GOVERNMENT OF SAMOA

SAMOA SECOND INFRASTRUCTURE AND ASSET MANAGEMENT PROJECT (SIAM II)

COMPONENT 5.01: LAND ADMINISTRATION AND SURVEY

Land Information Integration
Software Descriptions

TECHNICAL ASSISTANCE REPORT NO. 24

SUBMITTED TO

MINISTRY OF NATURAL RESOURCES, ENVIRONMENT & METEOROLOGY

JANUARY 2006

LAND equity

Contents

Land Registration System (LRS) Version 3.00 (30 January 2006) Software Description

1 Description

The LRS application supports the operation of the Land Registration Section of the Ministry of Natural Resources, Environment & Meteorology, Samoa.

This software application was developed by Neil Pullar, Land Equity International Ltd, (npullar@cadastre.co.nz) as part of the World funded Technical Assistance provided in the C5 Land Administration and Surveying Component of the SIAM2 Project. It was developed from May – January 2006.

The impetus for the development of this software application was new legislation to implement a "Torrens" land title registration system such as exists in Australia and New Zealand. As there were delays in the passing of this new legislation, the original design was modified to allow the software to support current land registration legislation and, at the same time, to facilitate the transition to the form of "Torrens" land title registration defined in the proposed legislation prepared for the Government of Samoa as part of the same technical assistance.

The LRS software application is intended as an in-house application for Land Registration staff to operate on the existing MNRE network operating in the MNRE Molesi office. It is hosted on a new server (MNRE1) connected to the existing MNRE network

The LRS application was developed in Microsoft Visual Basic .NET (69463-706-2540136-18087) and utilizes a Microsoft SQL Server database.

2 How to Install

The LRS application is loaded on the 4 Land Registration Sections workstations procured in October 2005 as a client application. It can be loaded on older Land Registration workstations providing:

- Preferred operating system is Windows XP with SP2 installed. LRS has also run on Windows 2000
- Regional and Language settings must be set to English (New Zealand) or English (Australia) language settings and Location setting to Samoa
- Microsoft .NET Framework Version 1.1 (or later) is loaded
- MDAC Version 2.6 (or later) is loaded
- The workstation has a connection to the MNRE network in the Molesi office
- The workstation screen resolution settings are 1280 by 800 pixels

There are two sets of software installation to be run:

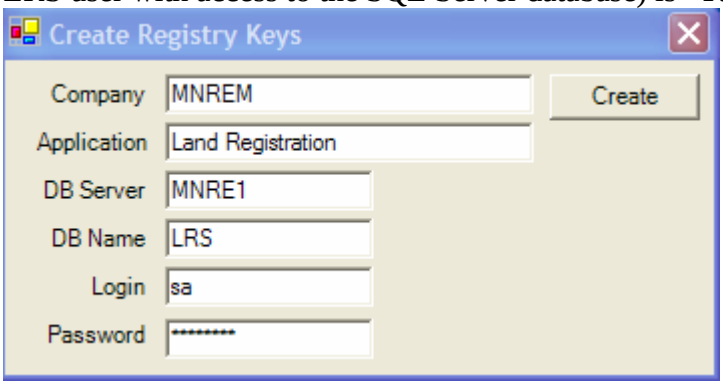
1. An initial, once only LRSregistryInstall installation to write LRS database access parameters to the workstation's Registry keys; and

2. The main LRS client software application.

Both installations are standard Visual Studio.NET installation packages.

To install run the setup.exe files located in the \SLISsoftware\LRSregistryInstall and \SLISsoftware\LRS folders on the T:\ network drive. When prompted by the installation wizard, click on the "Everyone" option (and do not limit the installation to the installing user). Because of MNRE network user privilege settings, only a user with Administrator rights for the workstation on which the LRS software is to be installed can install the software.

Before a new installation, any previous versions of the Land Registration software should be removed using the standard Control Panel Remove Software Tool (there is no need to remove and reinstall the LRSregistryInstall software unless the database host for the SQL Server database changes). The following screenshot identifies the required field entries. The password to be entered (to provide the LRS user with access to the SQL Server database) is "Talofa01".



The LRS application utilizes a Microsoft SQL Server 2000 database LRS (updated with SP3A) which is located on the MNRE1 server. This version of SQL Server is installed using the Microsoft Desktop Engine (MSDE) product and needs to use a command line installation for the server end (where the database actually resides).

For the LRS application to run correctly, the following logical drives should be mapped for all workstations running the software:

Drive	Mapping
T:	\\MNRE1\Data\

This mapping is made automatically whenever you logon to the MNRE network, providing you are a member of the Land Registration Section network group.

3 System Requirements

All the 4 new (October 2005) Land Registration Section Workstations are running Windows XP Professional with 512 MB of RAM and Intel Pentium 4 3 GHz processors.

There have been problems in running the LRS application on an older Land Registration Section workstation with Windows 95 despite being updated with the most recent Microsoft Framework .NET and MDAC installations (October 2005).

The LRS application has run without any difficulties on a workstation running Windows 2000.

All workstations must be loaded with MS Word (Version 10 or later) All workstations must also be loaded with Adobe Acrobat or Adobe Acrobat Reader (version 6 or later)

4 Software Folder

By default, the installation loads the client application into C:\Program Files\SLIS\Land Registration System. It also loads an associated sub-folder C:\Program Files\SLIS\Land Registration System\Templates and copies a series of MS Word templates into this sub-folder.

5 Main LRS Programming Objects

The LRS software is implemented in three tiers and hence three separate MS Visual Studio.NET projects. Generally there is a one-to-one relationship between objects in these three projects. These projects are:

1. **Object Classes (Land Registration –** the startup programme)
   Objects are outlined in the table below
2. **Business Logic (LRBusinessLogic)**
   Includes XML schemas of all data structures accessed in the application
3. **Data Access (LRDataAccess)**
   Includes cryptification routines to safeguard LRS users passwords and access to the LRS SQL Server database. These routines provide the links to over 250 LRS specific SQL Server Stored Procedures (relatively short stored SQL routines stored within the LRS database). For each database table there are stored procedures to Insert (new values), Delete (individual records), Select both individual records (using the key record value) and all records in the table and Update records. There are also specialized search routines for some LRS database tables

Main LRS Objects

Form	**Associated Database Tables**	**Description**
About	-	Typical high level description of LRS
AddAgent	LodgingAgent	Adds details on Lodging Agents
ConvertEncumbrance	Instrument Encumbrance	Used to capture encumbrance details for title conversion
ConvertTitle	Title Parcel	Used to capture and release title details for title conversion
CreateProprietors	Share InterestHolder	Captures ownership details for both title conversion and dealing registration
DraftNewTitles	Title Parcel Plan	Prepares new titles from a lodged survey plan

Form	Associated Database Tables	Description
EditEncumbrance	Instrument Encumbrance	Used to capture encumbrance details in dealing registration
EditTitle	Title Parcel	Used to capture title details in dealing registration
LodgeDealing	Instrument Dealing Lodgement	Used to capture initial details of instruments presented for registration
LodgeOtherDocuments	PowerOfAttorney Dealing Lodgement	Used to capture details of documents lodged with Land Registration Section but not to be registered against a title (currently only Power of Attorney and Revocation of Power of Attorney)
LodgeSurvey	SurveyPlan Instrument Dealing Lodgement	Used to capture details of survey plans lodged with MNREM
Login	-	Collects User name and password details to authorize access LRS software application
Main	-	Main form for the LRS application – no functional use apart to "hold together" other LRS functions.
PrepareReport	Various	Prepares statistics on lodgements and registrations
PrepareTitle	Title	Collates information from the LRS database to display summary of current details. Generates a series of printed output products
ReceiveDealing	Lodgement Dealing	Collects details from various database tables as a preliminary stage to accessing the registration forms
RecordDealing	Instrument SurveyPlan Dealing Lodgement	Main form for the registration processes including database edits to reflect the changes to the title caused by lodged instruments and the addition of links to scanned image links
SearchDocument	PowerOfAttorney	Entry of search criteria and subsequent searches for Powers of Attorney (and revocations)
SearchInstrument	Instrument	Entry of search criteria and subsequent searches of instruments and dealings
SearchTitle	Title	Entry of search criteria and

Form	Associated Database Tables	Description
		subsequent searches of titles
Workspace	Dealing Various Codelists	Dealing – display in tree structure of all currently lodged but not yet registered dealings Codelists – Maintenance forms for most system codelists (only accessible by LRS user, Admin)

Module	Description
mShellAndWait	A routine to allow calls to external applications such as Adobe Acrobat (to view, print etc scanned images)

6 Typical Subroutines for Major Forms

Subroutine ActionAdd
Subroutine ActionDelete
Subroutine ActionUpdate
Subroutine ClearFieldsInForm
Subroutine DockPanel
Subroutine LoadNnnnnn (where Nnnnnn is the name of each codelist referred to in form)
Subroutine Navigate
Subroutine NavigateWindows
Subroutine PopulateNnnnnn (where Nnnnnn is the name of the form)
Subroutine UnDockPanel
Subroutine UserFormViews

7 Use of Microsoft Word Templates

A series of templates have been designed to work with the software to create standard documents and reports. These are during installation into the C:\Program Files\SLIS\Land Registration \Templates directory. An integral (and very critical) part of these templates are the defined Bookmarks that can be identified through the use of an italic font if these templates are opened directly (not through the software). Changes to wording and format of these templates must maintain these Bookmarks if the software is to continue to work properly.

These templates are used when Certificate Printing is invoked (Certificate Form) or as a menu option from the Completed Work Panel within the Instrument Form.

Template Name	Purpose
ComputerFolio	Proposed new Certificate with "Torrens" legislation
ConvertCheck	Report to Check conversion details of a Folio
Historical	Standard Search product including all

Template Name	Purpose
	instruments lodged against a title plus encumbrances
Lodgement	Management Report detailing lodgements and registrations over a period of time
NewForm	New form of Certificate for a folio following conversion (for the period before the "Torrens" legislation is passed)
StaffSearch	The current details for a folio (or title)

8 Links to Scanned Images of Land Registration Documents

The LRS software has a simple method of linking and viewing scanned images of land registration documents. The scanning occurs independent of the LRS software but expects:

- dealings to be saved in the T:\Instruments\Lodgement or the T:\Instruments\Registration folders
- New Form (and similarly Computer Register) folios to be saved in the T:\Instruments\NewForm or the T:\Instruments\ComputerRegister folders
- documents to be saved as multi-paged pdf files (one pdf file for each document)
- scanned image documents to be named with the allocated Document Reference

The LRS software links the scanned image to the appropriate LRS database record by storing the full file name (including drive and directory) in a scannedImage field of the corresponding database record.

The LRS (Image) View function is reliant on the installation of Adobe Acrobat or Acrobat Reader on the LRS users workstation so the pdf file type is associated with the Adobe Acrobat software application. (Similarly, the LRS view function will display scanned images stored in tif and other graphics file formats, if there is a graphic image view software application installed on the workstation that associates the specific graphics file format to a graphic image view application.)

9 New Software Versions – Compilation Details

The LRS software is compiled using the standard Visual Studio .NET Build Menu option.

The following steps need to be followed by the software developer when a new version of the software is produced (note these are NOT installation instructions):

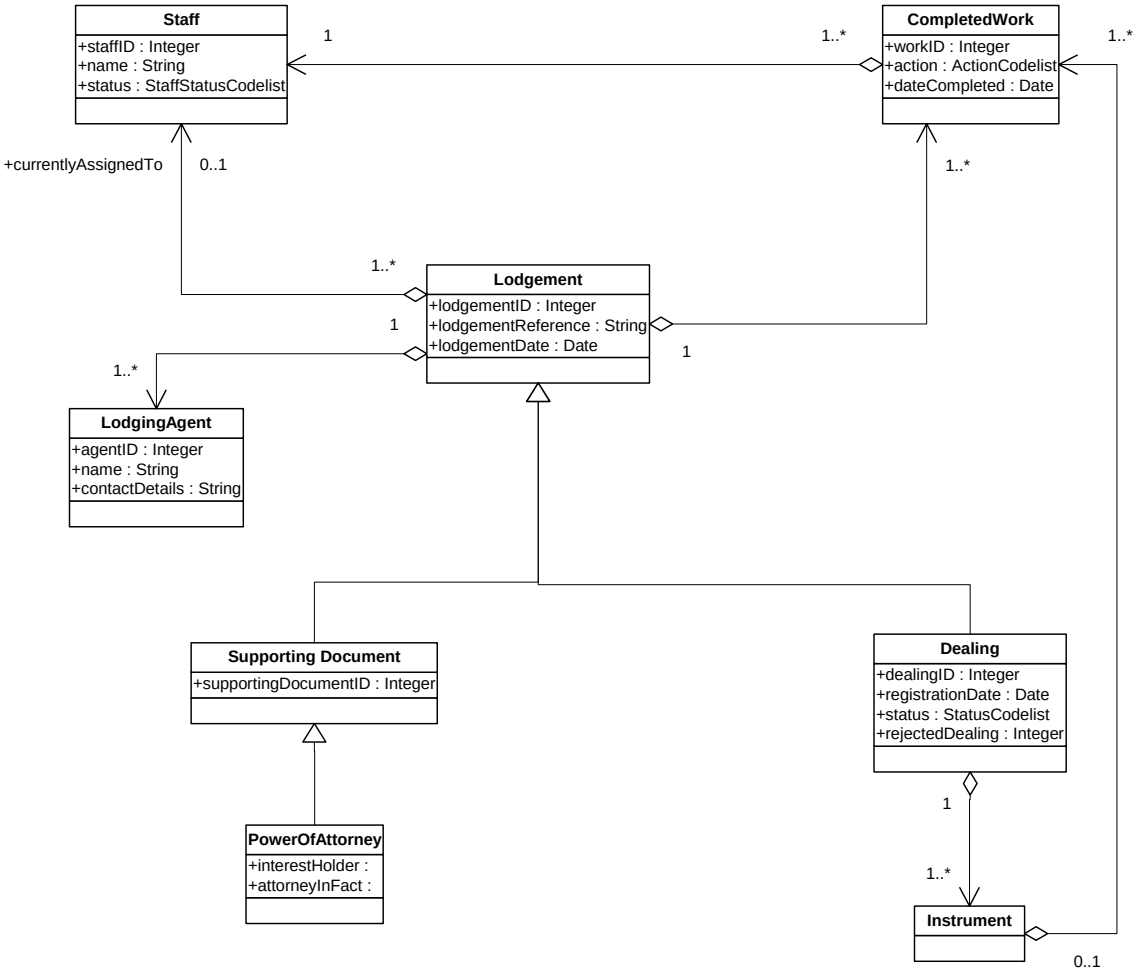
- A copy of the folder containing the last version of the source code (eg. C:\Data\Samoa\AppDev\SLIS\LRS\v3.0) needs to be copied to a new folder (eg C:\Data\Samoa\AppDev\SLIS\LRS\v3.01)
- The deployment folder should be renamed (eg C:\Data\Samoa\AppDev\SLIS\LRS\v3.0\LandRegistration\LRSXPdeployment\LRSv3.01) and the contents of the Release sub-folder (eg.

..\v3.01\LandRegistration\LRSXPdeployment\LRSv3.01\Release) deleted to leave an empty folder (for the default MS Word 10 version. A similar step is required for the MS Word 11 version from C:\Data\Samoa\AppDev\SLIS\LRS\v3.0\LandRegistration\LRSdeployment\LRSv3.01 to ..\v3.01\LandRegistration\LRSdeployment\LRSv3.01\Release

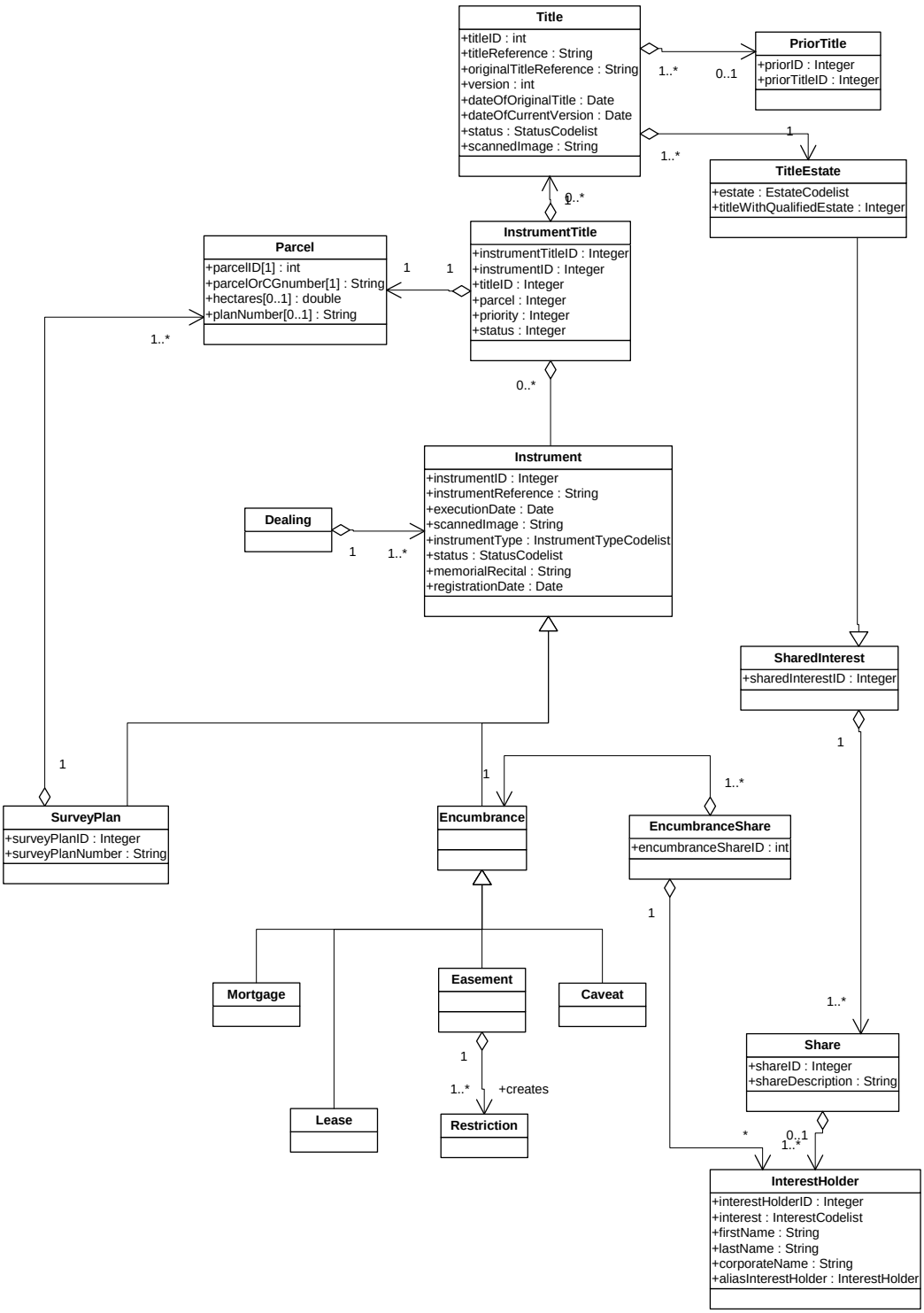
- The Visual Studio solution file in the deployment folder (eg ..\v3.01\LandRegistration\LRSdeployment\LRSXPv3.01) renamed to the new version (eg LRSXPv3.01.sln)
- Then double click on this solution file to open Visual Studio and make the following changes within this development tool (assuming Visual Studio .NET had been installed)
  - The LRS solution file (LRSv3.01) – Properties – Active Configuration = Release
  - Open Land Registration Project Assembly file and update the reference to Version (at bottom of file) and save changes
  - In the LRSvn.nn Deployment Project – Properties – change the version number AND in the Property Pages change the reference to the Output file to reflect the new version (eg LRSv3.01.msi)
  - Under the LRSvn.nn Deployment Project, double click Primary Output from Land Registration item to view the File System (ver1.1) property page. Double click on Desktop Output and update the Name of the icon to reflect the version (eg LRS v3.01). Similarly update the Application Folder item above to include any new files (including MS Word templates)
  - Within Primary Output display delete the old version and add the new version of files in the Template and Help folder if there are new versions have been made

10 LRS Database Outline

Lodgement Component



Title Component



11 Microsoft SQL Server Installation

It should only be necessary to reinstall an instance of MS SQL Server, if you need to migrate the database to a different host from the current database host; the MNRE server MNRE1

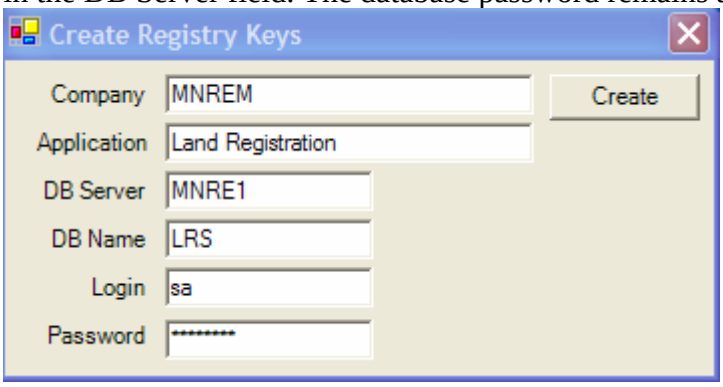
To install the MSDE 2000 / MS SQL Server 2000 Database and the LRS databases

This installation can only be undertaken by a user with Network Administrator privileges.

1. **Copy the complete MSDE2000 directory from the MSDE2000 CD** onto the the C:\ drive of the new database host workstation or server.
2. **Install SQL Server Enterprise Manager (Evaluation CD)**. The Evaluation CD is self booting and installation is guided by a wizard. Choose the "Server & Client Tools" option, then the "Custom" install option. When the wizard asks you to specify specific modules, un-select all modules except Management Tools and, within that module, Enterprise Manager – the other tools are not required. Enterprise Manager is an extremely useful tool as it provides direct access to all Database tables (for editing values such as Codelist values), to schedule and run backups (and restores) aswell as other useful database routines.
3. **Update Enterprise Manager** using the SP3 files copied across in Step 1 above. To do this: Start – Run – COMMAND
   key the following
   cd \msde2000
   THEN
   Setup
4. **Install the MSDE 2000 version of MS SQL Server** by:
   Start – Run – COMMAND
   key the following
   cd \msde2000\msde
   THEN
   setup SAPWD="Talofa01" SECURITYMODE=SQL DISABLENETWORKPROTOCOLS=0
5. **Wait patiently.** The databases created in this process are the Master database and a series of standard Microsoft example databases. Apart from Master database the other database are of no interest to the LRS application. The standard MS SQL Server user account of *sa* with password *Talofa01* have been created during installation and the server created by this process expects SQL Server Authentication (not Windows Authentication).
6. **Check** through the Run – Programs that there is now a new MS SQL Server – Enterprise Manager program menu item
7. **Through Enterprise Manager create a new database** with the name LRS making sure that both the Data File and the Log file point to the D:\SQL Server Data\LRS folder (or equivalent on the new host system)
8. **Stop the new instance of SQL Server** (using Enterprise Manager, right mouse click on the "Local Server" menu item and selecting Stop)
9. **Copy the last backed up copy of the two LRS database files** into the D:\SQL Server Data\LRS folder to overwrite the two database files.

10. **Restart SQL Server** using Enterprise Manager (right mouse click on the "Local Server" menu option
11. Using the Enterprise Manager, **check that LRS databases has a full complement of 41 user tables** and that you are able to connect (Using SQL authentication, user sa password Talofa01.

Following a change of database host, every workstation used by a LRS user would need to run the LRSCreateRegistryKeys software again entering the same details as is shown in the following screen shot EXCEPT that the name of the workstation or server now hosting MS SQL Server should be substituted for "MNRE1" value in the DB Server field. The database password remains as "Talofa01".



12 Land Registration Section Computing Arrangements

Equipment

The Land Registration Section is connected to the MNRE Local Area Network in the Molesi Office and includes the following items of equipment:

- 4 dedicated workstations connected to network by wireless (named LRS1, LRS2, LRS3 and LRS4)
- 1 older workstation connected to the network by cable currently configured for testing and training and configured to a test database on the SQL Server server (MNRE1) called "LRStest"
- All these workstations have been loaded with the LRS client software
- 1 Konica Minolta PagePro 9100n A3 printer (connected directly to network by cable)
- 1 Microtec A3 scanner (connected to one of the LRS workstations)
- 1 HP Scanjet A4 scanner with automatic document feed (connected to one of the LRS workstations)

The 4 dedicated workstations are linked wirelessly to the MNRE network through a DLink DI 784 Access Point Router. The secure protocol used on these links is Shared 64 bit WEP and the wireless SSID is *mnrewgn* . This has been established on the workstations using the standard XP Wireless setup arrangements. The Access Point has been setup using DLink configuration software which can be run through any computer connected to the Access Point via Internet Explorer (MNRE System Administrator has been supplied the configuration details including the encryption factors by the supplier of the equipment, CSL. The Access Point is connected to the MNRE1 Server by cable and is located in the SIAM 2 sub component project managers office.

The dedicated Land Registration Section workstations have been configured in the regular manner used within MNRE.

Backup

1. Daily SQL Server backup are made to the network T drive \LandArchive\SQLserverBackups\LRS folder automatically
2. Draughting Section staff will make daily backups of all folders utilised by the LRS application on the T:\drive (which will include the SQL Server backups, plus all Land Registration scanned images and MS Word reports and documents generated through the LRS software) using the Willow Creek Backup to DVD/CD (Made Simple) V5.1 (license No AB54-1524-3346-C89C) software loaded on all the dedicated workstations. A series of 4 Daily backups of 4 DVDs (labelled Monday – Thursday) will be used on a rotational basis whereby Monday's backup will overwrite the backup from the previous Monday. The Daily backups will be stored in a secure location within the Draughting Section office.

   Backups will be run during the lunch break every day.

   On Friday the backup will occur in a similar fashion except this backup will use a different series of DVDs (labelled Week 1-4). The backup will occur during the lunch break but with this series of DVD all except the DVD for the following week will be stored away from the Molesi office (possibly the National Mapping Office). On each Friday afternoon after the backup has been made, that DVD will be delivered to the offsite storage and the weekly DVD to be used for the next week collected and stored in a secure location within the Draughting Section.

   SQL Server Backup

   A maintenance plan using the SQL Server Wizard for this purpose has been established which runs on a daily basis. The database backups are made to the SQLserverBackups folder on the T:\ server drive in a separate sub-folder for the LRS database. Care must be taken to make sure the SQL Server Agent is always running and particularly after any situations where the SQL Server has been stopped. SQL Server Agent is a separate software process and although it automatically starts when MNRE1 is rebooted, it does not automatically restart when the SQL Server itself is restarted without a reboot.

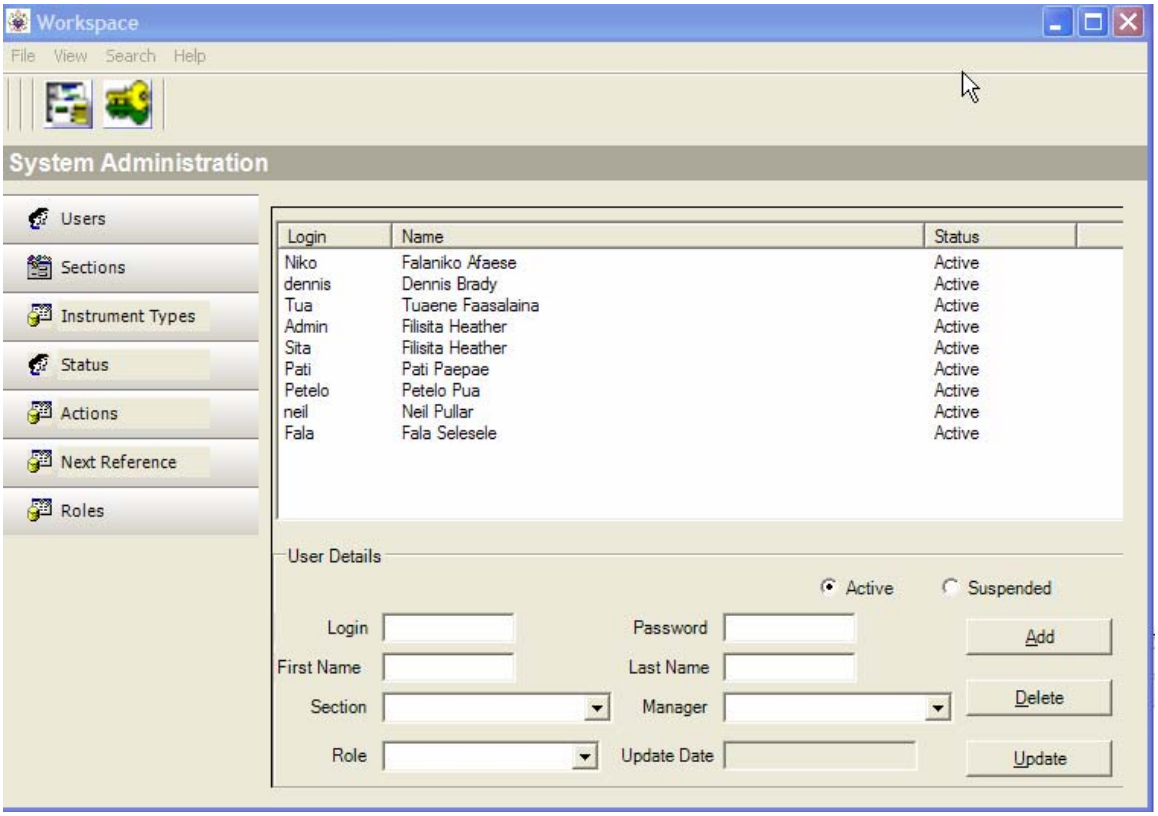
   Data Recovery

   With respect to data recovery, the "Backup to DVD / CD (Made Simple) software has various data restore options depending on the nature of the data loss or corruption.

   For the SQL Server databases, the strategy would be firstly to restore the SQL Server backup files with the "Backup to DVD / CD (Mad Simple)" software and then to use SQL Server Enterprise Manager to do a SQL Server restore for the LRS database. Enterprise Manager also has other routines which can remedy certain types of database corruption.

LRS Codelists and System Administration Tables

The LRS software depends on a series of Codelists to keep the LRS database consistent. Most of these Codelists are accessible within the LRS software through the Admin user login for LRS. The following screenshot displays the Adminstration Screen .



The navigation bar on the left of the screen allows the Admin user to move from screen to screen to modify Codelist values. All Codelist screens look and operate in a similar fashion to the User Screen displayed in the screen shot above.

Codelist and System Administration Tables

Users

This is used to add and delete users of the LRS software; change their passwords and the authority role level. The Role field is important in giving LRS users the appropriate authority and ability to perform their duties – for instance the authority to Release / approve new titles is limited to the Registrar. Only experienced Land Registration Staff can register land transactions within LRS.

Sections

This is not applicable to Samoa as there is only one Section, the Land Registration Section.

Instrument Type

This is a very important table and changes to existing records should only be done after consultation with the software developers. However, new records can be added provided all relevant fields are completed and kept consistent. For instance the sort order value should not replicate an existing value.

Status

This is another important table and no changes should be made to it (including additions) without consulting the software developers.

Actions
Similarly to Instrument Type, changes should only be made after consultation with the software developers

Next Reference
Records the next number to be allocated for Instrument/Dealing, Survey Plan and Power of Attorney. The Lodgement and Share numbers are not visible to users in the current version of the LRS software but could be used by the software in the future. These numbers can be changed by the Admin user without reference to the software developers providing they are sure there is no risk with any changes causing multiple records with the same number.

Role
LRS uses the ranking value to assess what functionality a LRS user is entitled to. For this reason, any changes made should be limited to all fields except the ranking field. Generally speaking the higher the ranking the greater the LRS functionality available to the user. The exception is the Admin user with a ranking of 99 but this only permits access to these System Administration forms and no Land Registration functionality.

Lodging Agents
This is available through the View menu and is also available the same way to regular Land Registration LRS users. This allows new lodging agents to be added and contact details of existing Lodging Agents to be changed.

Other Codelist and System Administration Tables
In addition to those forms identified above, there are further tables that currently are only accessible from the MS Visual Studio.NET development environment or through the MS SQL Server Enterprise Manager tool (for details on how to install Enterprise Manager, see the notes on the MS SQL Server installation in this document). These tables include:

- CodelistUseCodelist (to categorise the use of Instrument Type)
- EstateCodelist (to categorise estates associated with different titles)
- InterestCodelist (to categorise Interest Holders)
- Island, Land District, Village (from Geographic Place Names database maintained by MNRE Mapping Section)
- MajorMortgageeCodelist (a list of major lending institutions and used within the Encumbrance entry forms)
- PlanTypeCodelist (to categorise Survey Plans) Should be made accessible System Administration Table in future versions of LRS.
- TimePeriodCodelist – not currently used by LRS software

13 Data Directories (on MNRE1 Server)

A series of folders have been created on the T:\ network drive to hold different records, software and documents.

ArchivedRecords
A series of folders have been created to hold different archived collections of land records:

- GrundAktens
- LandClaims
- MiscellaneousPlans
- SchemePlans
- SketchPlans (of Land Claims)

- SurveyPlans

Help

This folder holds the pdf version of the Land Registration User Manual and Land Registration legislation (accessible through the Help menu item)

Instruments

To store scanned images presented for registration. If scanned prior to registration, these images should be stored in the Lodgement sub-folder. When scanned following registration these images will be stored in the Registration sub-folder

LandRegistration

To store the Microsoft Word documents and reports generated by LRS

SLISsoftware

Stores the latest version of the installation software for the client software for both the LRS and the Survey Geodetic Database (SGDB) in separate sub-folders

SQLserverBackups

MS SQL Server has been scheduled to make automatic backups of the three SLIS databases to a sub-folder for each database:

- DCDB (Digital Cadastral Database – created and maintained by Draughting Section)
- LRS
- SGDB (Survey Geodetic Database – created and maintained by Survey Section)

Survey Geodetic Database (SGDB) Version 1.04 (30 January 2006) Software Description

1 Description

The LRS application supports the process of maintaining a Survey Geodetic Database by the Survey Section of the Ministry of Natural Resources, Environment & Meteorology, Samoa.

This software application was developed by Neil Pullar, Land Equity International Ltd, (npullar@cadastre.co.nz) as part of the World funded Technical Assistance provided in the C5 Land Administration and Surveying Component of the SIAM2 Project. It was developed from September – October 2005.

The impetus for the development of this software application was introduction of a modern geocentric datum for Samoa and the associated geodetic survey work undertaken for the Government of Samoa as part of the same technical assistance.

The SGDB software application is intended as an in-house application for Survey staff to operate on the existing MNRE network operating in the MNRE Molesi office

The SGDB application was developed in Microsoft Visual Basic .NET (69463-706-2540136-18087) and utilizes a Microsoft SQL Server database.

2 How to Install

The SGDB application is loaded on a Survey Section workstation as a client application. This workstation was procured specifically for this purpose in October 2005. It can be loaded on other workstations providing:

- Preferred operating system is Windows XP with SP2 installed. SGDB has also run on Windows 2000
- Regional and Language settings must be set to English (New Zealand) or English (Australia) language settings and Location setting to Samoa
- Microsoft .NET Framework Version 1.1 (or later) is loaded
- MDAC Version 2.6 (or later) is loaded
- The workstation has a connection to the MNRE network in the Molesi office
- The workstation screen resolution settings are 1280 by 800 pixels

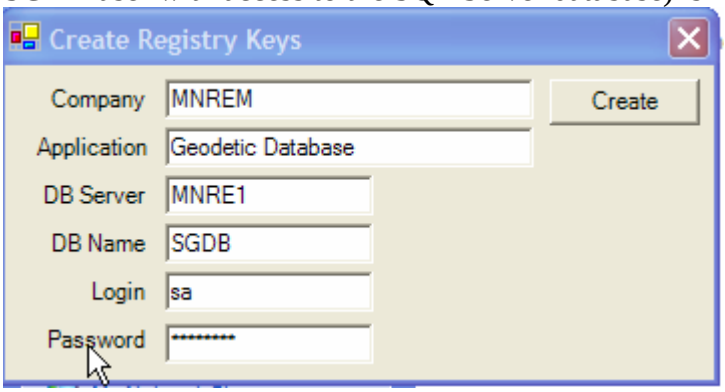
There are two sets of software installation to be run:

1. An initial, once only LRSregistryInstall installation to write SGDB database access parameters to the workstation's registry keys; and
2. The main SGDB client software installation.

Both installations are standard Visual Studio.NET installation packages.

To install run the setup.exe files located in the \LRSregistryInstall and \SGDB sub-folders on the T:\ SLISsoftwere network folder. When prompted by the installation wizard, click on the “Everyone” option (and do not limit the installation to the installing user). Because of MNRE network user privilege settings, only a user with Administrator rights for the workstation on which the SGDB software is to be installed can install the software.

Before a new installation, any previous versions of the Land Registration software should be removed using the standard Control Panel Remove Software Tool (there is no need to remove and reinstall the LRSregistryInstall software unless the database host for the SQL Server database changes). The following screenshot identifies the required field entries. The password to be entered (to provide the SGDB user with access to the SQL Server database) is “Talofa01”.



The SGDB application utilizes a Microsoft SQL Server 2000 database SGDB (updated with SP3A) which is located on the MNRE1 server. This version of SQL Server is installed using the Microsoft Desktop Engine (MSDE) product and needs to use a command line installation for the server end (where the database actually resides).

For the SGDB application to run correctly, the following logical drives should be mapped for all workstations running the software:

Drive	Mapping
T:	\\MNRE1\Data\

This mapping is made automatically whenever you logon to the MNRE network, providing you are a member of the Survey Section network group.

3 System Requirements

The new (October 2005) Survey Section Workstation is running Windows XP Professional with 512 MB of RAM and Intel Pentium 4 3 GHz processors.

There have been problems in running the related LRS application on an older workstation with Windows 95 despite being updated with the most recent Microsoft Framework .NET and MDAC installations (October 2005).

However, the LRS application has run without any difficulties on a workstation running Windows 2000.

All workstations must be loaded with MS Word (version 10 or later). Similarly, all workstations must also be loaded with Adobe Acrobat or Adobe Acrobat Reader (version 6 or later) in order to view scanned images related to Survey Marks

4 Software Folder

By default, the installation loads the client application into C:\Program Files\SLIS\Survey Geodetic Database folder. It also loads an associated sub-folder C:\Program Files\SLIS\Survey Geodetic Database\Templates and copies a MS Word templates into this sub-folder and creates a folder on the local drive of the workstation C:\Geodetic Database Prints.

5 Main SGDB Programming Objects

The SGDB software is implemented in three tiers and hence there are three separate MS Visual Studio.NET projects. Generally there is a one-to-one relationship between objects in these three projects. These projects are:

4. **Object Classes (Geodetic Database –** the startup programme)
   Objects are outlined in the table below
5. **Business Logic (SGBusinessLogic)**
   Includes XML schemas of all data structures accessed in the application
6. **Data Access (SGDataAccess)**
   Includes cryptification routines to safeguard SGDB users passwords and access to the SGDB SQL Server database. These routines provide the links to over 120 SGDB specific SQL Server Stored Procedures (relatively short stored SQL routines stored within the SGDB database). For each database table there are stored procedures to Insert (new values), Delete (individual records), Select both individual records (using the key record value) and all records in the table and Update records. There are also specialized search routines for some SGDB database tables

Main SGDB Objects

Form	Associated Database Tables	Description
About	-	Typical high level description of SGDB
Login	-	Collects User name and password details to authorize access SGDB software application
Main	-	Main form for the SGDB application – no functional use apart to “hold together” other SGDB functions.
Search	Mark	Entry of search criteria and subsequent searches for Marks and the associated routine to produce

Form	Associated Database Tables	Description
		MS Word documents (and hence print) the results of searches
Workspace	Mark Various Codelists	Mark entry and maintenance Codelists – Maintenance forms for most system codelists (only accessible by SGDB user, Admin)

Module	Description
mShellAndWait	A routine to allow calls to external applications such as Adobe Acrobat (to view, print etc scanned images)

6 Major Subroutines for Workspace Form

Subroutine ActionAdd
Subroutine ActionDelete
Subroutine ActionUpdate
Subroutine ClearFieldsInForm
Subroutine DecimaliseLatitude
Subroutine DecimaliseLongitude
Subroutine DisplayDecimalisedLatitude
Subroutine DisplayDecimalisedLongitude
Subroutine DockPanel
Subroutine ImportGeoLab
Subroutine ImportLandXML (to be implemented)
Subroutine LoadNnnnnn (where Nnnnnn is the name of each codelist referred to in form)
Subroutine Navigate
Subroutine NavigateWindows
Subroutine PopulateMark
Subroutine TransformToGeographicals
Subroutine TransformToProjectedCoordinates
Subroutine UnDockPanel
Subroutine UserFormViews

7 Use of Microsoft Word Templates

A single template has been designed to work with the software to create standard documents and reports. These are loaded during installation into the C:\Program Files\SLIS\Survey Geodetic Database \Templates directory. An integral (and very critical) part of these templates are the defined Bookmarks that can be identified through the use of an italic font if these templates are opened directly (not through the software). Changes to wording and format of these templates must maintain these Bookmarks if the software is to continue to work properly.

These templates are used when Certificate Printing is invoked (Certificate Form) or as a menu option from the Completed Work Panel within the Instrument Form.

Template Name	Purpose
markDetails	Summary of details held about a survey mark

8 Links to Scanned Images of Survey Mark Documents

The SGDB software has a simple method of linking and viewing scanned images of land registration documents. The scanning occurs independent of the SGDB software but expects:

- documents to saved in the T:\SurveyMarkReferences or the T:\ArchivedRecords\SurveyPlans folders
- documents to be saved as multi-paged pdf files (one pdf file for each document)
- scanned image documents to be named with an appropriate filename that clearly identifies the original source (eg SurveyPlan7089.pdf)

The SGDB software links the scanned image to the appropriate SGDB database record by storing the full file name (including drive and directory) in a scannedImage field of the corresponding database record.

The SGDB (Image) View function is reliant on the installation of Adobe Acrobat or Acrobat Reader on the SGDB users workstation so the pdf file type is associated with the Adobe Acrobat software application. (Similarly, the SGDB view function will display scanned images stored in tif and other graphics file formats, if there is a graphic image view software application installed on the workstation that associates the specific graphics file format to a graphic image view application.)

9 New Software Versions – Compilation Details

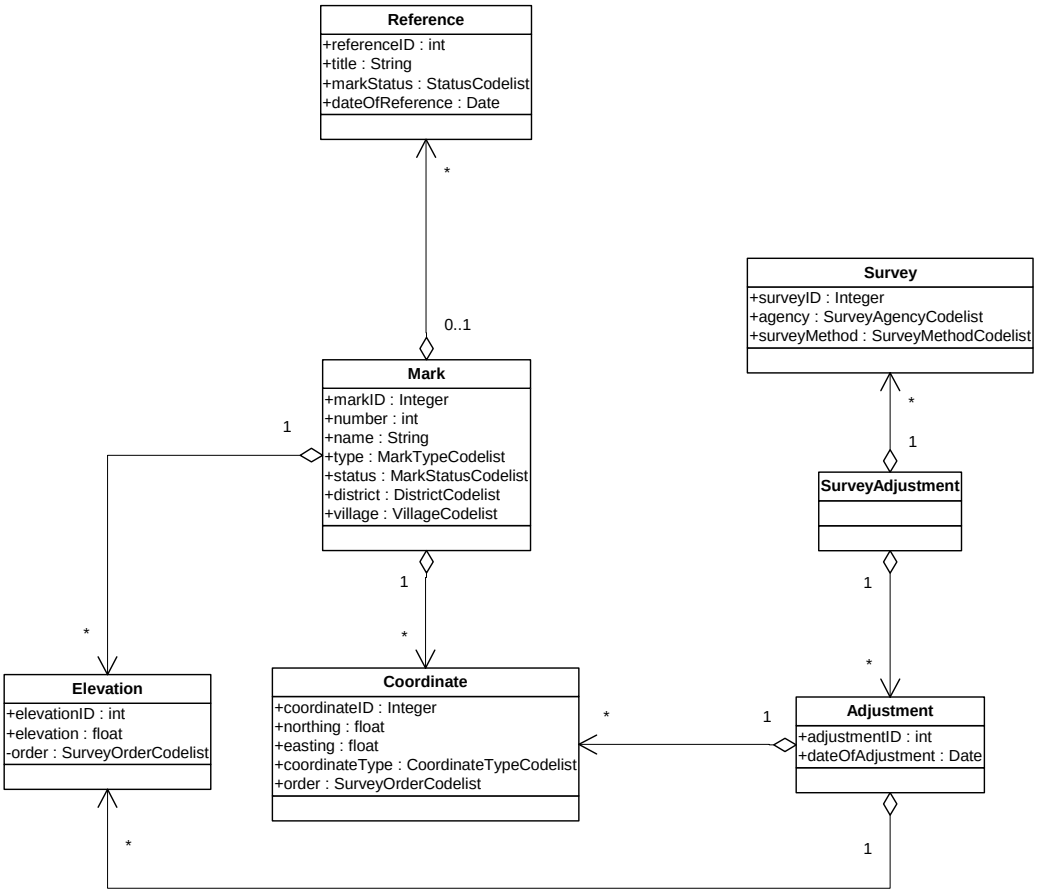
The SGDB software is compiled using the standard Visual Studio .NET Build Menu option. Two versions of the software are required to cater for workstations with MS Word Version 10 (eg Office XP) and another for the later Version 11 (eg MS Office Professional). The compilation for the two version is identical except for naming of certain folders and Visual Studio solution (.sln) files. The convention followed with this naming is that for the Version 10 compilation these files and folders include “XP” in the name whereas the Version 11 is as described below.

The following steps need to be followed by the software developer when a new version of the software is produced (note these are NOT installation instructions):

- A copy of the folder containing the last version of the source code (eg. C:\Data\Samoa\AppDev\SLIS\SGDB\v1.00) needs to be copied to a new folder (eg C:\Data\Samoa\AppDev\SLIS\SGDB\v1.01)
- The deployment folder should be renamed (eg C:\Data\Samoa\AppDev\SLIS\SGDB\v1.00\LandRegistration\SGDBdeployment\SGDBv1.01) and the contents of the Release sub-folder (eg. ..\v1.01\LandRegistration\SGDBdeployment\SGDBv1.01\Release) deleted to leave an empty folder

- The Visual Studio solution file in the deployment folder (eg ..\v1.01\LandRegistration\SGDBdeployment\SGDBv1.01) renamed to the new version (eg SGDBv1.01.sln)
- Then double click on this solution file to open Visual Studio and make the following changes within this development tool (assuming Visual Studio .NET had been installed)
  - The SGDB solution file (SGDBv1.01) – Properties – Active Configuration = Release
  - Open Land Registration Project Assembly file and update the reference to Version (at bottom of file) and save changes
  - In the SGDBvn.nn Deployment Project – Properties – change the version number AND in the Property Pages change the reference to the Output file to reflect the new version (eg SGDBv1.01.msi)
  - Under the SGDBvn.nn Deployment Project, double click Primary Output from Land Registration item to view the File System property page. Double click on Desktop Output and update the Name of the icon to reflect the version (eg SGDB v1.01). Similarly update the Application Folder item above to include any new files (including MS Word templates) and the files included in the Help Folder, should the included files be updated

10 SGDB Database Outline



11 Microsoft SQL Server Installation

It should only be necessary to reinstall an instance of MS SQL Server, if you need to migrate the database to a different host from the current database host; the

MNRE server MNRE1. This process is identical to the one described for the Land Registration software – both applications reside on the same instance of SQL Server hosted on the new server MNRE1.

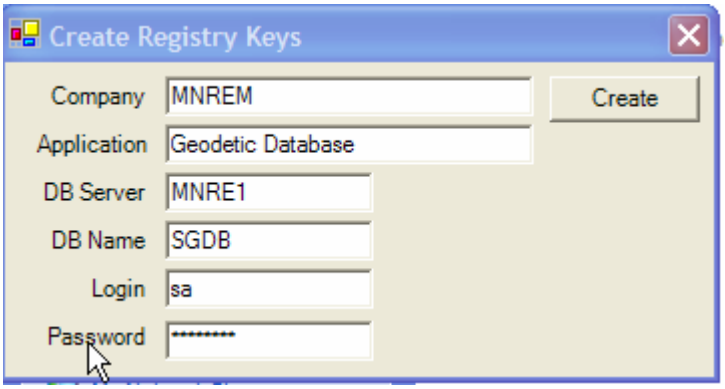
To install the MSDE 2000 / MS SQL Server 2000 Database and the SGDB databases

This installation can only be undertaken by a user with Network Administrator privileges.

12. **Copy the complete MSDE2000 directory from the MSDE2000 CD** onto the the C:\ drive of the new database host workstation or server.
13. **Install SQL Server Enterprise Manager (Evaluation CD)**. The Evaluation CD is self booting and installation is guided by a wizard. Choose the "Server & Client Tools" option, then the "Custom" install option. When the wizard asks you to specify specific modules, un-select all modules except Management Tools and, within that module, Enterprise Manager – the other tools are not required. Enterprise Manager is an extremely useful tool as it provides direct access to all Database tables (for editing values such as Codelist values), to schedule and run backups (and restores) aswell as other useful database routines.
14. **Update Enterprise Manager** using the SP3 files copied across in Step 1 above. To do this: Start – Run – COMMAND
    key the following
    cd \msde2000
    THEN
    Setup
15. **Install the MSDE 2000 version of MS SQL Server** by:
    Start – Run – COMMAND
    key the following
    cd \msde2000\msde
    THEN
    setup SAPWD="Talofa01" SECURITYMODE=SQL DISABLENETWORKPROTOCOLS=0
16. **Wait patiently.** The databases created in this process are the Master database and a series of standard Microsoft example databases. Apart from Master database the other database are of no interest to the SGDB application. The standard MS SQL Server user account of *sa* with password *Talofa01* have been created during installation and the server created by this process expects SQL Server Authentication (not Windows Authentication).
17. **Check** through the Run – Programs that there is now a new MS SQL Server – Enterprise Manager program menu item
18. **Through Enterprise Manager create a new database** with the name SGDB making sure that both the Data File and the Log file point to the D:\SQL Server Data\SGDB folder (or equivalent on the new host system)
19. **Stop the new instance of SQL Server** (using Enterprise Manager, right mouse click on the "Local Server" menu item and selecting Stop)
20. **Copy the last backed up copy of the two SGDB database files** into the D:\SQL Server Data\SGDB folder to overwrite the two database files.
21. **Restart SQL Server** using Enterprise Manager (right mouse click on the "Local Server" menu option

22. Using the Enterprise Manager, **check that SGDB databases has a full complement of 41 user tables** and that you are able to connect (Using SQL authentication, user sa password Talofa01.

Following a change of database host, every workstation used by a SGDB user would need to run the SGDBCreateRegistryKeys software again entering the same details as is shown in the following screen shot EXCEPT that the name of the workstation or server now hosting MS SQL Server should be substituted for "MNRE1" value in the DB Server field. The database password remains as "Talofa01".



12 Survey Section Computing Arrangements

Equipment

The Survey Section computer arrangements required to support the Survey Geodetic Database are connected to the MNRE Local Area Network in the Molesi Office and includes the following items of equipment:

- 1 dedicated workstation connected to network by wireless (named SGDB1)
- 1 HP LaserJet 1022 A4 printer (capable of being connected directly to network)

The dedicated workstation is linked wirelessly to the MNRE network through a DLink DI 784 Access Point Router. The secure protocol used on these links is Shared 64 bit WEP and the wireless SSID is *mnrewgn* . This has been established on the workstation using the standard XP Wireless setup arrangements. The Access Point has been setup using DLink configuration software which can be run through any computer connected to the Access Point via Internet Explorer (MNRE System Administrator has been supplied the configuration details including the encryption factors by the supplier of the equipment, CSL). The Access Point is connected to the MNRE1 Server by cable.

The dedicated Survey Section workstation has been configured in the regular manner used within MNRE.

Backup

1. Daily SQL Server backup are made to the network T drive \LandArchive\SQLserverBackups\LRS folder automatically
2. Draughting Section staff will make daily backups of all folders utilised by the LRS application on the T:\drive (which will include the SQL Server backups, plus all Land Registration scanned images and MS Word reports and

documents generated through the LRS software) using the Willow Creek Backup to DVD/CD (Made Simple) V5.1 (license No AB54-1524-3346-C89C) software loaded on all the dedicated workstations. A series of 4 Daily backups of 4 DVDs (labelled Monday – Thursday) will be used on a rotational basis whereby Monday's backup will overwrite the backup from the previous Monday. The Daily backups will be stored in a secure location within the Draughting Section office.

Backups will be run during the lunch break every day.

On Friday the backup will occur in a similar fashion except this backup will use a different series of DVDs (labelled Week 1-4). The backup will occur during the lunch break but with this series of DVD all except the DVD for the following week will be stored away from the Molesi office (possibly the National Mapping Office). On each Friday afternoon after the backup has been made, that DVD will be delivered to the offsite storage and the weekly DVD to be used for the next week collected and stored in a secure location within the Draughting Section.

SQL Server Backup

A maintenance plan using the SQL Server Wizard for this purpose has been established which runs on a daily basis. The database backups are made to the SQLserverBackups folder on the T:\ server drive in a separate sub-folder for the SGDB database.

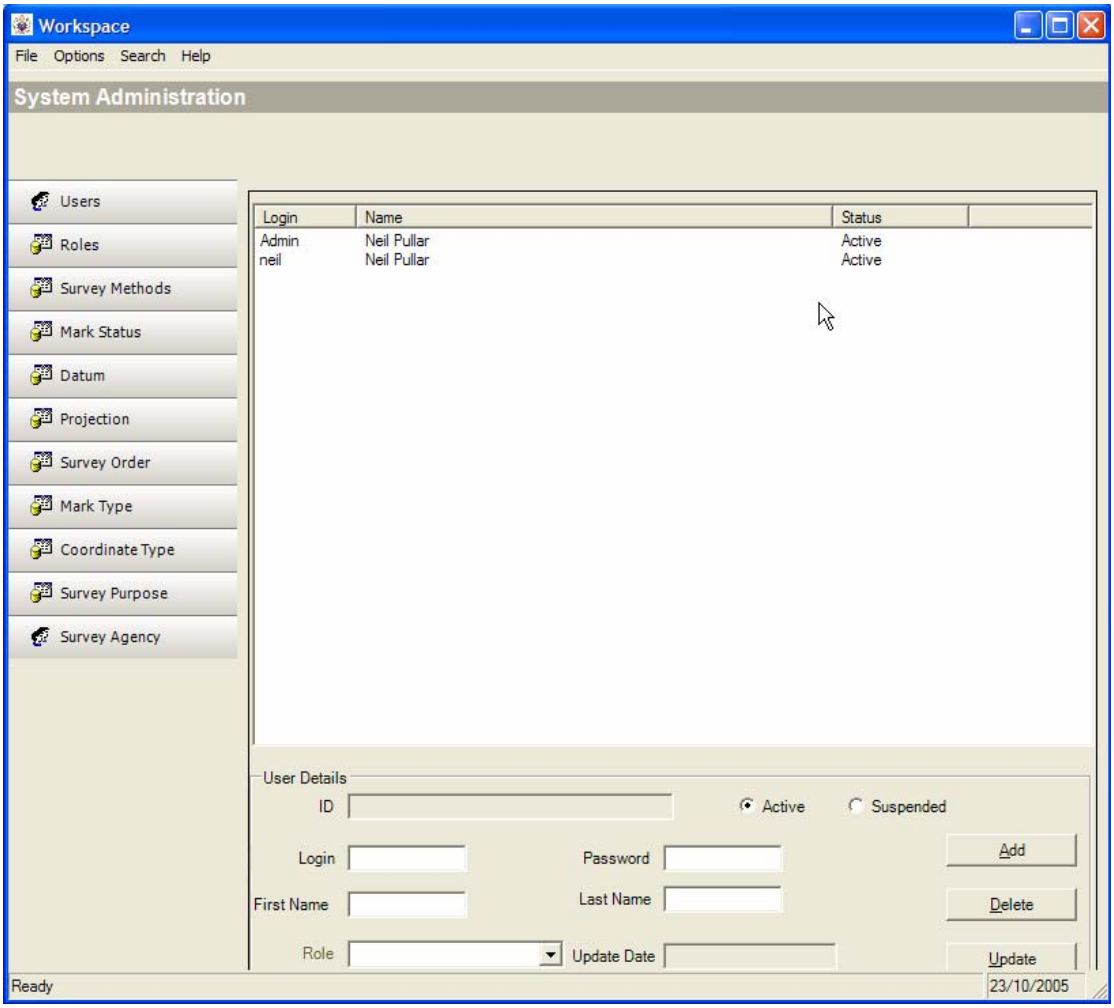
Data Recovery

With respect to data recovery, the "Backup to DVD / CD (Made Simple) software has various data restore options depending on the nature of the data loss or corruption.

For the SQL Server databases, the strategy would be firstly to restore the SQL Server backup files with the "Backup to DVD / CD (Made Simple)" software and then to use SQL Server Enterprise Manager to do a SQL Server restore for the SGDB database. Enterprise Manager also has other routines which can remedy certain types of database corruption.

SGDB Codelists and System Administration Tables

The SGDB software depends on a series of Codelists to keep the SGDB database consistent. Most of these Codelists are accessible within the SGDB software through the Admin user login for SGDB. The following screenshot displays the System Adminstration Screen .



The navigation bar on the left of the screen allows the Admin user to move from screen to screen to modify Codelist values. All Codelist screens look and operate in a similar fashion to the User Screen displayed in the screen shot above.

Codelist and System Administration Tables

Users

This is used to add and delete users of the SGDB software; change their passwords and the authority role level. The Role field is important in giving SGDB users the appropriate authority and ability to perform the different tasks associated with maintaining the Survey Geodetic Database

Role

SGDB uses the ranking value to assess what functionality a SGDB user is entitled to. For this reason, any changes made should be limited to all fields except the ranking field. Generally speaking the higher the ranking the greater the SGDB functionality available to the user. The exception is the Admin user with a ranking of 99 but this only permits access to these System Administration forms and no SGDB maintenance functionality.

Codelists

The following codelists are used to ensure consistent data entry. Additions of new entries or changes to the “description” field to make the meanings clearer or correct spelling mistakes can be made by the Admin user without any implications to the SGDB software or database. However, it is suggested that deletion of

codelist values only be made after consultation with the software developers apart from when the database is being configured and before any marks have been entered into the database.
Maintenance forms are available for the following codelists:

- Survey Methods
- Mark Status
- Datum
- Projection
- Survey Order
- Mark Type
- Coordinate Type
- Survey Purpose
- Survey Agency

Other Codelist and System Administration Tables
In addition to those forms identified above, there are further tables that currently are only accessible from the MS Visual Studio.NET development environment or through the MS SQL Server Enterprise Manager tool (for details on how to install Enterprise Manager, see the notes on the MS SQL Server installation in this document). These tables include:

- ElevationTypeCodelist (to capture Height Datum and units of measure used for different systems of recording heights)
- HeightTypeCodelist (to distinguish between Orthometric and Spheroidal Heights)
- UnitsOfMeasureCodelist (to record units used in recording coordinates and heights)
- Island, Land District, Village (from Geographic Place Names database maintained by MNRE Mapping Section)
- NextReference (records the next id reference to be allocated to the next new Survey Mark to be recorded in the SGDB. Also records the next id for two system codelist tables; CoordinateType and ElevationType)

13 Data Directories (on MNRE1 Server)

A series of folders have been created on the T:\ network drive to hold different records, software and documents.
ArchivedRecords
A series of folders have been created to hold different archived collections of land records:

- GrundAktens
- LandClaims
- MiscellaneousPlans
- SchemePlans
- SketchPlans (of Land Claims)
- SurveyPlans

Help
This folder holds a pdf version of the SGDB Training Notes and other files accessible through the Help menu item
SurveyMarkReferences
To store the scanned images (pdf format) of all reference documents to Survey Marks apart from Survey Plans (stored in the T:/SurveyPlans folder)

SLISsoftware
Holds the latest version of the installation software for the client software for both the SGDB and the Land Registration System (LRS) in separate sub-folders
SQLserverBackups
MS SQL Server has been scheduled to make automatic backups of the three SLIS databases to a sub-folder for each database:

- DCDB (Digital Cadastral Database – created and maintained by Draughting Section)
- SGDB
- LRS (Land Registration System – created and maintained by the Land Registration Section)

Metadata Export Utility (MEU) Version 1.00 (28 October 2005) Software Description

1 Description

The MEU application provides the Samoa GIS community with a software tool to convert geospatial metadata captured in the SPREP Metadata Catalogue (Microsoft Access application) into a format that is compliant with the Proposed (Samoa) Geospatial Metadata Standard (being a profile of the international IS0 19115 Geospatial Metadata Standard) and in a form that allows the metadata to be published on websites (in a format that is compliant with draft ISO Technical Specification 19139 for the XML Implementation of ISO 19115 compliant metadata).

This software application was developed by Neil Pullar, Land Equity International Ltd, (npullar@cadastre.co.nz) as part of the World funded Technical Assistance provided in the C5 Land Administration and Surveying Component of the SIAM2 Project. It was developed from September – October 2005.

The impetus for the development of this software application was the push within the Samoa GIS community, supported by regional organizations such as SPREP and SOPAC, to collect geospatial metadata for publication. SPREP had funded the development of the Metadata Catalogue with this entry tool based on the soon to superseded ANZLIC metadata standard. ANZLIC, as are many other geospatial organizations around the world, have decided to adopt a profile of ISO 19115 as their metadata standard and so it was appropriate to provide the means to convert metadata collected with the SPREP Metadata Catalogue to a new Samoa Geospatial Metadata Standard being a profile of ISO 19115. As the draft companion technical specification to ISO 19115 defines a XML implementation (ISO draft technical specification 19139), this XML format was selected for the format to store the converted geospatial metadata. This format has the added benefit of being in a format that is easily published on websites (when associated with a XSLT style sheet).

The MEU software application is intended to be distributed to any organization in Samoa who are responsible for geospatial information resources (ie GIS data or printed maps).

The MEU application was developed in Microsoft Visual Basic .NET (69463-706-2540136-18087). It needs to connect to a copy of the SPREP Metadata Catalogue containing the users geospatial metadata descriptions.

2 How to Install

The MEU application is loaded on the 4 Land Registration Sections workstations procured in October 2005 as a client application. It can be loaded on older Land Registration workstations providing:

- Preferred operating system is Windows XP with SP2 installed. MEU has also run on Windows 2000 and Windows 98
- Regional and Language settings must be set to English (New Zealand) or English (Australia) language settings and Location setting to Samoa
- Microsoft .NET Framework Version 1.1 (or later) is loaded
- MDAC Version 2.6 (or later) is loaded

There is just one software installation to be run:

1. The MEU client software application.

The installation is a standard Visual Studio.NET installation package.

To install run the setup.exe file. When prompted by the installation wizard, click on the "Everyone" option (and do not limit the installation to the installing user). If you are installing this on a networked workstation, you will need to ensure you have full administrative rights to complete this installation.

Before a new installation, any previous versions of the MEU software should be removed using the standard Control Panel Remove Software Tool.

The MEU software needs to connect to a copy of the SPREP Metadata Catalogue MS Access database which contains complete metadata descriptions. A copy of the SPREP Metadata Catalogue is bundled with the MEU installation software but it must be emphasized that all editing of metadata description must occur in the SPREP Metadata Catalogue

3 System Requirements

As the MEU software utilizes the MS .NET Framework, it is ideal to run this software on workstations loaded with Windows XP operating system. However, providing older operating systems such as Windows 2000 and Windows 98 have been upgraded with MS .NET Framework and the latest MDAC drivers, the MEU appears to run satisfactorily on older workstations too.

4 Software Folder

By default, the installation loads the client application into the C:\Program Files\SLIS\MetadataExport folder. It also loads a series of associated sub-folders of this folder which contain the XML schema files associated with the ISO draft TS 19139 plus a copy of the MS Access .mdb file for the SPREP Metadata Catalogue. The structure of the sub-folders containing the XML schemas is extremely critical and should not be changed. Similarly all converted metadata descriptions must be stored as XML files in the C:\Program Files\SLIS\MetadataExport\examples sub-folder.

5 Main MEU Programming Objects

The MEU software is implemented in a single level of implementation which involves user interface, business logic and data access routines.

Main MEU Objects

Object	Associated Database Tables	Description
About Form	-	High level description of MEU
MetadataExport Form (& Code)	[SPREP] Dataset File	Main object including data access routines to the MS Access database, data validation routines and data conversion (utilizing the ConvertSPREP_19115.xslt file)
ISO TS 19139 XML schemas (draft as at 1 October 2005)		XML implementation of ISO 19115 containing a series of xsd schemas which enables validation of geospatial metadata descriptions against 19115
SamoaGeospatialMD.xslt		A custom produced XML stylesheet (SamoaGeospatialMD.xslt) which allows all the metadata elements contained in the Proposed Samoa Geospatial Metadata Standard to be displayed in a easily understood table form. All metadata converted using the MEU software need to be associated with this style sheet in order to be published
Samoa specific Codelists		In the Resources subfolder of the MEU application folder can be found XML encoded definitions of all the Codelists associated with ISO 19115. In the future, Samoa specific Codelists should be developed in a similar fashion to define Datums, Projections and keywords specific to Samoa. MEU software will run satisfactorily without the Samoa specific codelists, but the addition of the codelists would ensure greater consistency in geospatial metadata descriptions.

6 Main Subroutines in MetadataExport Form

Subroutine GetFilesForDataset
Function IsConnectionOpen
Subroutine ShowCurrentRecord
Subroutine WriteXMLtoFile2

7 Data Validation within MEU

A limited range of checks are performed to ensure the SPREP metadata has been correctly and completely entered. If these checks identify an issue, the user must exit MEU, make the changes within the SPREP Metadata Catalogue and then re-run MEU.

Where the Proposed Samoa Geospatial Metadata Standard requires a metadata element not collected within the SPREP Metadata Catalogue, MEU places a default value into the converted data. In most situations the only default value which may require to be changed (using a text editor) is the Topic Category element (default value is imageryBaseMapsEarthCover)

8 XML Validation of Converted Metadata Descriptions

MEU has been tested and the resulting converted XML instance files validated against the ISO 19139 schema using the XML Editing Tool, XMLspy (refer to www.altova.com for more details and an evaluation copy). However, as the metadata collected within the SPREP Metadata may be invalid and incomplete, it is possible that the XML instance files produced by MEU do not conform. The only way to check is to validate this files using a tool such as XMLspy.

9 Proposed Samoa Geospatial Metadata Standard

A proposed metadata standard has been produced in association with the development of the MEU software application. The proposed standard is currently (28 October 2005) under review by MNRE. The next stage is to seek comments from the Samoa GIS User Group prior to its approval. Documentation describing the proposed standard will be published at http://www.mnre.gov.ws/metadata . The two documents (Profile Definitions and Profile Guidelines) are also available in the documentation sub-folder of the MEU application folder.