

資料 - 7 防災放送に関わる覚書

Memorandum of Understanding on Disaster Broadcasting

Between


Solomon Islands Broadcasting Corporation,

And


Ministry of Environment, Climate Change, Disaster Management and Meteorology

December 2010


**Honiara
Solomon Islands**

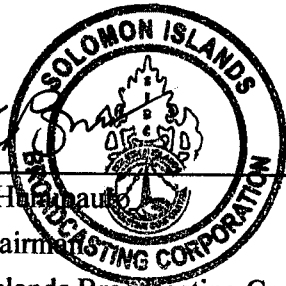

Mr. Joe Hopkrou
Acting Permanent Secretary
Director/Environment
Ministry of Environment, Climate Change,
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Honiara




Mr. Lotie
Director/National Disaster Management Office
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Deputy Chairman
Solomon Islands Broadcasting Corporation
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Article 1: Introduction

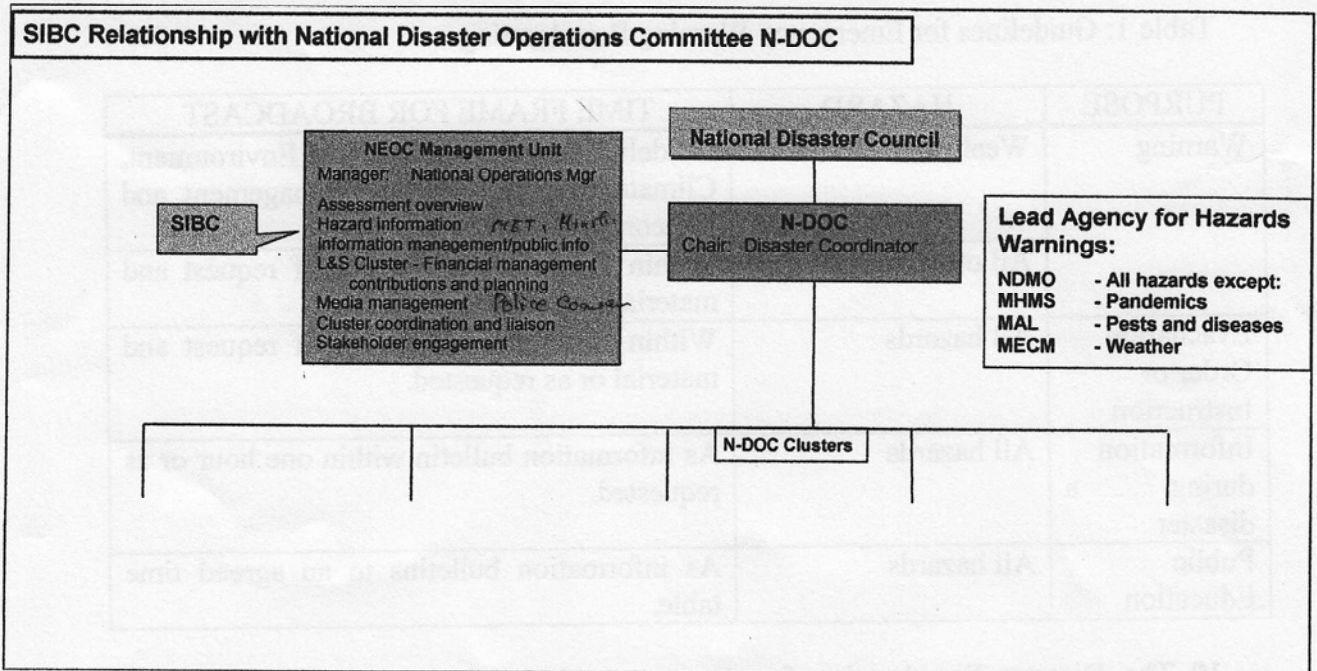
1. This MOU provides for a common understanding on Disaster Broadcasting through radio broadcasting services by Solomon Islands Broadcasting Corporation (SIBC) between the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM), and Solomon Islands Broadcasting Corporation.
2. This MOU is for supporting services of SIBC relating to disaster reporting and not intended to place any constraints on the journalistic roles, such as reporting news, fulfilled by SIBC.

Article 2: Purposes of Disaster Broadcasting

3. The purposes of Disaster Broadcasting are:
 - To provide for early warning and information to the public on a potential or impending disaster in order to allow steps/measures to be taken to reduce the impacts of such disaster and prepare for assistance of people with special needs.
 - To provide evacuation orders or other instructions to the public under the National Disaster Council Act or the National Disaster Risk Management Plan.
 - To broadcast and disseminate information during disasters and on any assistance from the central government, provincial governments including Honiara City Council, medical facilities, Donors, NGOs and the other relevant organizations.
 - To provide public educational broadcasts from time to time on steps and measures to prepare for and manage disasters and reduce risk.
 - To provide forecasting and warning of disaster risks before any disaster occurs or to provide disaster information during and following a disaster.
4. The possible threats to be announced to the public by Disaster Broadcasting are:
 - Tropical Cyclones and Wind Storms
 - Floods
 - Earthquakes
 - Landslides
 - Volcanic Eruptions
 - Tsunamis and wave surges
 - Droughts
 - Pandemics
 - Agriculture Pests and Diseases
 - Aviation and Maritime Disasters
 - Fires
 - Industrial Accidents
 - Marine Pollution
 - Other man-made threats including the civil impacts of conflict

Article 3: Disaster Risk Management System

5. The disaster risk management system in Solomon Islands addresses all of the disaster phases of disaster risk reductions, preparedness, and response as well as recovery and rehabilitation. With clear roles and responsibilities of the national and local governments, the relevant stakeholders of the public and private sectors cooperate in implementing various disaster countermeasures.
6. The organization arrangement of the disaster risk management system for Disaster Broadcasting is:-



- ◆ N-DOC - The National Disaster Operations Committee co-ordinates warnings and disaster response and is informed by the relevant Lead Agency for hazard warnings. The N-DOC is chaired by the Disaster Coordinator. This is the Director of NDMO.
- ◆ NEOC - The National Emergency Operations Centre services the N-DOC through the National Operations Manager.
- ◆ SIBC - Provides a Disaster Broadcasting Service through the NEOC Management Unit to the Disaster Coordinator or the relevant lead agency. For weather warnings the service is provided directly to the Solomon Islands Meteorological Service.

Article 4: Responsibility for Disaster Broadcasting

7. SIBC has responsibility for providing for Disaster Broadcasting as a designated public corporation and as a critical infrastructure agency under the National Disaster Risk

Management Plan. Such Broadcasting shall be made in an accurate and timely manner according to the criteria set out in Article 5.

8. A Request for Disaster Broadcasting shall be made by Director NDMO or the Disaster Coordinator in the Ministry of Environment, Climate Change, Disaster Management and Meteorology to SIBC. Material to be broadcasted shall be provided by the Lead Agency for the hazard.

Article 5: Criteria for Disaster Broadcasting

9. A Request for Disaster Broadcasting shall be made by Director NDMO or the Disaster Coordinator in the Ministry of Environment, Climate Change, Disaster Management and Meteorology according to the criteria shown in the following table 1:-

Table 1: Guidelines for Emergency Warning Broadcasting

PURPOSE	HAZARD	TIME FRAME FOR BROADCAST
Warning	Weather	Guideline issued by Ministry of Environment, Climate Change, Disaster Management and Meteorology.
	All other hazards	Within 5 minutes of receipt of request and material.
Evacuation Order or Instruction	All hazards	Within 5 minutes of receipt of request and material or as requested.
Information during disaster ^a	All hazards	As information bulletin within one hour or as requested.
Public Education	All hazards	As information bulletins to an agreed time table.

10. The Disaster Broadcasting for the purposes of Warnings and Evacuation Orders or Instructions shall not be charged to the organization which requested it. Disaster Broadcasts for the purpose of Information and Public Education shall be charged to the Lead Agency.

Article 7: Relation, Validity to the National Disaster Risk Management Plan

11. This MOU shall be defined on the National Disaster Risk Management Plan, which will be finalized by the Government.
12. Before establishment of the National Disaster Risk Management Plan, this MOU has validity by itself.

資料 - 8 既設周波数に関わる確認レター



**SOLOMON ISLANDS GOVERNMENT
TELECOMMUNICATION LICENCE**

**BROADCASTING STATION LICENCE NO H4B5/1
VALID UNTIL 31ST DECEMBER 2009**

In pursuance of the authority conferred upon the Telecommunication Authority by the Telecommunications Act 1971, a licence is granted to: **S.I.BROADCASTING CORPORATION** to established a **BROADCASTING STATION** and operate the said station in accordance with the particulars of the schedule hereto.

The installation and operation of the said station shall be carried out in accordance with, and this licence shall be subject to, the said ACT and Regulations made thereunder and such amendments and additions thereto as made from time to time,

Date of issue: 07/10/09
Valid: 01/01/09
Until: 31/12/09



SCHEDULE

Callsign: H4B5

Location of Station: **Fighter 1**

Assigned Frequencies (MHz)	Carrier (MHz)	Bandwidth/ Emission	Maximum Tx power	Stations with which communications is permitted	Nature of service
Tx: 5.020		3.0kA3E	10 kw	BROADCASTING	BC

Type of equipment: TBC AMIO

Serial NO. 510

Hours of service :

Special conditions:

NOTE: The licence must obtain the prior approval of the Director or a delegated officer for the replacement or alteration of equipment, transfer of station to another person change in operating frequency or other departure from the conditions of the licence.

An official receipt in respect of the payment of the initial fee for the licence or its subsequent renewal must be held with the licence.



**SOLOMON ISLANDS GOVERNMENT
TELECOMMUNICATION LICENCE**

**BROADCASTING STATION LICENCE NO H4B5/1
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In pursuance of the authority conferred upon the Telecommunication Authority by the Telecommunications Act 1971, a licence is granted to: **S.I.BROADCASTING CORPORATION** to established a **BROADCASTING STATION** and operate the said station in accordance with the particulars of the schedule hereto.

The installation and operation of the said station shall be carried out in accordance with, and this licence shall be subject to, the said ACT and Regulations made thereunder and such amendments and additions thereto as made from time to time.

Date of issue: 07/10/09

Valid: 01/01/09

Until: 31/12/09



SCHEDULE

Callsign: H4B9

Location of Station: **Fighter 1**

Assigned Frequencies (MHz)	Carrier (MHz)	Bandwidth/ Emission	Maximum Tx power	Stations with which communications is permitted	Nature of service
Tx: 9.5450		10.0kA3E	10 KW	BROADCASTING (TX only)	BC

Type of equipment: TBC AMIO

Serial NO. 508

Hours of service :

Special conditions:

NOTE: The licence must obtain the prior approval of the Director or a delegated officer for the replacement or alteration of equipment, transfer of station to another person change in operating frequency or other departure from the conditions of the licence.

An official receipt in respect of the payment of the initial fee for the licence or its subsequent renewal must be held with the licence.

資料 - 9 新規周波数に関わる確認レター

Solomon Islands Broadcasting Corporation

P.O. Box 654
Honiara
Solomon Islands

15th October 2009

Naoaki Nambu
Yachiyo Engineering Co., Ltd
2-18-12, Nishiochial Shinjuku-Ku,
Tokyo

Re- Registration of 6080 and 9545kHz to SIBC with the ITU

Dear Naoaki

I am writing to confirm the registration status of 6080 and 9545kHz with the ITU.

6080kHz

This frequency is currently registered to Radio Australia in ITU Schedule A09 which ends on 25/10/2009. Nigel Holmes from Radio Australia confirmed on 12/10/2009 that they will release the frequency to SIBC immediately, but will continue to broadcast on it until SIBC commences operation on it in 2011 to ensure that it is retained and not taken up by another HF Broadcaster. Accordingly, Adrian Sainsbury (Radio New Zealand International Frequency Manager) is registering this frequency with the ITU commencing in Schedule B09 effective from 25/10/2009. Going forward, Adrian will continue to register the frequency to SIBC in each ITU 6 monthly schedule. Co-ordination will be required with Radio Australia when SIBC are ready to commence broadcasting on this frequency in 2011.

9545kHz

This frequency (along with 5020kHz) is currently registered to SIBC by Adrian Sainsbury in the 6 monthly ITU Schedules, and will continue to be registered going forward. 9545kHz will be brought into operation again by SIBC as propagation conditions support it's use during the summer months of 2009 / 2010.

As such, I can now confirm that 6080 and 9545kHz are registered to SIBC with the ITU and will be kept available by means of regular broadcast use.

Yours faithfully



Cornelius Rathamana
General Manager

RADIO HAPI ISLES

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RADIO HAPI LAGOON

P.O. Box 78
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Tel/Fax: 60160
Website: www.sibconline.com.sb

RADIO TEMOTU

P.O. Box 46
Lata
Temotu Province
Tel: 53047

資料 - 10 土地証明に係るレター



MINISTRY OF LANDS, HOUSING & SURVEYS
P O BOX G38
HONIARA
SOLOMON ISLANDS

Your Ref:

Telephone: 21512/28600

Our Ref: AD 4/5/14

Faxcimine: 21514

28/09/2010

JICA Solomon Islands Office
SMI Building
P O Box 2046
HONIARA

Dear Sir

RE: **LETTER OF ASSURANCE LAND AVAILABILITY FOR THE CONSTRUCTION OF THE NEW SW ANTENNA ARRAY AND ADDITIONAL SW FREQUENCIES**

As requested, I hereby give my assurance on behalf of the Government as the Commissioner of Lands that Lot No. 10 of LR 83/R Parcel Number 192-004-0005 will be resumed for the public purpose of the SIBC's Aerial farm project. This project is supported by JICA at the request of the Solomon Islands Government and as such the Commissioner of Lands is under directive from the Executive to ensure the concerned land is made available. Could you please pass this assurance on to your office in Japan. The legal process will take time but is now set in motion.

I thank you for your understanding and continued support and patience.

Yours sincerely

Ruth Liloqula
Permanent Secretary/Commissioner of Lands (Acting)
Ministry of Lands, Housing & Survey

cc: Minister of Finance
cc: Permanent Secretary/Communications & Aviation
cc: Permanent Secretary/Planning
cc: SPM/OPMC

資料 - 1 1 自然条件調査結果（1回目）

REPORT

YACHIYO ENGINEERING CO., LTD

Improvement of Radio
Broadcasting Network for
Disaster Prevention in the
Solomon Islands
Site Survey and Soil
Investigation Report

Report prepared for:

YACHIYO ENGINEERING CO., LTD

Report prepared by:

TONKIN & TAYLOR INTERNATIONAL LTD

Distribution:

YACHIYO ENGINEERING CO., LTD

4 copies

TONKIN & TAYLOR INTERNATIONAL LTD (FILE)

1 copy

October 2009

T&T Ref: 750725



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1 Introduction

1.1 General

Yachiyo Engineering Co., Ltd (YEC) engaged Tonkin & Taylor International Ltd (T&TI) to carry out the soils investigation and topographical survey for the proposed improvement of the radio broadcasting network for the administration of disaster prevention in the Solomon Islands. The survey site is located near Henderson Airport on the island of Guadalcanal.

The investigation and survey have been carried out in accordance with the "Contract and Specification" (ref: Appendix A). The soils investigation consisted of two hand auger boreholes along with two Scala penetrometer tests and laboratory testing of recovered soil samples. This work scope was agreed with YEC. This report summarises the results of the soils investigation and topographical survey work carried out.

1.2 Project Description

The Solomon Islands consists of nearly one thousand islands. Together they cover a land mass of 28,400 square kilometres. The capital is Honiara, located on the island of Guadalcanal.

The proposed project involves constructing two new short wave transmitting antennas and associated buildings to assist the local administration co-ordinate between the islands in the event of a natural disaster. The project also involves upgrading existing antenna on some of the outer islands. No topographical survey or investigations were required on the outer islands.

The location of the site to be developed is described in more detail in Section 2.

2 Site Description

The project site is close to Henderson International Airport, which is positioned approximately 12km to the east of Honiara.

The proposed antenna site is located approximately 1km to the south east of the airport runway. In the vicinity of the site there is an existing transmitter building, a generator hut and a house owned by the Solomon Islands Broadcasting Centre (SIBC).

To the east of the site were four disused antenna's and to the south, two large operational medium wave antenna's.

At the time of the investigations, the site consisted of dense 3m high vegetation of flax, brambles and grasses. Prior to the investigation and survey commencing, a local tractor was used to cut the vegetation to enable site access for the survey equipment.

The location of the proposed antenna site in relation to the airport is shown in Figure 1 below.

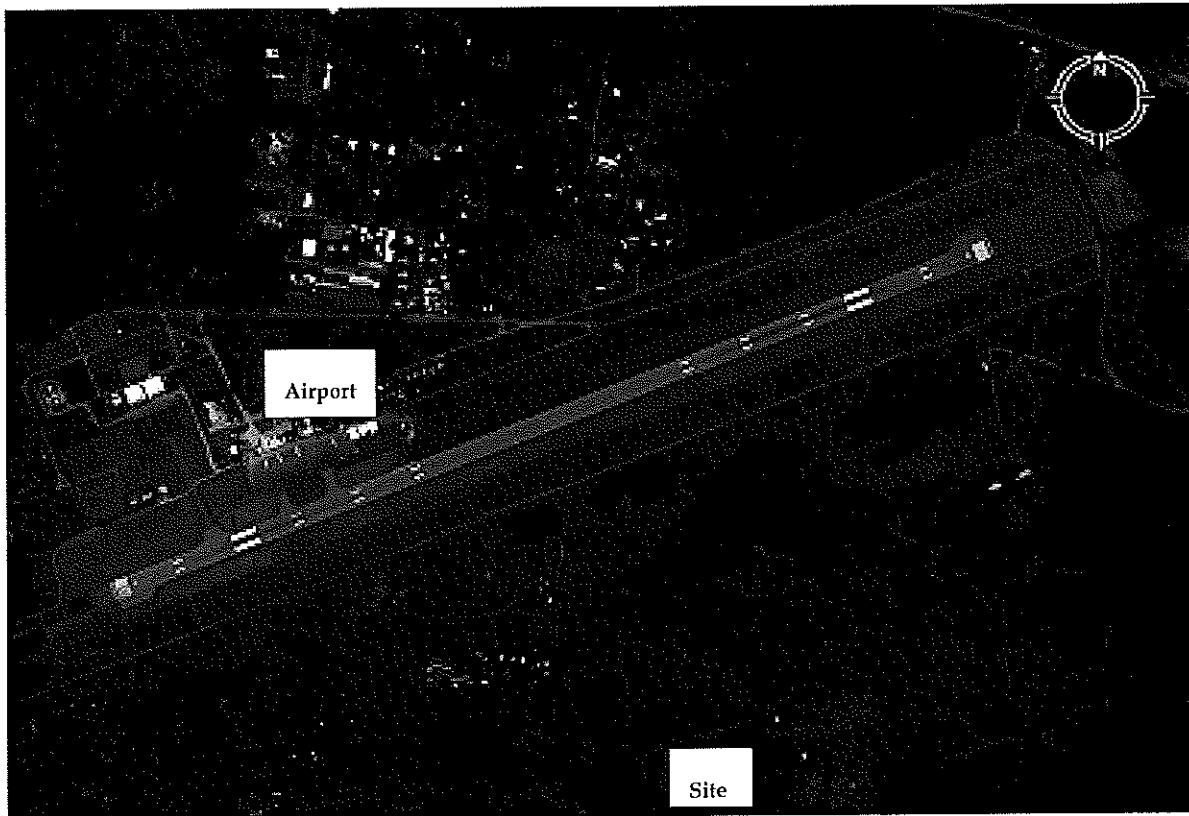


Figure 1: Site location plan

3 Summary of Site Survey

The topographical survey was carried out on the 23 and 24 September 2009 by Discovery Marine Limited (DML). Following a site reconnaissance the previous day, the vegetation was cleared from the survey area using a tractor and cutting box to enable the survey to be completed.

A Trimble RTK GPS system consisting of the following equipment was used during the site survey:

- Trimble 5700 base receiver (12 channel dual frequency)
- Trimble 5800 receiver - rover unit with TSC2 controller (RTCM messages transmitted from base station to rover unit via UHF radio link)

This enables positional accuracy to be +20mm/ -20mm vertically and +10mm/ -10mm horizontally.

The topographical survey of the site was completed by observing points at 3m to 5m intervals. Additional points were recorded around the boreholes and in areas of significant elevation change. A fixed survey mark (SR1) comprising a 1m long steel rod was installed in the north west corner of the site. The co-ordinates of this permanent survey mark are as follows:

- *Northling* - 8956863.475
- *Easting* - 616215.732
- *Height* - 6.339m

In general, the site is located between 5.6m and 6.1m above mean sea level. A copy of the full survey report and topographical plans are presented in Appendix B.

4 Summary of Soils Investigation

4.1 General

The soils investigations were carried out in March 2009 and the scope of work was completed in accordance with the "Contract and Specification" attached in Appendix A.

During the site reconnaissance with YEC, it was apparent that there no were pre-determined locations for the two antennas to be constructed. However T&TI were informed that the two antennas will be 76m apart. The antennas were also required to be at least 50m from any other structures.

Following the site vegetation clearance, described in Section 3, two points were selected for the investigation. Point one (BH1) was 65m from a house and point two (BH2) was 140m from another set of antennas.

The following tasks were completed for the soils investigation:

- 2 No. hand auger boreholes (BH1 and BH2) to 2m below existing ground level.
- 2 No. Scala penetrometer tests (SC1 and SC2) to 'refusal' - greater than 8-10 blows per 50mm penetration.

The subsections below present a summary of the investigation work and laboratory testing results. Site investigation logs are presented in Appendix C and laboratory testing results are presented in Appendix D.

4.2 Scala Penetrometer and Handauger Investigations

Two deep Scala penetrometer tests were carried out on 23 September 2009 at the BH1 and BH2 locations, SC1 and SC2 respectively. The Scala penetrometer provides continuous soil strength data until hard ground/refusal is achieved (8 to 10 blows per 50mm penetration). The results of the Scala penetrometer tests are included in Appendix C.

In addition, two hand auger boreholes were drilled at each location to recover soil samples for geotechnical laboratory testing. These boreholes could only be drilled to a depth of 2m due to the soil types encountered. In-situ shear strength testing was carried out at 0.5m intervals using a calibrated Pilcon shear vane. The subsurface soils were described and the shear strengths are recorded on the borehole logs presented in Appendix C

The precise test locations and coordinates are presented in the Survey report in Appendix B. The work was completed over a period of two days and was undertaken under the continuous supervision of a Field Investigation Manager from Tonkin & Taylor International, Mr Andy Pomfret.

4.3 Geotechnical Laboratory Testing Results

The recovered samples were air freighted back to Auckland and geotechnical laboratory testing was carried out by Geotechnics Ltd. The laboratory tests have been completed in full accordance with the relevant New Zealand standards, identified in the subsections below, and the laboratory is fully accredited with International Accreditation New Zealand (IANZ) registration.

The soils testing consisted of the following:

- Specific Gravity tests (4 No.)
- Grain size analysis (4 No.)
- Moisture content test (4 No.)

Below is a summary table of the testing undertaken. A full set of the geotechnical testing data sheets is presented in Appendix D.

Table 1 – Summary of geotechnical testing

Sample identification	Specific Gravity	Grain Size Analysis	Moisture Content
BH1 – 0.5m to 1.0m	2.81 t/m ³	Very clayey sandy SILT, stiff brown, high plasticity, slightly dilatant	45.9%
BH1 – 1.5m to 2.0m	2.82 t/m ³	Very clayey sandy SILT, firm to stiff brown, high plasticity, slightly dilatant	43.3%
BH2 – 0.5m to 1.0m	2.81 t/m ³	Very clayey sandy SILT, very stiff brown, high plasticity, slightly dilatant	49.3%
BH1 – 1.0m to 1.5m	2.80 t/m ³	Very clayey sandy SILT, firm to stiff brown, high plasticity, slightly dilatant	46.5%

The geotechnical laboratory test results indicate that the near surface (upper 2m) geology across the site is very consistent with similar test results recorded in both boreholes.

5 Subsurface Conditions

5.1 Geological Setting

The island of Guadalcanal in the Solomon Islands comprises high volcanic peaks with low lying dead coral along the northern coastline. The Ministry of Natural Resources, Geological survey map (GU5) for the site area indicates that the geology to be alluvial deposits derived from the major rivers, that flow from the high interior to the sea.

5.2 Ground and Groundwater Conditions

Both borehole locations encountered very similar ground conditions and these are summarised in Table 2 below:

Table 2 – Summary of ground conditions

Depths (Below Ground level)	Geological unit	Soil type	Soil shear strength (kPa)
0 m - 0.4m	TOPSOIL	Black and dark brown clayed SILT with occasional fine volcanic gravel and many roots	N/A
0.4m - 1.2m	ALLUVIUM	Highly plastic stiff and very stiff very clayey SILT	136kPa to 152kPa
1.2 m - 2.0m	ALLUVIUM	Highly plastic stiff and very stiff very clayed SILT with occasional volcanic grains and trace of organic debris	144kPa to >224 kPa

N/A - not applicable

No groundwater was encountered in the boreholes but it should be noted that during the extraction of the deeper Scala equipment, the rods were damp below 2.5m.

The Scala penetrometer tests, SC1 and SC2 were terminated at depths of 8.3m and 8.8m, respectively. From this in-situ testing, we can assess the soil strengths at specific depths below the site. The Scala results and inferred soil strength are summarised in Table 3 below:

Table 3 – Summary of Scala penetrometer results

Depths (Below Ground level)	Average Scala Blows per 50 mm		Inferred Soil Strength (cohesive/granular)
	SC1	SC2	
0.5m	1	1	Firm
1.5m	2	2	Firm
2.5m	3	2	Stiff/medium dense
3.5m	3	3	Stiff/medium dense
4.5m	7	5	Very stiff/medium dense
5.5m	9	8	Very stiff/dense
6.5m	8	8	Very stiff/dense
7.5m	10	10	Hard/dense
8.0m	10	10	Hard/dense

From the table above, it can be noted that the soil strength increases with depth at the site.

Rather than using the conservative Scala results in the upper 2m, it would be beneficial to use the shear strengths recorded in the handauger borehole for detailed foundation design. These shear strengths are summarised in Table 2 above.

6 Discussion and Engineering Properties

Recommendations and opinions contained in this report are based upon data from:

- 2 No. hand auger boreholes
- 2 No. Scala penetrometer tests

The nature and continuity of the subsoil away from the test locations is inferred, but it must be appreciated that actual conditions could vary from the assumed model.

From the results of the soils investigation, geotechnical laboratory testing and also using published empirical relationships, we have assessed the engineering properties for the alluvium for the designer's consideration in the following subsections:

6.1 Bulk Density Range (γ)

The near surface alluvium material can be assumed to have the following bulk densities:

$$\gamma(\text{Bulk Density}) \text{ range} = 16 \text{ to } 18 \text{ kN/m}^3$$

6.2 Effective Cohesion (c')

The near surface material does provide some effective cohesion due to the cohesive nature of the alluvium. A value of 3 kPa should be used for design.

$$c' \text{ (Effective Cohesion)} = 3 \text{ kPa}$$

6.3 Effective Internal Friction Angle (ϕ)

The effective internal friction angle for the near surface alluvium has been estimated using a correlation from the Scala penetrometer and shear strength results. A value of 28° should be used as the effective internal friction angle for design.

$$\Phi \text{ (Effective internal friction angle)} = 28^\circ$$

6.4 Bearing Capacity

Following discussions with YEC, it is understood that either a strip or pad foundations will be constructed for the two proposed antennas, providing the ground conditions are suitable. Some smaller buildings will also be constructed to store equipment.

The site investigation data has indicated that shallow foundations may be utilised at the site depending on actual loadings, particularly wind loadings. We have provided bearing pressures at different depths in the upper 3m.

We recommend using a strength reduction factor of 0.5 ($\phi_G = 0.5$) to give an ultimate limit state (ULS) bearing capacity, in accordance with New Zealand Design Standards (ref: NZS 1170). For serviceability limit state design we recommend a strength reduction factor of 0.33 ($\phi_G = 0.3$) to give an allowable bearing capacity.

We recommend that due to the high plasticity exhibited by the near surface alluvium, all foundations should be embedded a minimum of 600mm below finished ground level to allow for seasonal water content changes (shrink and swell effects).

The strip or pad foundations would be constructed in the near surface alluvial clay material. Bearing capacities for this material based on the in situ testing undertaken are shown in the table below.

Table 4 – Bearing pressures within the stiff and very stiff alluvial clay

Depth	Bearing Pressures					
	Shallow strip footings up to 1 m wide			Shallow isolated pad footings up to 2.5 m wide		
	<i>Allowable</i>	<i>ULS</i>	<i>Ultimate</i>	<i>Allowable</i>	<i>ULS</i>	<i>Ultimate</i>
0.6m	200kPa	300 kPa	600 kPa	160 kPa	240 kPa	480 kPa
1.0m	200 kPa	300 kPa	600 kPa	160 kPa	240 kPa	480 kPa
1.5m	230 kPa	345 kPa	690 kPa	180 kPa	270 kPa	550 kPa
2.0m	300 kPa	450 kPa	900 kPa	240 kPa	360 kPa	720 kPa
3.0m	400 kPa	600 kPa	1200 kPa	320 kPa	480 kPa	960 kPa

We recommended that all foundation excavations are inspected and tested to ensure the ground conditions and bearing capacities are similar to those encountered during this investigation.

These bearing pressures should be re-assessed following completion of detailed design for the antennas to accommodate the high wind loadings for the structure.

6.5 Settlement

T&TI have not been provided with any vertical loads for the proposed structures. It is recommended that settlement analysis is carried out following completion of the detailed design of the antennas including an allowance for the overturning forces due to the high wind loadings in this region.

We understand that some smaller buildings will be constructed to accommodate the equipment to operate antenna. For floor slab loadings up to 25kPa, analysis has indicated the settlements should be less than 20mm to 25mm.

6.6 Young's Modulus Range (E)

The soil stiffness or Youngs Modulus, E has been calculated from a correlation with SPT N values (Bowles et al) derived from the shear strength values in the upper 2m and the Scala penetrometer readings. The table below gives the range of Youngs Modulus values for varying depths.

Table 5 – Summary of Youngs Modulus(E) with depth

Depth (Below Ground level)	Approx Scala Blows per 300 mm		Corresponding SPT "N" values	Estimated Youngs Modulus, E (MPa)
	SC1	SC2		
0.5 m	9	9	6	19-20
1.0 m	9	9	6-7	19-21
1.5 m	10	14	7-8	20-25
2.0 m	15	16	9-10	28-31
3.0 m	17	16	10-11	31
4.0m	19	40	13-26	34-80
5.0m	30	40	20-26	60-80
6.0m	39	40	26-27	80
7.0m	50	45	30-34	90-98
8.0m	60	60	40	100+

7 Applicability

This report has been prepared for the benefit of Yachiyo Engineering Co., Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

TONKIN & TAYLOR INTERNATIONAL LTD

Environmental and Engineering Consultants

Report prepared by:

Reviewed by:

.....
Andrew Pomfret

.....
Chris Freer

Senior Geotechnical Engineer

Project Director

adp

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Appendix B: Topographical Survey Report and Plans

REPORT OF SURVEY

RADIO BROADCASTING NETWORK HONIARA SITE SURVEY

Report Prepared for Tonkin & Taylor International Ltd
(For Yachiyo Engineering Co. Ltd)

Report Prepared by:



Discovery Marine Ltd
Hydrographic & Coastal Management Services
NEW ZEALAND

Website: www.dmlsurveys.co.nz

BAY OF PLENTY: PO Box 4048, Mt Maunganui, Bay of Plenty, NZ Ph: 0064 7 575 6699 Fax: 0064 7 575 6695
AUCKLAND: Ph: 0064 9 309 1287 Fax: 0064 9 309 1329

REPORT OF SURVEY
RADIO BROADCASTING NETWORK
HONIARA SITE SURVEY

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1. List of Abbreviations
2. Introduction
3. Equipment and Methodology
4. Survey Control
5. Survey Results

Enclosures:

1. PDF Area Plan
1. PDF Site Plan – 0.1m Contours
2. PDF Site Plan – 0.05m Colour Contours

Accompanying CD:

- Survey Report – PDF format
- Survey Plans – PDF formats
- MS Excel Spreadsheet of Survey Marks and Topo data
- DXF File of Land Contours



DML 1000-PAC

29 September 2009

REPORT OF SURVEY – HONIARA SITE SURVEY, SOLOMAN ISLANDS

1 List of Abbreviations

2.1 Abbreviated terms which may be used in this document are as follows:

BH	Bore Hole
BM	Bench Mark
DGPS	Differential Global Positioning System
DML	Discovery Marine Ltd
GIS	Geographic Information System
MSL	Mean Sea Level
RL	Reduced Level
RTK	Real Time Kinematic (High Precision GPS Positioning System)
SM	Survey Mark

2 Introduction

2.1 DML was contracted by Tonkin & Taylor International Ltd to undertake a topographic survey of an area approximately 80m x 60m in size. The aim of the survey was to derive land contours of an area designated for possible radio antenna construction. The site is located approximately 1km south of the Honiara (Henderson) international airport runway.

2.3 A team of two surveyors were onsite from 21-25 September 2009. A field reconnaissance was undertaken on 22 September with the Client. This involved determining the best location for the proposed antenna site, taking into account proximity of existing buildings and radio masts, as well as suitability of the ground in terms of terrain and exposure to flooding during the wet season.

2.4 The most likely site was agreed upon, being close North of a pair of active MW masts and west of the existing transmitter building. The site consisted of very tall grasses, making it difficult to walk through. A local contractor with tractor and mower was therefore used to mow strips through the grass prior to the survey.

2.5 The topographic survey was undertaken on 23 September. The weather was fine and clear and very warm. Extremely hot and testing conditions were experienced during the middle of the day. An area of approximately 95m x 70m was surveyed.

3 Equipment and Methodology

3.1 Equipment

3.1.1 A complete set of GPS survey equipment was transported to the site from New Zealand. Specifications of equipment used are listed below:

Trimble RTK GPS system consisting of:

Trimble 5700 Base Receiver (12channel dual frequency)
Trimble 5800 Receiver - Rover Unit with TSC2 Controller
RTCM messages transmitted from Base Station to Rover unit
via UHF radio link.

Positional Accuracy: Horizontal: 10mm + 1ppm
Vertical: 20mm + 1ppm

3.2 Methodology

3.2.1 Prior to the survey, a visit was made to the Honiara Land and Mapping Office. A number of survey marks in vicinity of the airport were identified and the coordinates for these marks were provided by the GIS staff. The main control mark in the area was determined to be a survey pillar (known as 'Guy3') located on a hilltop to the north of the airport. The other marks were roadside marks, being of lower order control.

3.2.2 During the field reconnaissance, none of the existing survey marks could be located, due to probable error in the coordinates provided by the mapping office. However, the survey pillar GUY3 was located and found to be intact.

3.2.3 On the morning of the survey, the RTK base station was initially erected over the control mark GUY3. New temporary survey marks (Peg1 and Peg2) were positioned near the survey site and then the base station was relocated to Peg1. From Peg1, the site survey was undertaken including positioning of nearby roads, buildings and antenna's/masts. A further survey mark was installed in the NW corner of the site for future reference. This mark (SR1) is a stainless steel rod of 1m in length, driven into the ground with the top of the rod 5cm below ground level.

3.3.4 The topographic survey of the site was completed by observing points at approximately 3-5m intervals. Extra points were measured near the two borehole sites as well as over any significant ground gradient changes. From the resultant data, a DTM was created by gridding the survey data at 1m intervals. A series of PDF contour and site plans/images have been derived.

4. Survey Control

Geodetic Control

4.1 The survey was undertaken on WGS84 Datum, UTM Grid Zone 57 (south). Details as follows:

Co-ordinate System:

Name: 57 South
Group: UTM

Ellipsoid:

Name: World Geodetic System 1984
Projection: Transverse Mercator

Parameters:

Central Latitude: 0°00.0000'N
Central Longitude: 159°00.0000'E
False Northing: 10000000.00 m
False Easting: 500000.00 m
Scale Factor: 0.9996

Vertical Control

4.2 The existing control mark GUY3 was the only mark in the area with a known height; being 19.3m above MSL. No checks could be made on this height, however web-based research prior to the survey indicated that ground levels were in the order of approximately 6-7m above MSL at the site. This was found to be the case with general ground levels being within 5.6m – 6.1m. In addition, the airport runway had known heights at each end and these were also checked in the field.

Summary of Survey Control & Relevant Features

HONIARA - TOPOGRAPHIC SURVEY				
Name	Northing	Easting	Height	Comments
GUY3	8957529.700	614124.300	19.300	Concrete Pillar (1.10m high and painted white) - GPS Control Mark. Used for Origin of Survey. Located on hilltop to the NW of the western end of the runway.
Peg1	8956881.946	616196.550	6.558	Yellow plastic peg used for temporary mark. Located next to 4WD track, north of the proposed radio transmission site.
Peg2	8956795.917	616333.696	6.031	Yellow plastic peg used for temporary mark. Located 1.4m outside SW corner post of transmission building perimeter fence.
Mark SR1	8956863.475	616215.732	6.339	Stainless Steel rod (1m long) driven into ground. Top of rod is at ground level. Located in the NW corner of the survey area.
Post	8956880.330	616195.745	6.347	Galvanised steel post located adjacent to 4WD track. Possibly an old sign post. Located next to Peg1. Height taken at ground level.
bh1	8956839.656	616234.449	5.763	Northern Borehole Location. Located 65m away from the nearest house.
bh2	8956784.673	616180.261	5.858	Southern Borehole Location. Located 143m away from the existing SW mast.
genhut-1	8956728.668	616485.953	5.209	Corner of Generation Hut
genhut-2	8956732.018	616480.876	5.061	Corner of Generation Hut
genhut-3	8956724.638	616454.927	5.203	Corner of Generation Hut
genhut-4	8956720.266	616461.063	5.426	Corner of Generation Hut
am-mast-1	8956640.305	616176.771	5.973	Mast Position of Existing SW Antenna
am-mast-2	8956634.772	616124.651	6.788	Mast Position of Existing SW Antenna
txhut-1	8956788.767	616353.674	6.309	Corner of Transmitter Building
txhut-2	8956797.445	616341.064	6.058	Corner of Transmitter Building
txhut-3	8956807.661	616347.959	5.936	Corner of Transmitter Building
txhut-4	8956798.362	616360.661	6.127	Corner of Transmitter Building
oldmast-1	8956853.106	616322.281	5.33	Mast Position of Disused Antenna
oldmast-2	8956837.645	616337.567	5.369	Mast Position of Disused Antenna
oldmast-3	8956916.072	616388.618	6.117	Mast Position of Disused Antenna
oldmast-4	8956900.673	616403.639	6.593	Mast Position of Disused Antenna
house1	8956893.087	616288.292	6.172	Perimeter of house
house2	8956885.658	616290.459	6.148	Perimeter of house
house3	8956882.445	616287.211	6.122	Perimeter of house
house4	8956881.348	616283.549	6.173	Perimeter of house
house5	8956890.719	616280.85	6.197	Perimeter of house

5. Survey Results

General Terrain

5.1 Inspection of survey results indicates that the ground contours vary between 5.6 – 6.1m above MSL. With the exception of a localised mound near the western edge of the area surveyed, the terrain is generally flat and featureless. The height of the ground level at the two borehole sites was within 0.1m of each other.

Distances to Nearby Objects

5.2 The distances of several existing buildings/features in relation to the site were measured. These are as follows:

- House located NE of the site – 65m from BH1 location
- Existing active MW mast – 140m south of BH2
- Existing houses located SW of the site – approx 110m
- Airport runway – 900m to the north

Accompanying Data

5.3 Three plans have been generated from the data. A general site plan depicts the location of the topographic survey site in relation to nearby existing buildings and features. Two larger scale site plans show contours of the proposed antenna site, one image with contours at 0.1m height intervals and the other plan with coloured contours at 0.05m intervals. In addition, an excel spreadsheet has been provided with a summary of the control marks and also the XYZ topographic data. A DXF file of the site contours has also been provided.



G.J. Cox
Surveyor in Charge
Discovery Marine Ltd

Enclosures:

1. PDF Area Plan
3. PDF Site Plan – 0.1m Contours
4. PDF Site Plan – 0.05m Colour Contours

Accompanying CD:

- Survey Report – pdf format
- Survey Plans – PDF formats
- MS Excel Spreadsheet of Survey Marks and Topo data
- DXF File of Land Contours

Appendix C: Investigation Logs

- **Handauger borehole logs**
- **Dynamic cone penetrometer results**



TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: HA1
Hole Location: Refer to Site Plan

SHEET 1 OF 1

PROJECT: Geotechnical Investigation	LOCATION: Solomans Radio, Northeast Antenna	JOB No: 750725
CO-ORDINATES 8956839.56 mN 616234.45 mE	DRILL TYPE: 50mm diameter Auger	HOLE STARTED: 23/9/09
R.L. 5.73 m	DRILL METHOD: Handauger	HOLE FINISHED: 23/9/09
DATUM	DRILL FLUID: N/A	LOGGED BY: ADP CHECKED: CJF

GEOLOGICAL		ENGINEERING DESCRIPTION																			
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)		COMPRESSIVE STRENGTH (MPa)		DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour. ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.	
															0	50	100	200			5
TOPSOIL									5.5											- dark brown clayey SILT with occasional fine volcanic gravel and roots.	
ALLUVIUM				HANDAUGER		• 136/56kPa		0.5			CL	M	SI-VSI							Highly plastic brown, stiff to very stiff clayey SILT.	
							• 136/64kPa		1.0												Highly plastic (very sticky) brown stiff to very stiff, very clayey SILT with some volcanic grains and trace organic debris.
							• 144/48kPa		1.5												
							• 192/80kPa		2.0												
								3.5												1. No Groundwater 2. Unable to penetrate deeper due to skin friction on auger rods	
								2.5													
								3.0													
								3													

