surfaces to be grassed such as road shoulders, berms, benches, road side drains and swales shall be surfaced as soon as practicable and progressively as the works proceed.

10.3.6 Clean Up
At the completion of the works the whole site including any construction camp or storage areas shall be cleaned up. All surplus materials and construction debris shall be removed from the site and any exposed earth surfaces shall be trimmed and shaped to conform with surrounding topography and sown with appropriate grass.
10.4 Consent

10.4.1 Consent Required
In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in coastal protection shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

10.4.2 Application for Consent
Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the construction of coastal protection. In the case of land development, the land developer rather than the contractor or agent shall submit the application.

Applications shall be made no later than one month before the proposed construction is scheduled to begin.

Applications shall be accompanied by such other documents as PUMA may require.

10.4.3 Public Hearing
At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

10.4.4 Special Conditions
PUMA may, upon issuance of a consent, impose any conditions or special requirements on the construction of coastal protection as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

10.4.5 Consent Expiration and Renewal
A coastal protection consent issued by PUMA shall expire two years from the date of issuance. If protection work is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
11 COEP 11 - Drainage

11.1 Objective
The objective of this Code of Environmental Practice (COEP) is to prescribe procedures for the design, construction and maintenance of drainage structures and drainage channels to minimise short term and long-term adverse environmental effects. This COEP shall be read in conjunction with COEP 1 - Administrative Procedures and COEP 13 - Earthwork.

11.2 Design

11.2.1 Capacities
The capacity of all channels, culverts, bridge waterways and other drainage structures shall be such as to be able to discharge the relevant design flow without overtopping or surcharge.

In the design of bridge waterways and major culverts, care shall be taken to assess appropriate overland flow paths for the discharge of flood flows arising from extreme rainfall in excess of the specified design rainfall.

The following design directive is suggested:

_The Designer shall design all channels, culverts, bridge waterways and other drainage structures such that they are able to discharge their design flow without overtopping or surcharge. In the design of bridge waterways and major culverts care shall be taken to assess appropriate overland flow paths for the discharge of flood flows arising from extreme rainfall in excess of the specified design rainfall. Such overland flow paths shall be such as to avoid the overtopping of any bridge super structure._

_Overland flow paths shall be arranged wherever practicable to mitigate the adverse effects of flooding of land or buildings both upstream and downstream of any bridge or major structure. Flow paths across roads shall be protected against scour by appropriate methods._

11.2.2 Channel Lining
All permanent drainage channels shall be lined to mitigate against erosion. Where practicable channels shall be grassed. On steep gradients and elsewhere where expected flow velocity is likely to scour grassed surfaces, impervious lining such as concrete shall be used.

11.2.3 Channel Discharge
All channel discharge locations shall be protected against erosion. The preferred method of discharge is via broad grassed swales up to 20 metres in length designed to reduce velocity of flow to less than scour velocity and to trap or settle out suspended sediment particles prior to discharge to natural water courses.

Where the installation of grassed swales is impracticable, channel discharge locations shall be protected against scour by the installation of rock rip rap or energy dissipation structures or similar scour protection systems.
Where the discharge from catch drains, bench drains and/or road side drains is to flow down steep slopes such as may be encountered at cut/fill interfaces in steep terrain then permanent flumes shall be used to avoid erosion. Flumes shall extend at least 5 metres beyond the toe of any fill batter. The outlets from flumes shall be protected against scour.

11.2.4 Culvert Inlets and Outlets
All culverts inlets and outlets shall be protected against erosion. This will normally be achieved through the design of appropriate aprons, wing walls and head walls. Erosion of the watercourse bed both up stream and down stream of aprons shall be mitigated against by the installation of rock mattresses where necessary.

The integrity of aprons shall be protected from under mining by the design of cut off walls below the apron leading edge.

Bank erosion at culvert inlets and outlets shall be avoided by the design of appropriate wing walls, gabion baskets or similar.

Where necessary to minimise culvert exit velocities and hence minimise the risk of down stream erosion the design of outlet structures shall include appropriate energy dissipation measures. These may include “dragons teeth”, standing wave flumes, drop structures or similar devices.

11.2.5 Bridge Water Ways
Unless impracticable, the construction of bridges and bridge waterways shall be undertaken without stream or river diversion.

Bridge piers shall be designed to minimise bed scour. Where piers or abutments are located on riverbanks, erosion protection measures shall be incorporated in the design.

The entrances to and exits from bridge waterways shall be protected against scour by the use of gabions, rock mattresses or similar devices to protect road batters and/or the existing banks of the watercourse.

11.3 Construction

11.3.1 Channels and Open Drains
Prior to commencing site clearance work, topsoil stripping or earthworks the contractor shall install all temporary or permanent drainage channels as appropriate together with silt fences or silt retention ponds as are necessary to minimise the discharge of surface water containing sediment particles to any natural water course or on to land adjacent to the site of the works.

All permanent drains shall be lined as specified as soon as practicable after formation and such lining shall be maintained in good condition throughout the construction and maintenance period.

Specified erosion control measures at channel discharge locations shall be operational prior to the construction of the relevant permanent drainage and road works.
11.3.2 Culvert Construction

Where culverts are to be constructed in existing water courses care shall be taken to minimise the clearance of vegetation from existing banks and inverts to just that necessary for the construction of the works.

Construction shall be undertaken utilising methods that limit to practical levels the amount of water contaminated with sediment particles. Wherever possible, construction of culverts will commence at the down stream end and be undertaken in a dry trench. Downstream erosion protection measures should be constructed prior to diversion of flow through culverts.

Wherever practicable temporary downstream silt screens or weirs should be installed to provide a stilling basin for the settlement of suspended soil. Such stilling basins shall be cleaned out and soil transported to waste soil disposal areas before dismantling the temporary downstream weir.

Where culverts are to be constructed across an existing road, at least one half of the road shall be open to traffic at any time. Safety and traffic management procedures for such work shall be as COEP 12 – Traffic Control During Construction.

11.3.3 Bridge Construction

The clearance of existing vegetation from the invert or banks at any bridge site shall be limited to just that area required for the construction of the works.

The programme for construction of the bridge shall demonstrate that detailed and specified erosion protection works are to be constructed at the earliest possible time. Any construction materials to be stored on site at any time; e.g. aggregates, cement, formwork and the like shall be stored in a location above likely flood levels. Any fuel storage, workshop or fabrication yard shall be contained within a bunded area as for COEP 5 – Construction Camps. Facilities for workers at a bridge site shall be as for COEP 5.

The use of plant or equipment within the river or stream channel is to be avoided. If it is unavoidable only plant or equipment free from fuel or oil leaks shall be used.

Construction debris shall not at any time be deposited in any stream or river. At completion of the works all surplus construction materials, debris of any sort and any temporary buildings shall be removed from the site of the works and the whole of the works area returned to a condition in no way inferior to that which pertained prior to the commencement of the works.

11.3.4 Drainage Maintenance

All road drainage systems including side drains, channels (lined or unlined) and culverts shall be regularly maintained and all obstructions, debris and materials which limit hydraulic efficiency cleared away. Such maintenance work shall be programmed for implementation during the month prior to the onset of each wet season as a minimum.

Material cleared from drainage systems should be loaded on to a truck and transported to designated waste disposal areas for disposal. On no account should materials be disposed of on site.
11.4 Consent

11.4.1 Consent Required
In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in drainage work shall first obtain a Development Consent (consent) from PUMA for the proposed activity.

11.4.2 Application for Consent
Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the drainage work. In the case of land development, the land developer rather than the contractor or agent shall submit the application.

Applications shall be made no later than one month before the proposed construction is scheduled to begin.

Applications shall be accompanied by such other documents as PUMA may require.

11.4.3 Public Hearing
At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.

11.4.4 Special Conditions
PUMA may, upon issuance of a consent, impose any conditions or special requirements on the drainage work as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

11.4.5 Consent Expiration and Renewal
A drainage consent issued by PUMA shall expire two years from the date of issuance. If drainage work is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
12 COEP 12 - Traffic Control During Construction

12.1 Objective
The objective of this Code of Environmental Practice (COEP) is to prescribe the methods that are to be used for the safety and control of traffic during the upgrading, reconstruction or maintenance activities on any road. This COEP shall be read in conjunction with COEP 1 - Administrative Procedures.

12.2 Clothing
All personnel engaged in upgrading, reconstruction or maintenance activities on any road shall wear reflectorised and high visibility jackets while on the works site.

12.3 Signs
All traffic signs used for the warning or direction of traffic at road works sites shall comply with the requirements of MWTI and appropriate traffic regulations. Homemade signs shall not be used.

12.4 One Way Traffic
Unless otherwise provided for in the form of temporary deviations and the like, all roads shall have at least one lane open for the passage of traffic at all times. Personnel shall be positioned at each end of any one lane section of road equipped with stop/go paddles to facilitate providing instructions to passing vehicles.
Where personnel directing the traffic cannot see each other, they shall be equipped with radio telephones in good working order.
13 COEP 13 - Earthworks

13.1 Objective
The objective of this Code of Environmental Practice (COEP) is to provide planning and work guidelines for earthworks activities associated with development projects; with particular regard for the need to avoid or mitigate adverse environmental impacts from such work. This COEP shall be read in conjunction with COEP 1 – Administrative Procedures.

All earthworks activities shall be conducted in accordance with this COEP and in such a way as to prevent accelerated erosion, accelerated sedimentation and disturbance of potential cultural resources. To accomplish this, all persons engaging in earthwork activities shall design, implement and maintain erosion control, sedimentation control, and cultural preservation measures which effectively prevent accelerated erosion, accelerated sedimentation and adverse impact on cultural resources.

This COEP shall apply to all work carried out on land, or in the water, where natural sediment will be disturbed; including (but not limited to) the following works:

- Sand Mining
- Coastal Works
- Watersheds
- Parking Areas
- Landscaping and Land Contouring
- Footpath Construction and Maintenance
- Levelling of Sports Fields

13.2 Earthworks Plan

13.2.1 Plan Required
The erosion and sedimentation control measures referred to in this code shall be described in a plan (the Earthworks Plan). The Earthworks Plan shall be submitted to the Planning and Urban Management Agency (PUMA) by the applicant as part of the Development Consent Application and, if the consent is granted, a copy of the Earthworks Plan shall be available at all times at the site of the activity.

The applicant may be required to attend a preliminary meeting with PUMA and other interested parties to determine the scope of the Earthworks Plan.

13.2.2 Plan Preparation
A person qualified in erosion and sedimentation control methods and techniques shall prepare the Earthworks Plan.
13.2.3 Factors
The Earthworks Plan shall be designed to prevent acceleration of erosion or sedimentation and shall consider all factors that contribute to erosion and sedimentation, including, but not limited to, the following:

a. The topographic or hydrographic features, or both, of the project area;
b. The types, depth, slope and area of the soils, coral and reef of the affected area;
c. The original state of the area as to plant and animal life and ecosystem functioning;
d. Whether any living coral reef, seagrass bed, mangrove, freshwater lake, sandy beach, or other valuable ecosystem may be affected by the earthworks;
e. The proposed alteration to the area;
f. The amount of runoff from the project area;
g. The staging of earthwork activities;
h. Temporary control measures and facilities for use during earthwork activities;
i. Permanent control measures and facilities for long-term protection;
j. A maintenance programme for the control facilities including disposal of materials removed from the control facilities or project area;
k. Whether a Marine Reserve Area (MRA) or other designated coastal area of special concern is in the vicinity;
l. Whether archaeological sites or other cultural resources are in the vicinity;
m. Whether designated tourism or fishery resources are in the vicinity;
n. The presence and vulnerability of nearby beaches to erosion.

13.2.4 Earthworks Involving Water
If the project involves earthworks in a lagoon, on a reef, or in any body of water, PUMA may require the Earthworks Plan to map and describe existing ecosystems, plants, animals, the coastal zone management boundary and coastal areas of special importance as well as maximum and minimum turbidities that are likely to be generated by the earthworks.

13.3 Erosion and Sedimentation Control Measures and Facilities

13.3.1 Control Measures and Facilities
The erosion and sedimentation control measures and facilities described in Sections 13.3.2 and 13.3.3 of this Code shall be incorporated into all earthwork activities unless the Earthworks Plan shows that alteration of these measures or facilities, or inclusion of other measures or facilities, will prevent accelerated erosion and accelerated sedimentation.

13.3.2 Control Measures
a. All earthwork activities shall be planned in such a manner so as to minimize the area of disturbed land, reef or lagoon and the amount of sediment that leaves the area.
b. All sedimentation resulting from underwater earthwork activities shall be contained, confined and restricted in such a manner that turbidities will be kept to a minimum.

c. All permanent facilities for the conveyance of water around, through or from the project site shall be designed to limit the velocity of flow in and beyond the facilities to a speed that will not contribute to erosion.

d. All slopes, channels, ditches or any disturbed area shall be stabilized as soon as possible after the final grade or final earthworks have been completed within a section or area of the project.

e. Where it is not possible to permanently stabilize a disturbed area immediately after the final earthworks have been completed or where the activity stops for more than 14 days, interim stabilization measures shall be promptly implemented.

f. Before earthworks commence within a body of water or tidal zone, adequate seawalls or breakwater facilities, or both, shall be constructed to safely contain the sediment without failure and to prevent accelerated sedimentation.

g. All runoff from the project area shall be collected and diverted to facilities for removal of sediment.

h. Runoff from a project area shall not be discharged into water without effective means to prevent sedimentation.

### 13.3.3 Control Facilities

a. Earthworks on reefs or in lagoons.

Sedimentation retention booms, containment areas, sedimentation basins, or any combination of these, shall be used to restrict accelerated sedimentation around earthworks or earth disturbing activities on reefs or in lagoons. However, these facilities shall not be required if an actual demonstration can show that no facilities are needed to prevent accelerated sedimentation.

Sedimentation basins shall be required for any earthwork activity employing a pipeline cutterhead, suction dredger, or similar types of excavation equipment. PUMA shall determine whether sedimentation basins, sedimentation retention booms, or containment areas are appropriate. PUMA may give approval, in writing, to the use of alternate facilities or a finding that no facilities are necessary.

b. Diversion terraces:

i. Shall be constructed uphill of a project area to convey runoff around the project area, and shall have sufficient capacity to convey such runoff without overflowing;

ii. Shall be grassed or lined with erosion-resistant materials to prevent accelerated erosion and sedimentation within the channel; and

iii. Shall be designed so that outlet structures reduce the discharge speed to a level that will not cause accelerated erosion and are stabilized before use.

c. Seawalls and breakwaters:

Seawalls and breakwaters to contain fill or reclaimed land shall be sufficiently watertight to prevent accelerated sedimentation, well constructed on a solid foundation and built to a
level at least 1 metre above the highest tide or flood level of historical knowledge. Sloping porous revetments with armour stone and a slope of 1:3 or less are preferred over impervious vertical walls. Impervious vertical walls may reflect wave energy, remove sediment and soil, and cause erosion of the shoreline or beach areas. These facilities shall be planned, designed and constructed under the direction of a person trained and experienced in designing and building seawalls and breakwater facilities.

d. Interceptor channels:
   
i. May be used within a project area to reduce the speed of flow and prevent accelerated erosion;
   
ii. Shall convey collected waters to sedimentation basins or to vegetated areas but not directly to streams or other bodies of water; and
   
iii. Shall be designed so that outlets to vegetated areas reduce the discharge speed to a level that will not cause accelerated erosion.

e. Conveyance channels:
Conveyance channels shall be grassed or lined with erosion resistant materials or designed to reduce the speed of flow of surface runoff to a level that will not cause accelerated erosion.

f. Solids separation facilities
   
i. Shall have a basin for settling solids out of water that is structurally sound and has sufficient capacity to hold the water that drains into the basin until the solids have settled out;
   
ii. Shall have a basin which is cleaned when the settling of solids has reduced the basin's capacity by 25%; and
   
iii. Shall be designed so that outlet structures are large enough to allow only adequately settled water to be discharged, and at a rate that will not cause accelerated erosion.

g. Discharge from construction filling
Discharge from construction fills, whether by pumps, hydraulic dredgers, or any other means, used to construct fills shall be sufficiently treated and sufficiently retained with dikes, levees, seawalls, or other structures so that accelerated sedimentation will not take place in the waters which receive the effluent. Untreated overflow of dredged materials from a containment area into open waters or land areas is prohibited. Transmission pipelines transporting fill material shall be maintained in a watertight condition at all times of excavation and fill operation.

h. Secure transport:
Barges, scows, platforms, vessels, or anything used for hauling dredged material shall be sufficiently tight and secure that accelerated sedimentation will not occur by reason of leaking or premature dumping due to faulty mechanisms.
13.4 Cultural Preservation

13.4.1 Identifying Resources
Any person who engages in an earthworks activity shall prevent adverse impact on archaeological sites or other potential cultural resources by identifying and preserving all such resources.

13.4.2 Prior Determination
Any person who engages in an earthwork activity shall first make every reasonable effort to consult to determine if a cultural resource may be unearthed, disturbed, or in any way affected by the earthworks activity.

a. Efforts to identify potential cultural resources may include, but are not limited to, the following:
   i. Inquiries with surrounding traditional landowners;
   ii. Inquiries with PUMA
   iii. Field investigations conducted by archaeologists or historians, or both, familiar with the cultural resources of the area; and
   iv. Inquiries to any recognized authority on historic, architectural, archaeological or cultural preservation.

13.4.3 Declaration
When investigation conducted pursuant to Section 13.4.2 reveals that a potential cultural resource may be affected by an earthwork activity, the person who wishes to engage in that activity shall immediately declare the results of the investigation to PUMA.

13.4.4 Adverse Impact
If PUMA determines that an earthworks activity may adversely affect a cultural resource, then PUMA shall require the person engaging in the earthworks to design, implement and maintain appropriate cultural preservation measures.

13.4.5 Duty To Inform
In the event a cultural resource is discovered during the earthworks process, the person engaged in the earthworks shall inform PUMA, by the quickest means available and in writing, of the discovery.

13.4.6 Mitigation
When informed of a discovery, PUMA shall, in consultation with the person engaging in the earthworks, develop mitigation procedures to limit potential damage to the cultural resource. Mitigation procedures may include a requirement to stop work temporarily at the earthworks site so that the full extent of the cultural resource and the potential damage to that resource may be assessed. Mitigation procedures shall be:

i. Reasonable;
ii. Clearly described in writing by PUMA; and
iii. Delivered to the person engaged in the earthworks activity in a timely manner.

13.5 Restoration
Upon completion of the project, all areas which were disturbed by the project shall be stabilized so that accelerated erosion, or accelerated sedimentation, or both, will be prevented.

13.5.1 Interim Control Measures
Any erosion and sedimentation control facility required or necessary to protect areas from erosion or sedimentation during the stabilization period shall be maintained until stabilization is completed.

13.5.2 Final Measures
On completion of stabilization, all unnecessary or unusable control facilities shall be removed, the areas shall be graded and the soils shall be stabilized.

13.6 Consent

13.6.1 Consent Required
In accordance with Part V of the Planning and Urban Management Act 2004 and any other relevant legislation, any person who engages in an earthwork activity shall first obtain a Development Consent (consent) from PUMA for the proposed activity, except that no consent is required for any earthwork activity that involves ploughing or tilling of land for agricultural purposes.

Those persons who qualify for the agricultural exemption and carry out earthwork activities without a consent must otherwise comply with all of the provisions of these regulations.

13.6.2 Application for Consent
Consent applications shall be on a form approved by PUMA and shall be submitted by the person undertaking the earthwork activity. In the case of land development, the land developer rather than the contractor or agent shall submit the application.

Applications shall be made no later than one month before the proposed earthwork activity is scheduled to begin.

Applications shall be accompanied by an Earthworks Plan and such other documents as PUMA may require.

13.6.3 Public Hearing
At any time during the consent process, PUMA may convene a public hearing or hearings for the purpose of determining the facts on which to base a decision. Adequate notice of the hearing or hearings, adequate opportunity to appear and be heard, and adequate opportunity to provide written comment, shall be given to all interested persons.
13.6.4 Special Conditions
PUMA may, upon issuance of a consent, impose any conditions or special requirements on the earthwork activity as it sees fit. All such conditions and requirements shall be listed in writing by PUMA and attached to the consent.

13.6.5 Consent Expiration and Renewal
An earthwork consent issued by PUMA shall expire two years from the date of issuance. If the earthwork activity is ongoing at the time of consent expiration, a new consent application shall be submitted to PUMA one month before expiration of the consent.
14 COEP 14 - Cellular Telecommunications Facilities

14.1 Introduction
The purpose of this COEP is to provide guidance on the assessment of development consent applications under the PUM Act 2004 for Cellular Telecommunications Facilities. This COEP will be applied by PUMA in assessing individual and network development applications.

This COEP is adopted as a formal policy guideline under s9 of the PUM Act 2004. This COEP shall be read in conjunction with COEP 1 – Administration Procedures.

14.2 Background
An increasing volume of modern telecommunications is undertaken using radio waves. These facilities require no fixed connections between sending and receiving points but they do require elevated antennae to provide line of sight communications. Generally a network will have a number of individual linked sites, each with one or several antennae either fixed to a tower or pole structure or mounted on an existing building. Cellular communications technology has the ability to provide high quality low cost telecommunications and not having fixed wire connections has certain positive advantages in situations where damage to fixed installations can disable a network. There is the need however, to ensure the cellular communication network is planned and constructed with due consideration to a range of effects upon the environment. This COEP sets out those matters which PUMA will take into account undertaking those assessments.

14.3 Assessment Criteria
The following matters will generally be taken into consideration in the assessment:

14.3.1.1 Health effects
14.3.1.2 Visual amenity considerations
14.3.1.3 Proximity to sensitive land uses
14.3.1.4 Location relative to identified risk and hazard zones
14.3.1.5 Applicable standards
14.3.1.6 Positive effects

14.4 Health Effects
There has been extensive international investigation into potential adverse health effects from radiofrequency fields. The general conclusion is that provided exposure guidelines published in 1998 by the International Commission on Non-Ionising Radiation Protection (ICNIRP) are complied with, risks to health are very small (e.g. 1 in 1 million). The ICNIRP guidelines have been incorporated into the 1999 New Zealand Radiofrequency Fields Exposure Standard (NZS2772.1:1999) – refer to section 14.8 below.
All equipment proposed for the installation shall be certified as capable of meeting the standards set out in NZS2772.1 1999.

14.5 Visual Amenity Considerations

These effects vary according to the scale, height and design of the facility and the immediate environment within which they are located. Generally the following principles should be applied:

14.5.1.1 Co-location (sharing) of any existing masts, poles or towers is to be encouraged
14.5.1.2 Co-siting on existing sites is preferred to the proliferation of new sites
14.5.1.3 In urban locations mounting antennae on buildings is preferred to new mast, pole or tower installations wherever possible
14.5.1.4 Sites with access from existing roads or tracks are preferred over sites requiring new roads or tracks to be constructed with extensive vegetation clearance
14.5.1.5 On hillsides – lower slope or below ridgeline/skyline locations are preferred to assist with the installation’s absorption into the background
14.5.1.6 Prominent ridgeline and hill top installations will not be favoured unless there are exceptional operational or coverage circumstances to justify them
14.5.1.7 Vegetation removal should be the minimum required for installation and replanting around installations is required
14.5.1.8 Mast, pole and tower heights should be the minimum to achieve a balance between network coverage and the number of sites. Generally heights up to 20m will be permitted. Additional justification will be required for heights in excess of this. Obtaining clearance above surrounding vegetation/trees will be considered as a reasonable justification.
14.5.1.9 Masts, poles, towers and antennae shall be constructed in recessive coloured materials designed to blend in with surrounding vegetation or development.
14.5.1.10 Equipment cabinets shall be similar recessive colours and shall be sited as close to the mast, pole or tower base as reasonably practical
14.5.1.11 Electricity supply to sites should be underground whenever possible

14.6 Proximity to Sensitive Land uses

Installations shall generally be sited at least the stated minimum distances from sensitive land uses as follows:

14.6.1.1 Schools – 30m
14.6.1.2 Residential uses– 20m
14.6.1.3 Hospitals/clinics – 30m
14.6.1.4 Churches – 20m
14.6.1.1.5     Archaeological sites/historically important cultural sites – 30m
14.6.1.1.6     River and stream courses – 20m
14.6.1.1.7     Coastline (other than that identified as a hazard zone) – 30m

Permissions will not normally be granted for proposed sites in:

14.6.1.1.8     National parks
14.6.1.1.9     Nature reserves
14.6.1.1.10    Wetlands
14.6.1.1.11    Any other sites identified as having particularly sensitive characteristics by MNRE.

14.7 Location Relative to Identified Risk and Hazard Zones

MNRE has identified a range of hazard zones affecting both the coasts of Samoa and certain inland locations. These include coastal erosion zones, coastal flooding/inundation zones, coastal and inland land instability zones.

No installations shall be approved in any identified risk or hazard zones. On request, PUMA will provide applicants with advice as to the locations of risk and hazard zones in the localities being considered for installations. The actual cost of production of any mapping information may be charged for this service.

14.8 Applicable Standards and other Useful References

The applicable standard for exposures shall be NZS2772.1:1999 Radiofrequency Fields Part I: Maximum Exposure levels 3 kHz – 300 GHz. However, the Regulator will advise telecommunications providers once the Office has set the Samoan standard that providers will be required to comply with.

Other useful information/references can be found at the following websites:

www.odpm.gov.uk/index.asp?id=1143965
www.mfe.govt.nz

14.9 Positive Effects

Access to new and improved telecommunications technologies is essential to Samoa’s continued economic and social development. The benefits arising from these new facilities needs to be carefully balanced against any potential adverse effects on the environment. With careful design and selection of appropriate technology and materials the full benefits of the new facilities can be realised in a sustainable manner.