



GOVERNMENT OF SAMOA

**SAMOA SECOND INFRASTRUCTURE AND ASSET
MANAGEMENT PROJECT (SIAM II)**

COMPONENT 5.01: LAND ADMINISTRATION AND SURVEY

LAND INFORMATION INTEGRATION STRATEGY

TECHNICAL ASSISTANCE REPORT NO. 3

SUBMITTED TO

**MINISTRY OF NATURAL RESOURCES, ENVIRONMENT &
METEOROLOGY**

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Table of Contents

1	Opportunities and Barriers to Land Information Integration	4
1.1	Opportunities	4
1.2	Barriers	4
1.3	The Way Forward.....	5
2	Standards	6
2.1	Samoa Spatial Referencing Standard.....	6
2.2	Samoa Metadata Standard	6
2.3	Feature Classification / Product Specification.....	6
2.4	Samoa Digital Lodgement Standard	7
2.5	Templates for Land Registration Deeds and Dealings	7
3	Land Information Policies	9
4	Inter Agency Initiatives	10
4.1	GIS User Group.....	10
4.2	Map Server	10
4.3	Registration of Land and Titles Court Judgements – Ministry of Justice and Court Administration	11
5	Computerisation of Land Information Processes	13
5.1	Overview.....	13
5.2	Digital Archives.....	15
5.3	Data Conversion.....	16
5.4	Hardware Requirements	16
5.5	New Software Applications	17
5.6	Implementation Plan.....	21
	Appendix A Land Information Integration Data Model.....	22
	Appendix B Land Information Integration Data Flow Diagrams (Functional Analysis).....	28

ACRONYMS

<i>ADF</i>	<i>Automatic Document Feed (with scanners)</i>
<i>B & W</i>	<i>Black and White (monochrome) – referring to printers and scanners</i>
<i>DCDB</i>	<i>Digital Cadastral Data Base</i>
<i>GIS</i>	<i>Geographic Information System</i>
<i>GPS</i>	<i>Global Positioning System</i>
<i>ISO</i>	<i>International Standards Organisation</i>
<i>ISO TC211</i>	<i>ISO Technical Committee 211</i>
<i>LII</i>	<i>Land Information Integration</i>
<i>LIS</i>	<i>Land Information System</i>
<i>MNREM</i>	<i>Ministry of Natural Resources, Environment & Meteorology</i>
<i>MS</i>	<i>Microsoft Corporation</i>
<i>PC</i>	<i>Personal Computer</i>
<i>RS</i>	<i>Remote Sensing</i>
<i>SIAM-2</i>	<i>Second Infrastructure Asset Management Project</i>
<i>SIG</i>	<i>Samoa Integrated Grid</i>
<i>SLC</i>	<i>Samoa Land Corporation</i>
<i>SOPAC</i>	<i>South Pacific Applied Geoscience Commission</i>
<i>SPREP</i>	<i>Secretariat of the Pacific Regional Environmental Program</i>
<i>UPS</i>	<i>Uninterrupted Power Supply</i>

1 Opportunities and Barriers to Land Information Integration

1.1 Opportunities

Within Samoan Government Ministries and public agencies there are a number of favourable factors that would facilitate improved government services (especially within the Ministry of Natural Resources, Environment & Meteorology), improved efficiency in land administration processes and reduce the impact of both disasters and the natural deterioration of critical land records.

These factors are:

- Computerisation is well established within Ministries and public agencies and most organisations have well managed and supported networks (local and wide area networks);
- Senior management appreciate that spatial and land information needs to be managed as a valuable government resource with commonly held policies, standardisation and the need for further computerisation of land administration processes;
- There are a number of simple MS Excel and MS Access land related software applications in some of the land related sections of MNREM which have been developed by staff;
- GIS is being used in a number of organisations in Samoa, with support in the establishment of this systems being provided by regional organisations such as SOPAC and SPREP and development assistance programmes. This support includes the establishment of a Map Server by SOPAC;
- There are only a small number of different GIS software packages in Samoa and most agencies have adopted MapInfo;
- A GIS User Group has been established and the membership spans Government Ministries, public agencies, the private sector and staff from regional organisations.

1.2 Barriers

There are also a number of challenges or potential barriers to realising these benefits that should be addressed urgently:

- Critical land records are either not archived or have used a previous technology that is no longer viable (eg microfilms of survey plans). As a result there is an increased dependence on the original records and the additional handling of these records is hastening their deterioration;
- There is no computerised form of the record maps or cadastral maps and this limits the effective use of maps in land administration processes in a computerised environment and is a frustration to many organisations in Samoa who want to use a cadastral layer in their GIS applications;
- Current land registration, survey examination, lease administration and valuation rely heavily on traditional registers, files, indexes and labour

intensive processes that could be made more efficient with the computerisation of key land records and processes. Computerisation of the various indexing mechanisms (currently indexed through registers and other records) would significantly improve access to land records to both Ministry staff and the wider community served by the Ministry;

- There is an increasing number of adhoc Excel applications utilising data from the land registration process being developed with MNREM. These applications are difficult to maintain and it is difficult to verify the accuracy of queries and reports generated from them. The effort to maintain these Excel applications is duplicated in several sections of the Ministry. Ideally these applications should query or generate reports from a single corporate land database hosted on the MNREM server. This situation also heightens the need for standardisation of certain key data elements;
- The number of MNREM computer users is increasing and there is a need to introduce a little more formality and control with respect to the Ministry's information resources. One important measure that needs to be introduced is a regular backup regime and a Disaster Recovery Plan should the Ministry's computer infrastructure be affected by a disaster.

1.3 The Way Forward

This plan provides a plan for the next 3 years that builds on the current appreciation and skills and sets out the way for Samoa to modernise critical elements of government land administration and survey processes through land information integration.

Integration will be achieved through:

- new software applications supporting land registration, survey and land related processes¹ (including improved access to land information),
- the introduction of a rigorous backup and archive regime (coupled with a Disaster Recovery Plan),
- the definition and implementation of standards,
- the redesign of certain land information processes impacting on various government administrative functions and
- the up-skilling of Ministry staff to effectively use new appropriate technology and to be responsible for the effective operation of new redesigned processes.

¹ The extent of these software applications will depend on the resources available

2 Standards

Some of the key areas requiring the specification of standards and guidelines for their implementation are:

2.1 Samoa Spatial Referencing Standard

Initially, there is a need to identify the Lemuta Map projection (for cadastral surveys) and the Samoa Integrated Grid (SIG) (for GIS) as the interim standard for spatial referencing in Samoa. Once the new datum and map projection has been defined, then the standard will need to be amended to specify the new datum as the spatial referencing standard for Samoa. In addition it will need to specify acceptable processes to transform old spatial data into terms of the new datum and standard.

2.2 Samoa Metadata Standard

Discussions have been initiated with the GIS User Group with the view to defining a Samoa Spatial Metadata Standard as a profile of ISO 19115. ISO 19115 is the international standard for geospatial metadata that is being adopted by an increasing number of countries and is supported by leading GIS software vendors.

The proposed extent of the Samoan metadata profile will be quite modest and initially only support Data Discovery. However, it will be compatible with the SPREP Metadata Catalogue tool and be capable of being extended to include the wide range of metadata elements available through ISO 19115.

It is expected that the implementation of this standard will be guided by the draft ISO Technical Implementation Specification 19139² and thus enable metadata to be exchanged and published using the capabilities available through XML.

2.3 Feature Classification / Product Specification

The definition of a core national mapping product is also likely to use one of the ISO TC 211³ geospatial standards. The decision on which ISO standard is most applicable will depend on the nature of the core national mapping product.

Traditionally a Feature Catalogue would be the usual way of defining a national mapping product and, if this was the case, ISO 19110 the geospatial standard for feature cataloguing should be used. This would also link directly to the proposed Samoan metadata profile based on ISO 19115.

² ISO 19139 describes how to implement ISO 19115 within an XML environment. XML is increasingly the framework used to implement internet based services.

³ Refer to <http://www.isotc211.org> ISO TC 211 is the technical working committee of ISO that is formulating a wide range of geospatial standards and specifications. As at the beginning of 2005, there were about 20 finalised international standards covering many aspects of geospatial information and another 30 standards and specifications currently under development.

There is also another ISO TC 211 geospatial standard for Data Product Specification (ISO 19131) which is more wide ranging (than a Feature Catalogue) and includes aspects such as data capture, quality and maintenance processes as well as a more general application schema and the definition of the spatial referencing system used. Future national mapping specifications captured, managed and maintained using spatial technologies such as GIS and GPS are likely to be defined in terms of this standard rather than as a Feature Catalogue.

2.4 Samoa Digital Lodgement Standard

Initially, the focus of this standard will be on facilitating the future lodgement of survey plans digitally. It is expected that this standard will be based on the international LandXML⁴ standard.

Fortunately, New Zealand has recently implemented LandXML within the Landonline system that allows surveyors to lodge their surveys on-line. This means that there are available export and import software extensions to survey software packages commonly used in Samoa that can “translate” and complete SDR files into complete LandXML files. The similarities in the cadastral survey systems of New Zealand and Samoa mean that these New Zealand software extensions provide an easy solution as to how this standard can be implemented in Samoa and customised software will not need to be developed.

The best way for the LandXML standard to be implemented in Samoa will need to be investigated. On-line digital survey lodgement would seem to be a medium to long term goal for Samoa. However, in the short term the maintenance of the (new) DCDB could be streamlined if surveyors were to supply a LandXML file (generated through the SDR survey software).

2.5 Templates for Land Registration Deeds and Dealings

The need to standardise the layout of deeds and dealings to be presented for registration in the future has been identified as urgent. The scanning of all deeds and dealings (for archive and disaster recovery purposes) would be simplified and the cost of scanning considerably reduced by the decision to only accept A4 format document size for all future deeds and dealings as part of this proposed standard.

New technologies provide us with the means to implement this standardisation just as printed forms may have enabled this standardisation in the past. Templates can be defined in MS Word and distributed to lawyers which will standardise the layout of new deeds and dealings.

New XML technology, now available within MS Word, allow this standardisation to bring benefits beyond just a standardised layout and to prepare Samoa for the digital lodgement of deeds and dealings. The use of XML to “tag” key data elements (like parties names, land description, area, dealing type) and still present it so that it still reads as a legal document will

⁴ Refer to <http://www.landxml.org>

facilitate the creation of entries in the land registration database (in addition to the stored scanned image of the dealing in the land registration archive records).

Decisions on the layout of new dealings will involve discussion with local lawyers and once the layout has been decided, templates (including the associated XML schemas and stylesheets) will need to be developed and made available to all lawyers and organisations lodging dealings with the Land Registration Section.

3 Land Information Policies

The resolution of issues through the development of land policy papers will require an ongoing effort. Initially, there are a number of current issues that impact on the success and effectiveness of future land information integration initiatives.

These first land policy papers will provide a model for how future land policy papers can be developed.

Recommended topics to be dealt with as land policy papers are:

1. Responsibilities of Data Custodians (including authorising the use of land information resources)
2. Data Charges for Land Information
3. Data Sharing of Land Information
4. Training Needs Analysis (including initial Training Programme)

4 Inter Agency Initiatives

Although most of the current priority land information integration tasks are the responsibility of the Ministry of Natural Resources, Environment & Meteorology, there are some priority areas that require cooperative efforts with the other agencies

4.1 GIS User Group

Much of the land information held and maintained by the Ministry has a spatial dimension and hence are valuable mapping resources. Of the land information resources to be developed in this programme, the Digital Cadastral Database with its portrayal of current cadastral boundaries is one such mapping resource keenly sought by a number of agencies. GIS technology has been adopted by a number of agencies in Samoa and, in 2004, with the support of the regional organisation, SOPAC, the GIS User Group was established. Its membership spans both public and private sector organisations.

The GIS User Group is an excellent technical forum and the Ministry should support its ongoing operation through encouraging Ministry technical staff to participate and take an active role in its operation.

In addition to providing the Ministry with an insight into the issues impacting on the use of GIS across the country, it is also a useful sounding board for new initiatives such as draft standards and policies. Interagency GIS training sessions (particularly those resourced by regional and development agencies) are likely to channelled through the GIS User Group. This group will also mentor staff from organisations at early stages of GIS implementation.

4.2 Map Server

The implementation of the Map Server in March 2005 provides a new means to distribute spatial information in Samoa. At the time of writing this strategy, training⁵ in the management of the Map Server (and in particular, how to publish spatial information) had just occurred and so it was still unclear as to how some of the initial issues to do with the establishment of the Map Server were yet to be resolved.

Although the technology provides a very flexible platform for the integration of different themes of spatial information to meet both ongoing and one-off needs for maps, there are a number of policy, technical and financial issues that do need to be considered including:

- How widely will spatial information on the Map Server be made available and under what conditions (including pricing) ?
- The financial arrangements for the operation of the Map Server and how operating costs will be funded ?

⁵ by SOPAC staff

- What obligations are there on data custodians to update and maintain published spatial information (including published metadata) ?
- What standards should spatial information published on the Map Server comply with ?
- Where is the best location for the Map Server to be sited ?

The Land Policy papers to be prepared as part of this strategy will provide proposed solutions to some of these issues but, in other cases, more immediate solutions are required. As these solutions will “set the scene” for future interagency cooperation in mapping and LIS initiatives, these decisions will need to be carefully considered.

4.3 Registration of Land and Titles Court Judgements – Ministry of Justice and Court Administration

Although there are statutorily defined requirements for the registration of land related Land and Titles Court judgements, the actual mechanisms to implement these requirements have never (or rarely) been implemented. The Land and Titles Court records also represent a valuable data resource but, unfortunately, there is no backup of these records. There is also a desire from the Ministry of Justice and Court Administration to improve access to this information to both the community as a whole (in part to try and minimise disputes) and also within this Ministry so that court processes can be made more efficient.

There are limited computing resources within this Ministry and also limited land information expertise.

Investigations should be initiated:

1. to facilitate the registration of all future judgements of land related Land and Titles Court judgements;
2. to devise an appropriate approach to the registration of unregistered land related Land and Titles Court judgements;
3. to plan the establishment of a digital archive for all critical Land and Titles records, an associated database and software application to maintain the digital archive and database and facilitate access to the Land and Titles Court records;
4. to implement appropriate standards that will facilitate the registration of judgements, access to Land and Titles Court judgements and land information integration generally; and
5. devise an appropriate protocol between the Ministry of Justice and Court Administration and the Ministry of Natural Resources, Environment & Meteorology covering roles and responsibilities in any joint effort resulting from these investigations.

The approach to be taken in the Ministry of Natural Resources, Environment & Meteorology with respect to Land Information Integration Computerised Applications may also be relevant to the Land and Titles Courts and thus it may be possible to minimise the software application, database, and digital

archive development effort in the Land and Titles Court. The data conversion effort will still be significant.

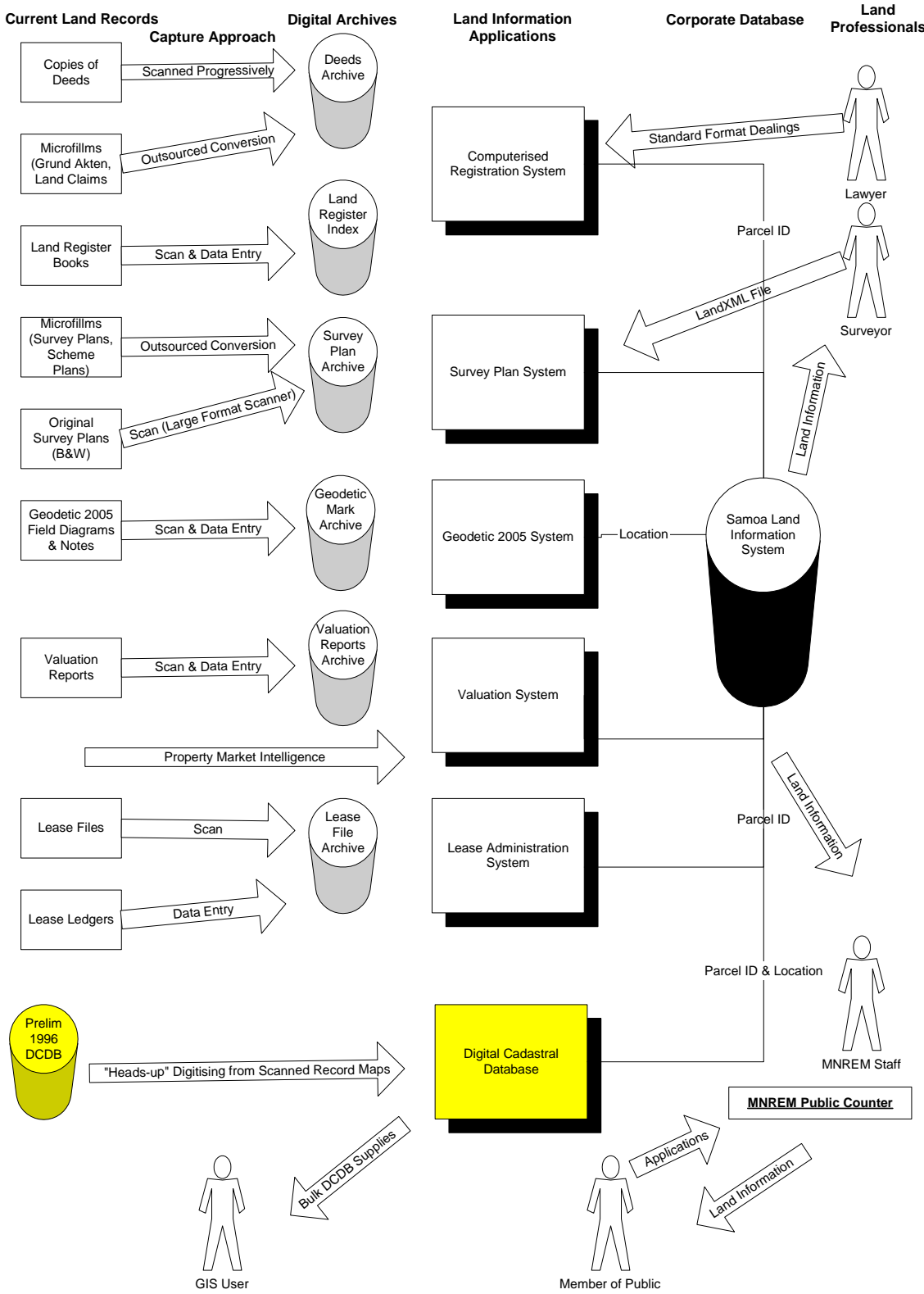
5 Computerisation of Land Information Processes

5.1 Overview

The computerisation of key land administration processes within the Ministry will require an effort in the following areas:

1. the creation of a series of digital archives of key land records;
2. the development of a new corporate database (the Samoa Land Information System);
3. the completion and upgrade of the Digital Cadastral Database (linked to the Samoa Land Information System); and
4. the development of a series of software applications to support key land information processes supporting government administrative functions, maintain the data held within the corporate database (Samoa Land Information System) and to provide information services to the staff of the Ministry, the members of the public and GIS users from a range of organisations operating in Samoa.

Proposed Samoa Land Information Integration Framework



5.2 Digital Archives

There are two drivers to move towards the creation of up-to-date digital archives of key land records.

Firstly, there is the need to recover from a disaster where original records are damaged. This need not be a sudden occurrence but could result from the deterioration of records from handling or sub-standard storage environment.

Secondly, there is a need by a wide range of public and private organisations for better access to land information. This includes within the Ministry itself. By scanning all key land records, any workstation has the capability to display and print those images without needing to resort to special readers and printers as was case with microfilms.

5.2.1 Disaster Recovery

A formal Disaster Recovery Plan should be prepared for each significant land records collection. In some cases this may identify the need for legislative changes to give legal validity to records reconstructed from digital archives.

Activities that need to be completed before a Disaster Recovery Plan is viable:

1. Existing records must be converted to digital formats (outsourced where specialized equipment is required that has no use following conversion eg survey plan microfilms);
2. New records should be scanned (or directly converted to scanned images) as a routine step in processing that record;
3. Network backup regime should be implemented which results in the regular, scheduled backup of all network directories that are repositories of digital archives and critical database including off-site storage of backup media

A Disaster Recovery Plan will need to include plans to cover all significant risks to the on-going operation of land information processes supporting government administrative functions. Of particular interest will be the plans to cover situations where original land records are lost or destroyed whether these are traditional manuscript records or digital records (scanned image archives or database records).

5.2.2 Improved Access to Land Information

The demand for land information is likely to increase dramatically once users appreciate the extent of land information held by the Ministry and other public agencies. In order to manage this demand, early initiatives should be focused on the Ministry itself including the information service provided at public counters.

As a second stage, the needs of the wider community will be considered including remote access through the internet. However, it is important that policy issues such as Data Sharing, Data Charging, Privacy Implications are carefully studied before such a move is made. It is also important that limited

software development resources are initially focused on developing applications to capture and maintain the land information.

5.3 Data Conversion

There are a number of critical one-off data conversion tasks that must be completed early in the implementation of this strategy if other subsequent initiatives are not to be delayed:

1. DCDB Upgrade and Completion (Draughting Section);
2. Microfilm Conversion (outsourced procurement);
3. Land Register Index (Land Registration Section);
4. Progressive Scanning & Indexing of all (current) Deeds Documents;
5. Scanning of all Survey Plans that have not been microfilmed (Draughting Section);
6. Capture of all Samoa Geodetic 2005 Control Mark Descriptions (Survey Section)
7. Lease File Scanning (Land Administration Section);
8. Capture of Government and Customary Lease Index & Ledger Accounts (Land Administration Section)

5.4 Hardware Requirements

The following list of hardware requirements provides an optimum environment for the Land Information Integration programme envisaged by this strategy.

The procurement advice provided to the Project Manager SIAM2 provides for two other situations where either

1. the budget (and / or actual costs for the equipment) mean that the Land Information Integration programme needs to be curtailed including both this list of hardware, the software applications and conversion tasks undertaken; or
2. it is found the budget can accommodate additional equipment which will support subsequent phases of the Land Information Integration programme.

As the use of some of this equipment will be required by different Ministry sections at different times, for different data conversion tasks and, for different steps in on-going land administration processes, it is important that this equipment is viewed as a “corporate” resource and not the property of individual sections within the Ministry.

Quantity	Description
6	PC Workstation, 15 inch Monitor, wireless enabled, protected by UPS to be connected to MNREM network. (Windows XP Professional (SP2), Microsoft Word and Microsoft Excel from MNREM corporate licence)
3	PC Workstation, 17 inch Monitor, wireless enabled, protected by UPS to be connected to MNREM network. (Windows XP Professional (SP2), Microsoft Word and Microsoft Excel from MNREM corporate licence)

Quantity	Description
1	Geodetic Laptop
1	Integrated Wireless Router, Access Point, DSL modem Unit
1	Server (to replace existing MNREM server which can then become a dedicated Web Server)
1	A3 B & W Laser Printer
1	A4 Colour Laser Printer
1	A4 B & W Laser Printer
1	A3 Scanner
1	A4 Scanner with ADF
2	A4 Scanner (no ADF)
1	Large Format Roll Scanner
9	Adobe Acrobat 7.0 Standard (to create and view scanned images)
1	Microsoft Visual Studio .NET 2003 Professional (software development)
1	Microsoft Visio Professional 2003 (system design and diagram drawing)
1	ERDAS IMAGINE (to spatially register scanned images)
3	MapInfo Professional (GIS software)
9	Anti Virus Software
1	Backup Software
2	Survey Calculation Software that can import and export (fully populated) LandXML files as an add-on to existing survey software (SDR Map)
8	HP 49GPlus Hand held programmable calculators
8	Survey calculation software for Hand Held programmable calculators

5.5 New Software Applications

Record Collection / Function	Software Application
Samoa Digital Cadastral Database (DCDB)	Digital Cadastral Database (DCDB) <ul style="list-style-type: none"> • Initial upgrade of spatial cadastral boundary data (captured in 1990s) to accurately reflect current cadastral boundaries • Add attribute data (including identifiers to enable linking with other database) • Initial data maintenance (“heads-up” digitizing of scanned new survey plans) • Improved data maintenance (import of LandXML files for new surveys) • Improved access to DCDB across all agencies

Record Collection / Function	Software Application
	<ul style="list-style-type: none"> • Add links to corresponding records in other database or archives • Add further layers to capture other cadastral lines (eg easements) or lines related to existing cadastral boundaries <p><u>Application Environment:</u></p> <ul style="list-style-type: none"> • Regular Mapinfo GIS software with only minor software (MapBasic) customisations • Based on Samoa DCDB schema • Future links to Samoa LIS located on MNREM server (MS SQL Server database and Visual Basic .NET applications) <p><u>Necessary Procurements:</u></p> <ul style="list-style-type: none"> • new Workstations with MapInfo GIS software • Large Format Scanner (also used for Digital Survey Plan Archive)
Digital Survey Plan Archive	<p>Digital Archive of Survey Plans</p> <ul style="list-style-type: none"> • Outsourced conversion of current microfilms to digital format • Scanning of all modern plans not microfilmed • Scanning of all new lodged survey plans • Remedial Digital Photography of all sub-standard converted digital plan images • Establishment of structured archive accessible to users <p><u>Application Environment:</u></p> <ul style="list-style-type: none"> • Adobe Acrobat Reader (users) and Adobe Acrobat 7.0 Standard (Draughting Section to maintain archive) • Future links to Samoa LIS located on MNREM server (MS SQL Server database and Visual Basic .NET applications) <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • Outsourced conversion of survey plan microfilms to digital images • Adobe Acrobat 7.0 Standard software package
Land Register Index	<p>Land Register Index</p> <ul style="list-style-type: none"> • Create database record for all Land Register entries affected by new registrations including owner details, parcel details, preceding and succeeding

Record Collection / Function	Software Application
	<p>land register entries and links to corresponding DCDB parcel record, digital survey plan image file and digital deeds image files (if they exist)</p> <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed)
Digital Deeds Archive	<p>Digital Archive of Deeds</p> <ul style="list-style-type: none"> • Outsourced conversion of current microfilms to digital format (Land Claims and Grund Atken microfilms) • Scanning of all new deeds presented for registration and the addition of the links to these images in the Land Register Database • Progressive back capture through scanning of old deeds as resources permit and the addition of the links to these images in the Land Register Database • Remedial Digital Photography of all sub-standard converted digital deeds images • Establishment of structured archive accessible to users <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • Outsourced conversion of Land Claim and Grund Atken microfilms to digital images • Adobe Acrobat 7.0 Standard software package
Computerised Registration System	<p>Streamline registration examination through:</p> <ul style="list-style-type: none"> • Online access to key data sources • Improved access to key data sources through computerized indexes • Investigate the possible implementation of email Registration Lodgement service • Provision of standard templates for all regular deeds (and the standardization of all new deeds to use A4 paper size) • Scanning all deeds and associated documents presented for registration • Automated "business rule" checks (through customized software utilizing information from digital Registration Abstract file) • Computerised Work Flow monitoring and

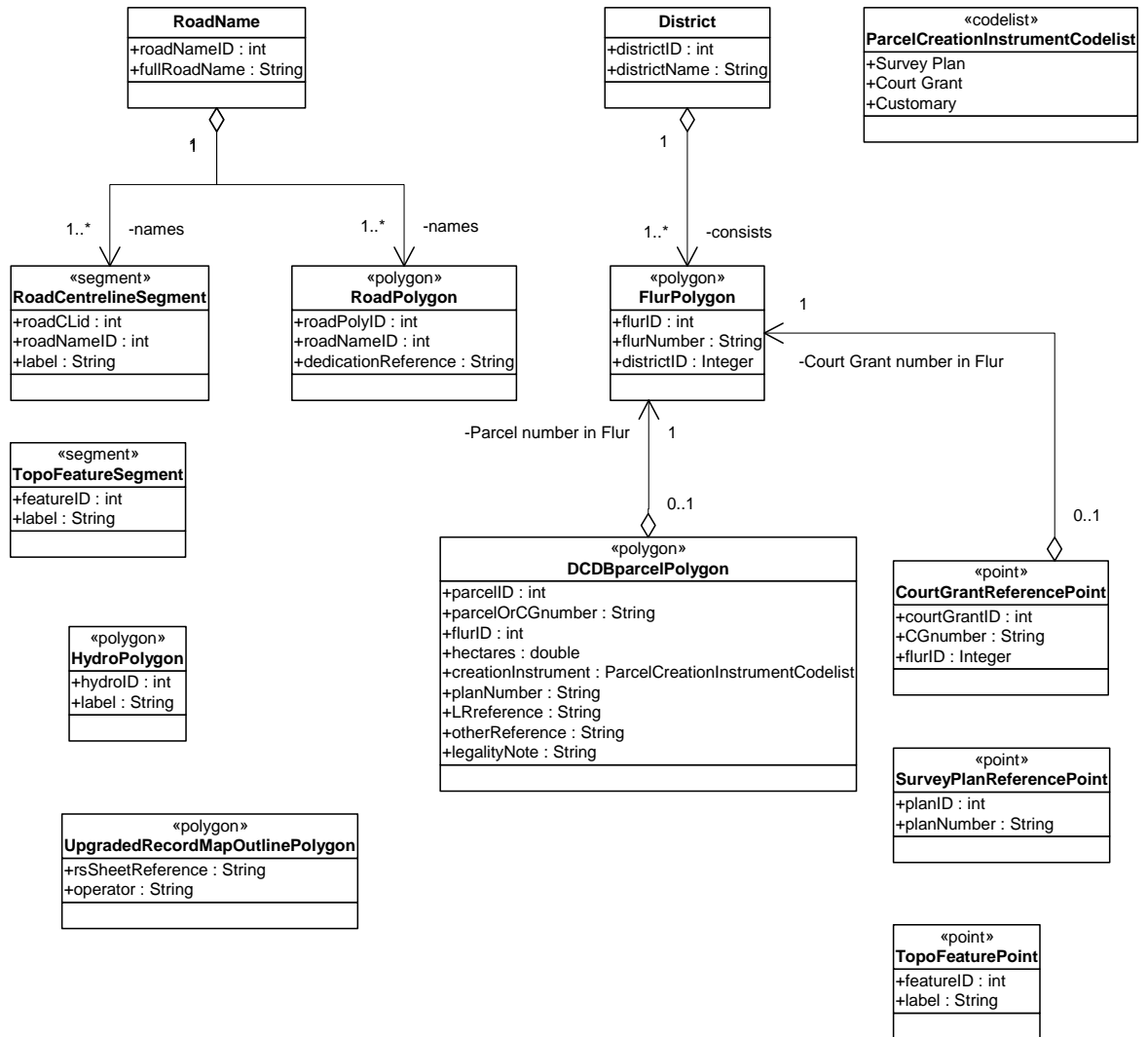
Record Collection / Function	Software Application
	<p>reporting</p> <ul style="list-style-type: none"> • Disaster recovery procedures <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed) • Workstations • A3 Scanner • A4 Scanner with Automatic Document Feeder (ADF)
Survey Plan Examination System	<p>Streamline plan examination through:</p> <ul style="list-style-type: none"> • Online access to key data sources • Improved access to key data sources through computerized indexes • Introduction of a standard survey report template (based on new Survey Manual) • Automated “business rule” checks (through customized software and the lodgement of LandXML files with new surveys) • Computerised Work Flow monitoring and reporting <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed) • A4 Scanner • Digital Lodgement of Survey Plan software package • Handheld calculators with survey software
Samoa Geodetic 2005 Application	<p>To include:</p> <ol style="list-style-type: none"> 1 Network adjustment routines 2 Coordinate transformation routines 3 Definition of new datum and associated map projections 4 A computerized record of all current geodetic stations: <ul style="list-style-type: none"> • All stations from this project’s geodetic campaign • Progressive back capture of existing geodetic marks descriptions • Software routine to accurately transform GIS files in terms of SIG to the new Geodetic 2005 datum (possibly using the NTv2 grid method of transformation) <p><u>Required Procurements:</u></p>

Record Collection / Function	Software Application
	<ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed) • 1 Workstation
Land Valuation	<p>Improve access to key records required to support land valuation :</p> <ul style="list-style-type: none"> • Online access to key data sources • Improved access to key data sources through computerized indexes • Timely provision of all conveyance and other transfers of land and leases presented for registration • Computerised access to lodged deeds to assist the valuation assessment of individual sales • Disaster recovery procedures <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed) • A4 Scanner (shared)
Lease Administration	<p>Improve access to key records required to support lease administration function in MNREM:</p> <ul style="list-style-type: none"> • Online access to key data sources • Improved access to key data sources through computerized indexes • Computerised Lease Administration Application (including Lease Ledger Accounts) • Scanning of Lease Files • Disaster recovery procedures <p><u>Required Procurements:</u></p> <ul style="list-style-type: none"> • MS Visual Studio .NET 2003 (shared with other Samoa LIS software applications to be developed) • A4 Scanner (shared)

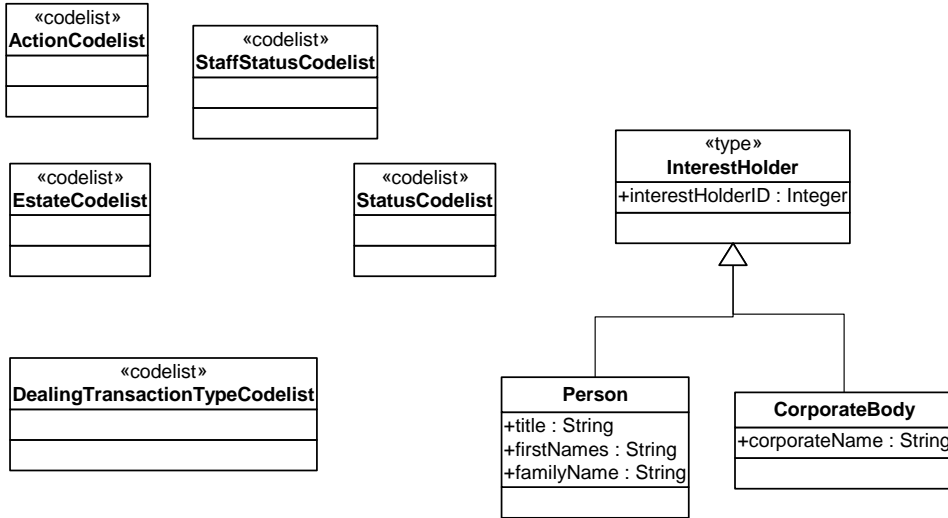
5.6 Implementation Plan

The scope and phasing of Land Information Integration initiatives is dependent on what equipment can be procured. As the exact budget available for this equipment has not been finalised, the description of the implementation plan will only be included in subsequent version of this strategy.

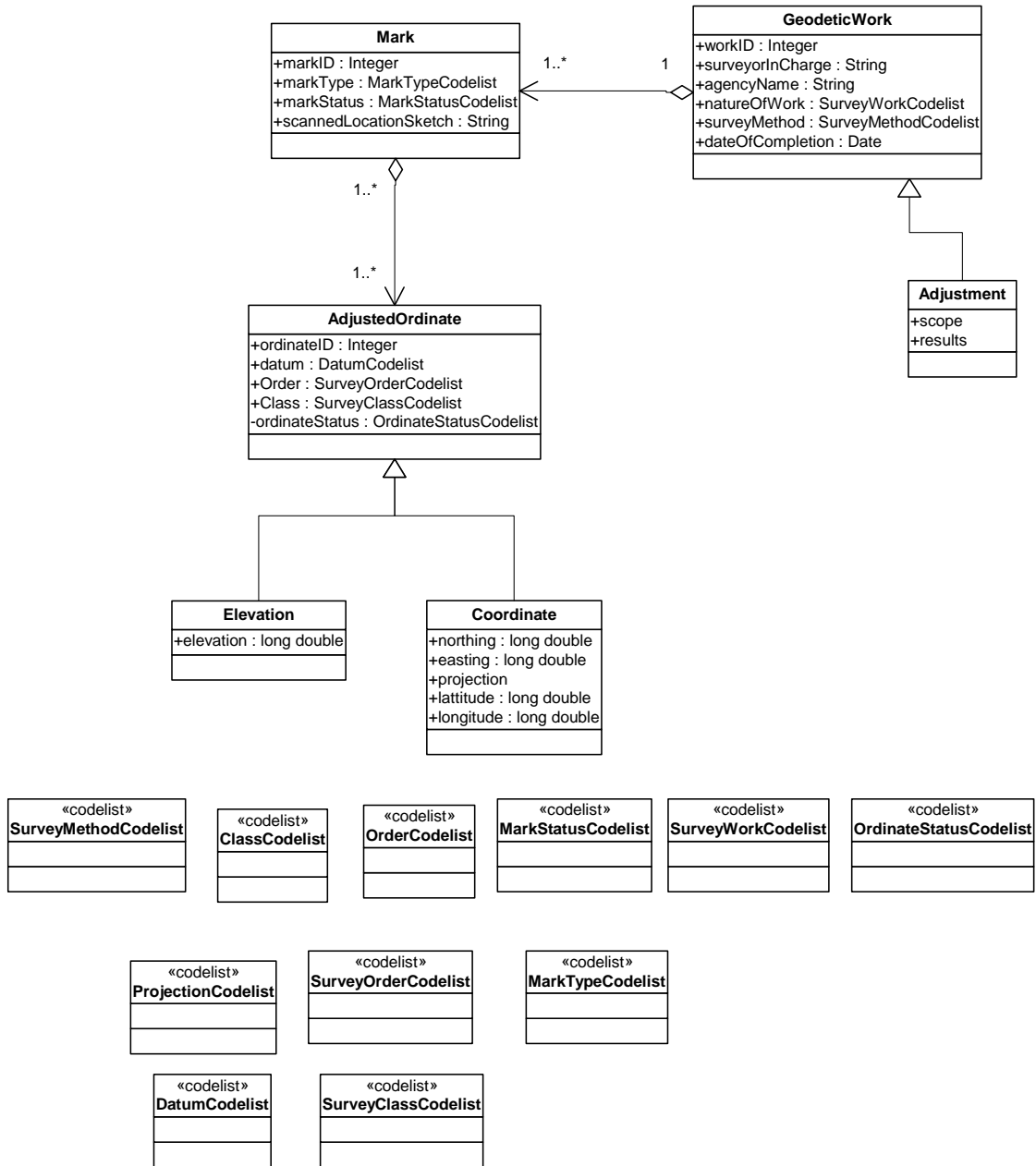
Appendix A Land Information Integration Data Model



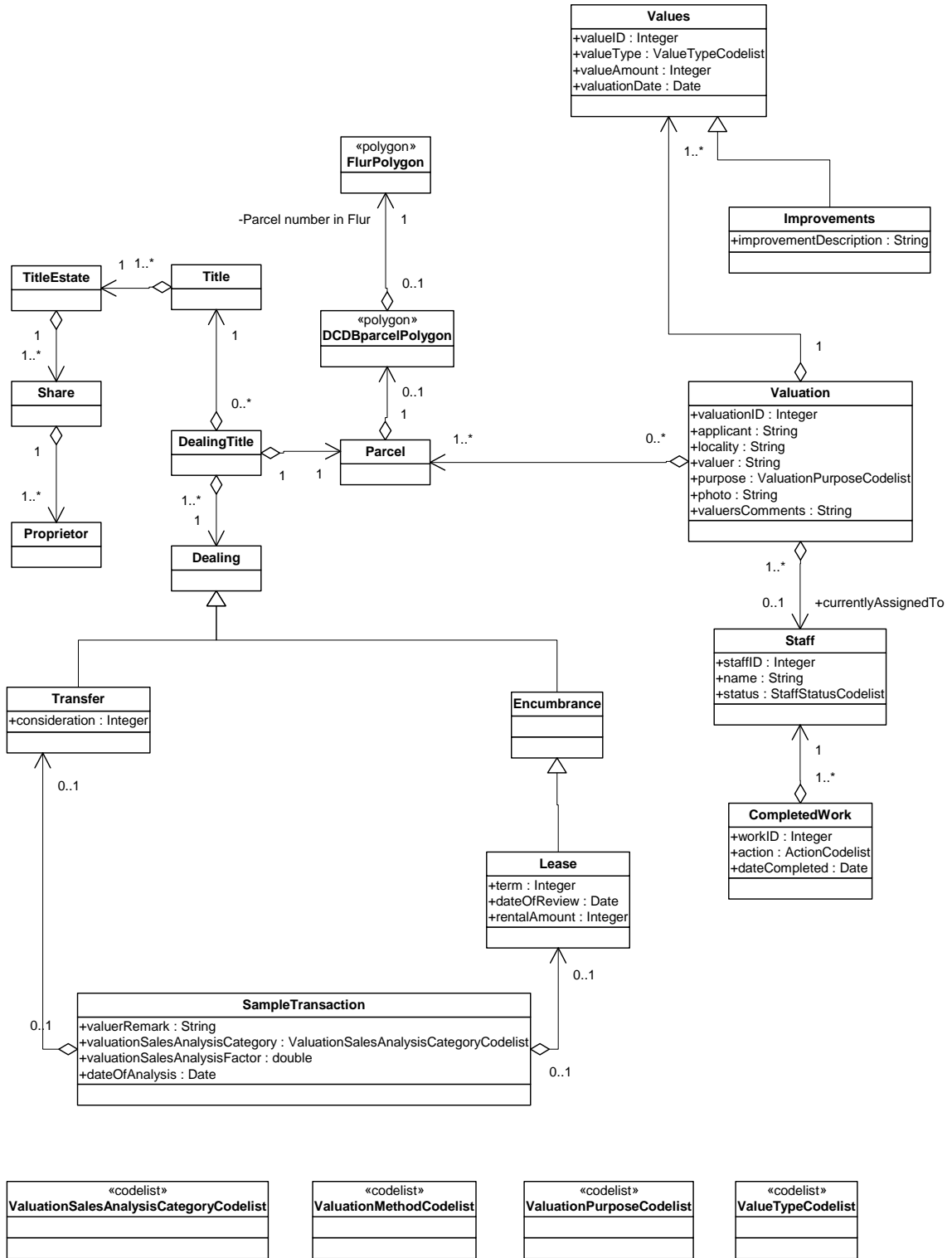
UML Class Diagram 1 – Digital Cadastral Database



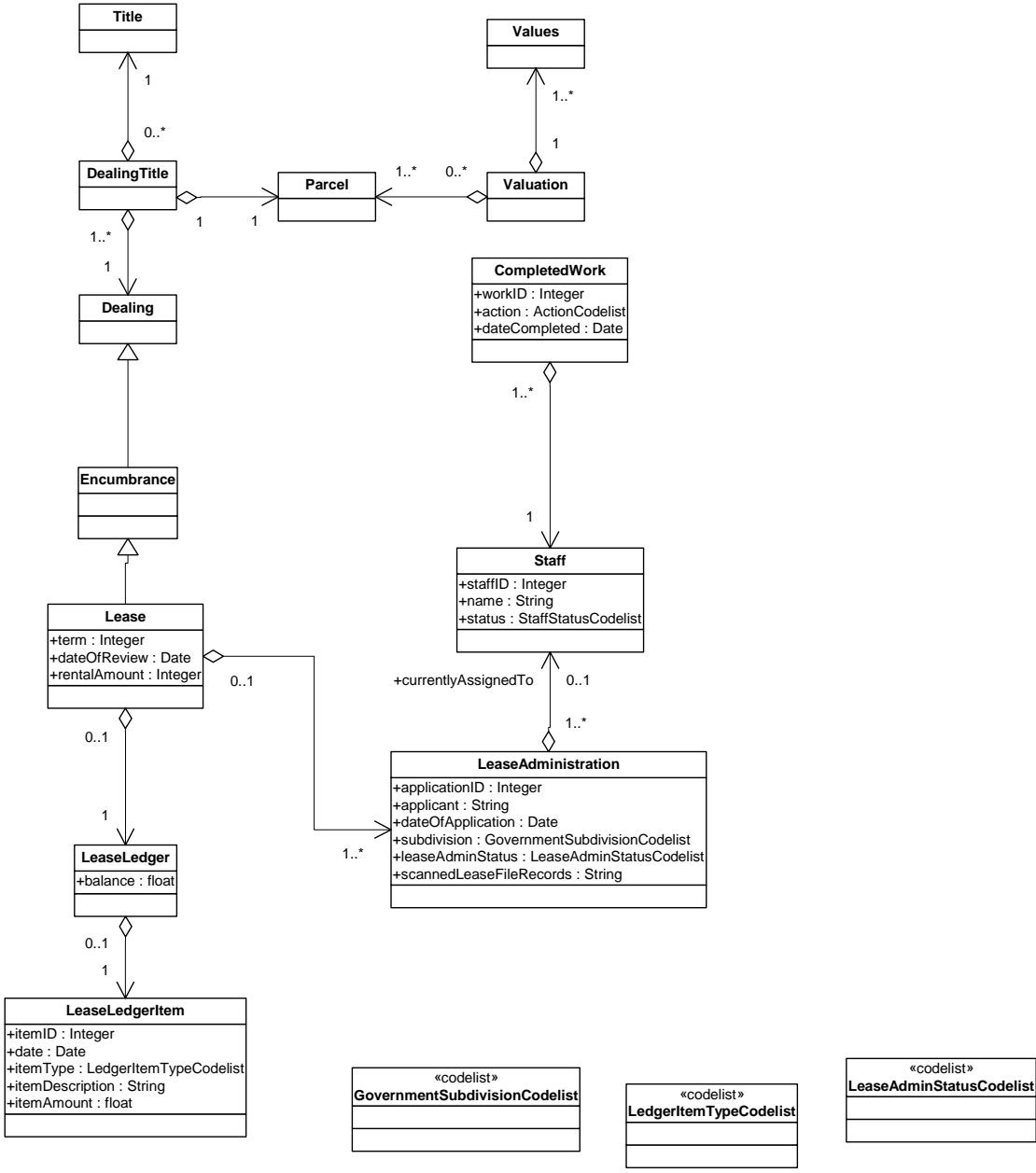
UML Class Diagram 2 continued – Land Registration System (Codelist and Type Definitions)



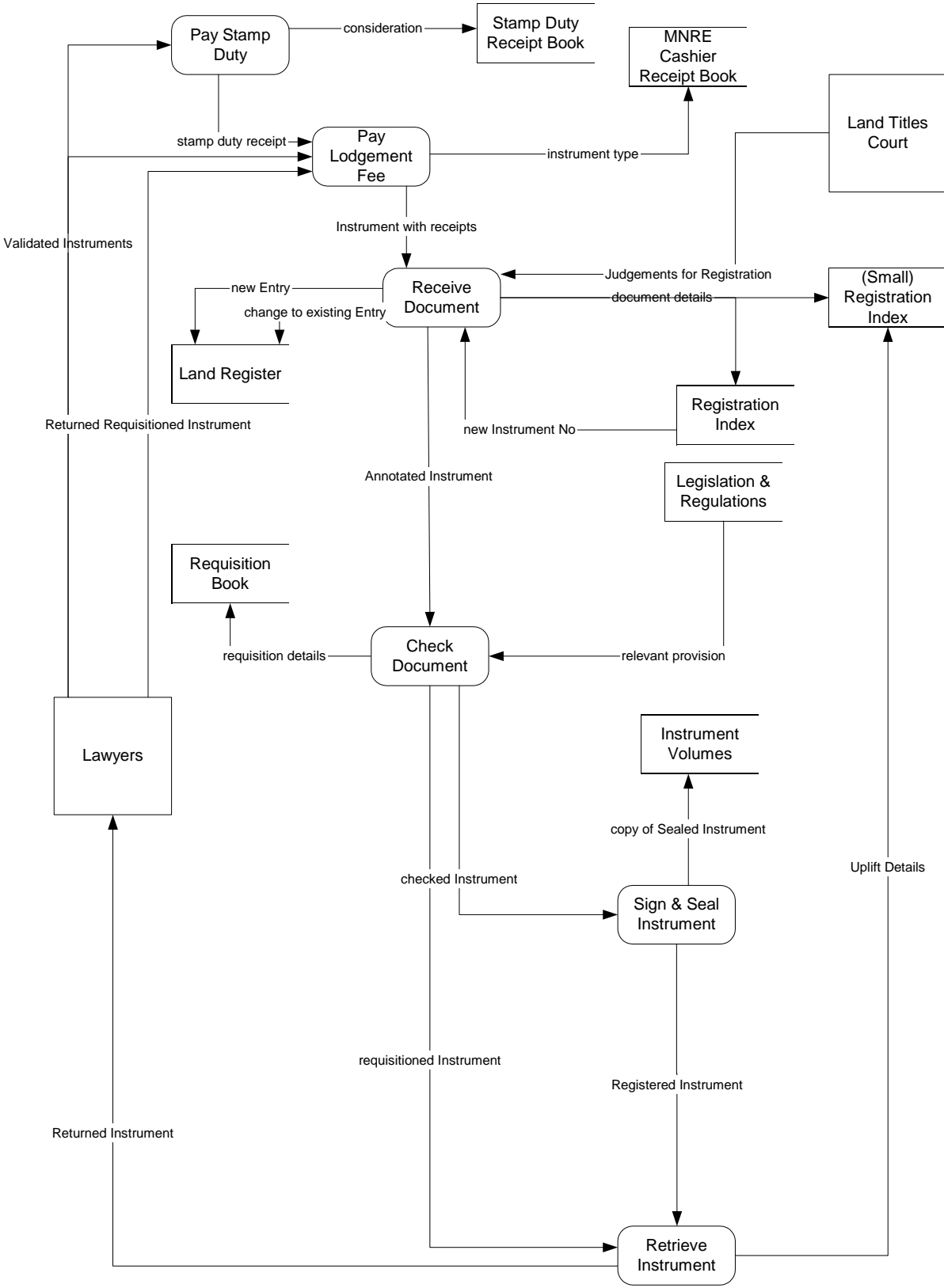
UML Class Diagram 3 – Geodetic Survey System



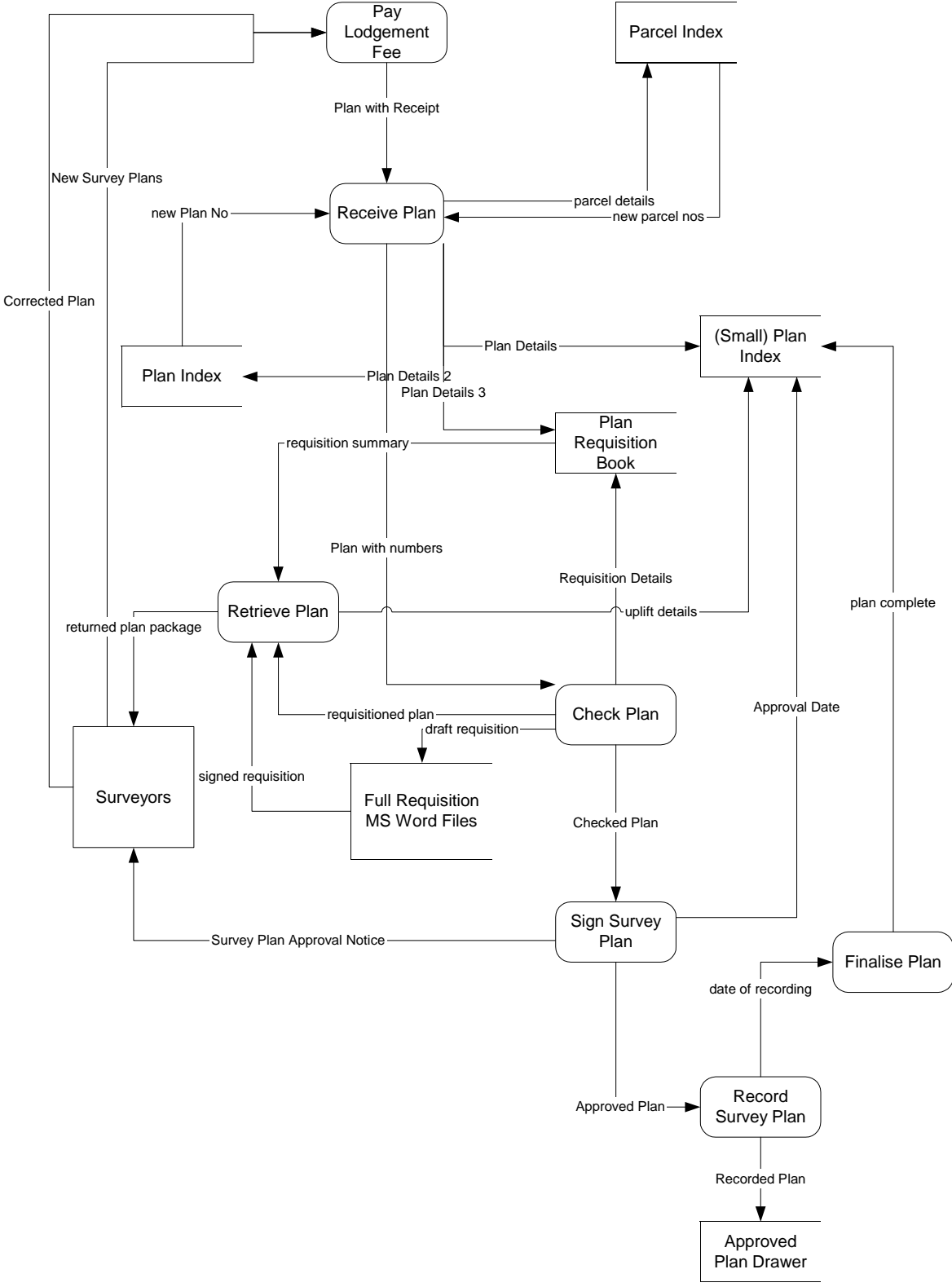
UML Class Diagram 4 – Valuation System



UML Class Diagram 5 – Lease Administration System



Land Registration Process



Survey Plan Process