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# Property Interests Product (PIP) Collaborative Research Project

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## **Information Infrastructure Modelling for the Property Interests Product**

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**(DRAFT)**

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**A Joint Government and Industry Research Initiative for  
the Development of the Queensland Spatial Information  
Infrastructure (QSII).**

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# 1 INTRODUCTION

## 1.1 Background

In the 1980's a great deal of effort was put into the conceptual development of Land and Geographic Information Systems. At the beginning of this period organisations commonly operated in isolation collecting and maintaining their own data in support of their respective functions. This approach created serious problems such as data duplication and data incompatibility between agencies, many of which used the same types of data.

Organisations throughout a wide range of disciplines were quick to seek the benefits offered by applying this concept to the rapidly developing technology. The promotion of these concepts made it clear that simply automating individual systems or functions alone would not achieve the optimum advantage from the vast amounts of land-related data that it had become necessary to collect.

Now, at the end of the 1990's, with the technological capabilities far exceeding those of the 1980's, and with vast amounts of resources having been directed towards the development of systems dealing with land-related data, difficulties are still being experienced in realising the full potential of this concept.

The underlying principles promoted at the highest levels of many government agencies during this period are much the same as those promoted now in the development of a Property Interests Product (PIP).

## 1.2 PIP Development

The concept of a Property Interests Product, as identified by the Property Interests Product Specification Project (April 1998), involves the integration and presentation of a broad range of data that is held across a number of different State and Local Government agencies. Throughout these organisations this data is held in differing formats, conforms to different standards, is duplicated both between and within agencies, and has varying levels of quality. In addressing these issues, the development of a Property Interests Product will require the application of data management principles and strategies that will provide for:

- Optimum use of data held by agencies
- Minimal or controlled duplication of data across and within agencies
- Maximum integration of data resources
- Adoption of standards
- Economic efficiency of data storage and application
- Value-adding to data
- Adoption of a "global perspective" to data management by considering data resources in their broadest context, not just within the bounds of a particular agency

The component of the Property Interests Product Collaborative Research Project (PIPGRP) addressed in this report concerns:

- developing a data model to help in understanding the data associated with the PIP
- identifying the data requirements of the PIP prototype based on the data model
- addressing the issues identified above to develop a strategy whereby the required data can be meaningfully integrated to provide a functional PIP
- assessing the resources required to upgrade and integrate data for further implementation of the PIP throughout the State

## 2 DATA OVERVIEW

The concept of a Property Interests Product includes land-related data in the form of graphical representation, relating the spatial relationships (Graphical Data) and in the form of attributes of the land itself (Attribute Data).

**Graphical data** files are digital representations of spatial entities. It can be represented in the form of:

- Points – which represent the location of features or events, for example a bore hole, a soil sample site, a crime occurrence
- Lines – which represent linear features, for example a road network, a waterpipe or powerlines
- Polygons – which represent areal features, for example a land parcel, an environmental area, land subject to flooding

**Attribute data** consists of textual descriptions or properties, which may be associated with spatial (or graphical) entities. Typical examples are:

- Parcel Identifier
- Valuation Number
- Land Use Category
- Sale Price

Specific data requirements for a Property Interests Product and the prototype development are dealt with in Section 5 of this report.

## 3 DATA INTEGRATION

### 3.1 Integration of Graphical Data

The integration of various sets of graphical data requires that the various types of spatial references can themselves be integrated. To achieve this, linkage mechanisms such as a spatial overlay system or coordinate linkage is required.

For the purposes of this project data integration is addressed only from the perspective of attribute data, however one major issue that does require attention is

readily obvious. This concerns the integration of the graphical representations of cadastral boundaries of the DCDB and mining lease boundaries of MERLIN. To maximise the capability and functionality of PIP this issue requires consideration.

*R3.1 In regard to integration issues concerning graphical data, this report recommends:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC establish a working group to investigate integration issues associated with graphical property interests data.	QSIIC Products Committee	Establish a suitably skilled technical working group with representation from appropriate agencies and academic institutions to: (a) investigate issues concerning the integration of graphical data associated with the PIP, priority being given to the integration of DCDB and MERLIN lease boundaries. (b) investigate issues associated with the integration of graphical data associated with further products.

### 3.2 Integration of Attribute Data

The integration of attribute data files is made possible through the use of a common identifier or key. A number of these data keys may exist in any one data set, with one usually being designated as the primary key. Some attribute data may be duplicated across databases but are not used as keys whereas other types of attribute data are unique to only one database. These three categories of attribute data are summarised as:

- Data Keys (used to link data sets)
- Duplicated Data (that is not a data key)
- Unique Data (occurring only in one location)

Each of these categories requires different consideration when dealing with quality (see Section 4.2) and the application of standards (see Section 4.3).

The data modelling exercise described in Section 5 of this report identified into which of the three data categories each PIP data element falls.

Issues arising from the duplication of data are a major focus of the information hypothesis of the Property Interests Product being tested through the PIPCRP prototype development. This hypothesis is that significant information management efficiencies can be gained by agencies through managing only the information for which that agency is the custodian and accessing other needed information as required. In achieving this, many of the problems associated with data duplication

would be overcome as information interchange between agencies would occur in the following three ways:

- Transactional online access in real time
- Bulk or batch transfer at customer determined intervals
- Transactional update based on custodial agency business activity

## 4 DATA INTEGRITY

### 4.1 Metadata

An important factor when integrating data from different sources is to know as much as possible about that data. ANZLIC (1996) consider that if community access to land information is to be maintained, adequate descriptions of the characteristics of all geographically referenced datasets must be available and accessible to the community at large.

*R4.1 In regard to obtaining appropriate metadata for data associated with the Property Interests Product, this report recommends:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC encourage each agency providing property interest data to capture core level metadata using the ANZLIC Metadata Standard.	QSIIC Standards Committee	Promote the benefit of the ANZLIC Metadata Standard and the value of including all collected metadata in the Queensland Spatial Information Directory (QSID).

The resource requirements for metadata collection for Local Government information was estimated using information gained by undertaking this task for the data held by Caloundra City Council.

One metadata component of particular concern when integrating data deals with the quality of the data. Integrating different data sets can have the effect of at best, compounding any discrepancies that exist, and at worst, prohibiting the possibility of integration altogether. The ANZLIC Metadata Guidelines (1996) specify five elements that are associated with data quality:

- Lineage
- Positional Accuracy
- Attribute Accuracy
- Logical Consistency
- Completeness

Whilst all of these elements are important, data integration requires special consideration to be given to attribute accuracy. This also has relevance to the classification system used to assign values to the features in the dataset and the

standards to which they comply. As previously discussed, the importance of attribute accuracy to integration will be different depending on the role a particular data element plays in linking one data set to another.

## 4.2 Quality Benchmark

The Property Interests Product Specification Project (April 1998) provided broad error tolerance guidelines for each of the six sub-products that it specified. These are shown in the document "PIPCRP Product Specifications" and reproduced in Appendix 1, which also provides useful information on possible error types, their results and impacts on the benefits of the sub-products.

The data modelling exercise undertaken for this project did not investigate aspects of data quality any further than the information described above, however indications were that data quality of data sets required for the Property Interests Product is currently quite variable. For example, in some cases, quality levels within individual datasets varied considerably depending on aspects such as capture date.

The error tolerances shown in Appendix 1 provide a preliminary data quality benchmark that can be applied to data required for the PIP. As the applications of the redesigned sub-products become better understood, these benchmarks will require further examination and confirmation.

With respect to the data categories identified in Section 3.2:

- Data keys require the highest quality. Errors here will result in the inability to link datasets
- Duplicated data requires quality suitable for specific applications. Errors here may show up as inconsistencies between data sets
- Unique data requires quality suitable for specific applications. Errors here will not be readily detectable

It will be necessary to identify whether dataset quality currently falls below that required for the PIP and to assess the resources required to improve quality to desired levels.

Aspects of validating and upgrading the attribute accuracy of PIP data, and a relevant strategy to achieve this are addressed in Section 7 of this report.

**R4.2** *In regard to quality benchmarks for PIP data, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC recommend that agencies publish the quality standard to which they will provide property interests information (as part of a Service Charter).	QSIIC Standards Committee	Agencies will be required to validate service standard against preliminary quality benchmarks set by the PIP Specification Project to actual applications of the PIP.

### 4.3 Standards

One of the most fundamental problems encountered with the integration of disparate data systems concerns the compatibility of the data itself. Without data compatibility the integration of diverse data sets is not possible. Data compatibility involves standards. A number of factors have caused standards and standardisation to be one of the enigmas of GIS development, these include the following:

- Standards frequently do exist but are not documented as formal rules or practices
- A standard or set of standards might be developed by some agencies and not adopted by others for political, logical, technical or other reasons
- Even if there are agreements in principle, differences in methods for achieving standards frequently arise

Issues such as these are addressed in the following sections of the PIPCRP Market Infrastructure Framework Report:

#### 8 Standards and Coordinating Functions

##### 13.2.1 Detailed conclusions concerning standards and coordinating functions – Technical standards

##### 14.2.1 Detailed advice concerning standards and coordinating functions – Technical standards

The investigations undertaken in preparing this report support the Market Infrastructure Framework Reports' advice:

"Recognising the importance of standards in making prudent business investments and the economies of scale available by preparing and making available comprehensive information on standards to industry participants, that the Queensland Spatial Information Council (QSIIC) establishes a Standards Committee representative of the Queensland spatial information industry to do the following:

- (a) consolidate information on existing and emerging technical standards having relevance to development of the Queensland Spatial Information Infrastructure (QSII).
- (b) consider issues peculiar to the QSII where existing standards do not suffice."

#### 4.3.1 Standards Issues

The objective of the Property Interests Product is not to impose restrictive standards upon agencies. The following provides a guide to how data standards should be treated for each of the three data categories identified in Section 3.2.

**Data Keys:**

The strongest requirement for standardisation concerns that data which is used as data keys. The data modelling exercise identified that the primary keys used to link the majority of PIP attribute data are:

- Parcel Identifier (Lot / Plan Description)
- Property Address

Standards are already in existence for Parcel Identifier and Rural Road Addressing.

*R4.3 In regard to standards for "Data Keys" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC promote the application of data standards for property interests data keys.	QSIIC Standards Committee	<ul style="list-style-type: none"> <li>• Promote the application of the Parcel Identifier Standard (August 1997) and the draft Australian Rural Road Addressing Standard for property interest data keys.</li> <li>• Give priority consideration to standards associated with Urban Street Addressing</li> </ul>

Of relevance to these two primary keys is the recent development of the Property Location Index (PLI). The PLI was developed by DNR from a QSIIC decision to build this fundamental dataset which contains two components, street address and its associated cadastral lot/plan identifier. In developing this dataset, it was acknowledged that Local Government is the custodian of street addressing information and DNR is the custodian of parcel identifier information.

**Duplicated Data:**

If data is duplicated, it should logically conform to the data standard of the source from which it was obtained. Inconsistencies may arise here where two replications of the same data become unsynchronised or translation errors occur. The presence of errors can also be evident where there is a time lapse between the updating of one database from another. These errors are however automatically overcome once scheduled updating of the database occurs.

Of greater concern are situations where more than one agency collects the same data. With the duplication that occurs here the possibility for inconsistency is far greater, as is the likelihood of more than one data standard being used for the same type of data. An example of where this has occurred can be seen in the case of land use data.

In situations where it is unavoidable for different agencies to maintain the same type of data using different data standards, it is important that these standards are well documented and the recording of data based on them have internal consistency. This will facilitate ease of translation between one standard and another. This situation should only occur where the possibility of developing or adopting a single standard has been discounted.

**R4.4** *In regard to standards for "Duplicated Data" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC commissions the Standards Committee to identify standards issues associated with duplicated property interests data.	QSIIC Standards Committee	Duplicated property interests data elements (identified in Table 6.1) are assessed to ascertain what, if any issues require addressing with respect to data standards.

**Unique Data:**

With respect to data standards, this project discerned two types of unique data:

- (a) Data of a type that is specific to a single agency, eg. Exploration permit data is held only by DME. This type of data is truly unique. It is not duplicated in other locations and does not have problems associated with incompatibility.
- (b) Data that is unique and relevant to a particular geographic area, but that "type" of data is held by more than one agency eg. Sewage infrastructure data, which is held by most Local Governments. In this sense, this "type" of data is duplicated across many agencies but the data itself is not duplicated.

In this case it will not be appropriate to specify standards to which all occurrences of a data element of this type should comply, ie. All local governments will not be required to have their sewage infrastructure data conforming to a single standard. Instead of prescribing standards, the requirement will be that individual agencies apply an "appropriate" standard to their data for which the agency can provide documentation and internal consistency. In doing this different standards will exist for the same types of data. Because they do have internal consistency and known quality, the processes of the Property Interests Product technical architecture will have the capability of translating between different standards used in different agencies. Metadata collected for the associated data will provide a basis for doing this. For the presentation of PIP information to users, the QSIIC Standards Committee will be required to recommend appropriate standards.

Whilst it is not proposed to prescribe standards for this type of data, progress and simplification of PIP procedures would be enhanced by a collaborative approach to standardisation of data by agencies involved and the QSIIC Standards Committee.

**R4.5** *In regard to standards for "Unique Data" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC recommend that where unique data is of a type that is specific to one agency, an appropriate standard be adopted, details of which are to be provided by the responsible agency to the QSIIC Standards Committee.	QSIIC Standards Committee	Agencies responsible for specific unique property interests data provide documentation of the data standards for that data to the QSIIC Standards Committee. This standard should be adopted consistently across an agency. The Committee is to be advised of any amendments or proposals to amend these standards.
QSIIC recommend that where a unique data "type" has multiple occurrences across a range of agencies, eg infrastructure data: <ul style="list-style-type: none"> <li>- existing data standards are evaluated</li> <li>- a preferred data standard is identified for property interests data presentation purposes.</li> </ul>	QSIIC Standards Committee	Existing standards are to be identified and evaluated. A preferred standard is identified for property interests data presentation purposes.

## 5 PIP DATA MODEL

### 5.1 Model Development

An understanding of the PIP data was gained by developing a high-level data model. This model was required as input to the technical component of the project, identifying data requirements in terms of individual agencies involved and the databases in which the data is held.

The initial objectives of the data model were to identify:

- the data requirements of the Property Interests Product for a full product specification;
- the data requirements relevant to the PIPCRP prototype development (a subset of the above);

- which agencies store each data element identified by the data requirements;
- which agency is considered to be the authoritative source of a data element.

The first step in determining data requirements for prototype development of the PIPCRP involved rationalising the information produced by the PIP Specification Project (April 1998). This produced the document "PIPCRP Product Specifications" which provides detailed information for each of the original six PIP sub-products. This document was then refined to identify specific data requirements for each of these sub-products. These data requirements are presented in the document "PIP Data Requirements".

The data model was developed by constructing a questionnaire based on these specific data requirements identified for the full development of the PIP. The questionnaire was designed to identify:

- which agency held the data element
- the authoritative source of the data element
- how the data element is updated and maintained
- if updated information is forwarded elsewhere
- how the data element is stored

The questionnaire was forwarded to those agencies participating in the PIPCRP, which hold property interest data. These agencies surveyed are identified in Table 5.1, and the questionnaire forwarded to each of these can be seen at Appendix 2.

<b>State Government</b>
Department of Natural Resources
Department of Mines and Energy
Department of Environment and Heritage
Department of Communication, Information, Local Government and Planning
Department of Main Roads
<b>Local Government</b>
Balonne Shire Council
Brisbane City Council
Cairns City Council
Caloundra City Council
Gold Coast City Council

**Table 5.1**  
**Agencies Providing Input to Data Model**

The results of the survey were analysed to produce the high-level data model shown in Appendix 3. This model identifies each graphic data element and its associated attribute data elements, the authoritative source and the information systems in which the data is held.

## 6 PIP PROTOTYPE DEVELOPMENT

### 6.1 Prototype Product Specification

The model shown in Appendix 3 represents the data that would be included in an idealistic implementation of a fully developed PIP. In reality not all of this data can be accessed by a Property Interests Product. Some data are only held in hard copy format, eg. some infrastructure data. Much of the data that is held digitally was found to be in databases on systems that can not be automatically accessed for integration as is required for such a product.

The PIP prototype therefore required the information represented in Appendix 3 to be further investigated to identify which data is currently held in a form suitable for some level of integration (ie, is automatically accessible). This investigation involved only those agencies participating in the physical development of the prototype, ie DNR, DME, DEH, Caloundra City Council and Balonne Shire Council.

A further refinement for the purposes of the prototype was also required. The Property Interests Product Specification Project (April 1998) provided the specifications for six individual PIP sub-products. These sub-products represented an idealistic view of the data requirements of a broad range of users of property interests information.

The PIPCRP has developed a prototype by taking into consideration the complexity, availability and quality of the data requirements presented in the original Product Specification report. This has resulted in the restructuring of the six sub-products into three broader based service oriented products and a reduction in the number of data elements. A fourth additional Metadata service has also been included. The PIP prototype is therefore specified in terms of the four services outlined below:

#### **Development Proposal Analysis Service**

This service is the initial entry point for early feasibility analyses for many land development proposals. Potential development areas within an area of interest can be located and the presence or absence of certain development restrictions can be ascertained.

#### **Tenure and Survey Analysis Service**

This service will allow users to identify various legal interests (ie. Titling details, valuation details, etc.) associated with selected cadastral parcels and selected mining polygons (ie. Mining tenure details). This service will also allow users to identify detailed survey information (ie. Permanent survey marks, survey plan history, etc.) associated with selected cadastral polygons and/or mining polygons.

#### **Built Environment Analysis Service**

This service will identify various utility infrastructure (ie. Water, sewage, stormwater, etc.) and building approval information (ie. Applications, permits, footprints, etc.) available for cadastral polygons.

## Acquire Dataset Service

This service will allow the user to identify the availability of spatial datasets within Queensland. A user will identify an area of interest on a keymap to search for spatial datasets and then has the option to select search criteria restrictions before initiating the search for spatial datasets.

High-level data models developed for the three individual sub-products of the PIPCRP prototype can be seen in Appendices 4,5 and 6. Appendix 7 provides an overview of the data that is contained in these models where it is presented in terms of the information themes to be used within the prototype development.

## 6.2 Issues Identified

As work progressed on the data model it became clear that some aspects concerning authoritative source and custodianship were misinterpreted. Some aspects may need to be reconfirmed at a later stage however the information presented here provides a good guideline.

Some of the major information issues associated with the Property Interests Product concern data duplication. A further complication to data duplication occurs when it is not clear who is the authoritative source for the data. Analysis of the information gathered to produce the data model enabled the development of Table 6.1 which identifies data which is duplicated across the range of agencies participating in the PIPCRP as well as data where more than one agency has been nominated as the authoritative source. In most cases data with multiple authoritative sources presents an issue that will need clarification and resolution, these are highlighted. Those multiple authoritative source datasets not highlighted do not present a major issue as they are related to the scale of the data involved and will inherently be sourced from multiple agencies.

As indicated in Section 3.2, the information hypothesis for the Property Interests Product aims to overcome many of the problems associated with data duplication by interchanging data between agencies in the following three ways:

- Transactional online access in real time.
- Bulk or batch transfer at customer determined intervals.
- Transactional update based on custodial agency business activity.

Issues associated with the application of these hypotheses to the PIP will be identified and assessed when the PIP Technology Infrastructure is implemented in the form of a functional prototype. Once this has been undertaken it will then be possible to develop an open specification for information architecture and services.

**R6.1** *With regard to the identification of more than one authoritative source for a particular data type, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
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QSIIC establish a team to resolve multiple authoritative source issues for property interests data.	QSIIC Infrastructure Committee	A team representative of both State and Local Governments addresses multiple authoritative source issues highlighted in Table 6.1 of this report.
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<b>Duplicated Data</b>	<b>Single Authoritative Source (No issues)</b>	<b>Multiple Authoritative Source (Issues to Resolve)</b>
<b>Cadastral Parcel</b>		
Lot #	DNR	
Plan #	DNR	
Parcel Area	DNR	
Easement	DNR	
<b>Title Related</b>		
Title Reference Number	DNR	
Tenure	DNR	
Owner/Lessee	DNR	
Title Type	DNR	
Dealing Number	DNR	
Tenancy Type	DNR	
Share	DNR	
Associated Lot/Plans	DNR	
<b>Valuation Related</b>		
IVAS Property Number	DNR	
Valuation Number	DNR	
Property Address (Owner)	Local Government	
Property Address (Physical)	Local Government	
Unimproved Value	DNR	
Date of Valuation	DNR	
Sale Price	DNR	
Land Use Code		DNR and Local Governments +
Land Use Description		DNR and Local Governments +
Zoning	Local Government	
<b>Constraints</b>		
Contaminated Site Information		DEH + Local Government
Heritage Site Information		DEH + Some Local Governments
Pollution Licensing		DEH + Some Local Governments
Unexploded Ordnance		DEH or Defence
Erosion Zones		DEH + Some Local Governments
Soil Information		AUSLIG, DPI Local Governments
Vegetation Development Constraints		DEH + Local Government
Wildlife Development Constraints		DEH + Local Government + Museum
<b>Topographic Contours</b>		AUSLIG, DNR, Local Governments
<b>Natural Drainage and Watercourses</b>		AUSLIG / DNR
<b>Road Network</b>		DNR, ERSIS, Some Local Governments
<b>Local Government Boundaries</b>	DNR	

**Table 6.1  
PIP Duplicated Data**

## 7 VALIDATION AND UPGRADE PROCEDURES

To achieve PIP objectives, it is necessary to specify a strategy to validate and upgrade the associated data to the desired quality levels referred to in section 4.2 of this report.

The following outlines at a high level, a five stage validation and upgrade strategy for all data associated with the PIP:

Stage A – Validation and Upgrade of Data Keys

Stage B – Validation and Upgrade of Duplicated Data

Stage C – Validation and Upgrade of Unique Data

Stage D – Impact Analysis

Stage E – Maintenance

### 7.1 Stage A – Validation and Upgrade of Data Keys

Stage A is required to enable the validation and upgrade of the data keys to databases that hold duplicated data. Both Stages A and B require that duplicated data sets held in separate databases be brought together on one database and compared against each other. This process identifies errors and inconsistencies between the two.

The procedures developed for the validation and upgrade of data keys and duplicated data of the PIP were modelled on those developed for the Local Government Interface Project (July 1996). This Project established a separate system to process all data captured for that project. The system, called the **Statewide Local Authority Information Bin (SLAB)**, ensured that the integrity of the data and service performance of systems was not adversely affected during the project. The SLAB stored data only for the duration of the validation process and was not designed to retain or maintain data on an ongoing basis. It contained only information supplied by a duplicating agency and the corresponding information extracted from the databases of the authoritative source.

This process compares data sets and derives error reports requiring further investigation. Errors are automatically corrected where appropriate, with a record of change maintained for acceptance checking or easy rollback if required. The process has the capability to produce error reports and validated data files, which will then be passed to the duplicating agency and others as required for review using an error browser.

## 7.2 Stage B – Validation and Upgrade of Duplicated Data

Once the keys to individual databases have been matched by undertaking Stage A validation and upgrade, Stage B, where other duplicated data sets are validated, can be undertaken. The objective of this stage is to improve the integrity of data elements that are duplicated in more than one database to equal or exceed agreed levels of attribute accuracy as referred to in section 4.2. Procedures for undertaking this stage are similar to those used in Stage A.

For each data type (grouping of data elements), this will involve:

- Providing an overview of the data and its application
- Identifying the responsibilities of the authoritative source with respect to validation and upgrade
- Identifying the responsibilities of each duplicating agency with respect to validation and upgrade
- Specify the outcome of the validation and upgrade process

## 7.3 Stage C – Validation and Upgrade of Unique Data

The objective of this stage is to ensure that unique data that can not be validated against any other data, has quality that equals or exceeds agreed levels of attribute accuracy as referred to in section 4.2. Responsibility for the integrity of this data rests with the agency identified as authoritative source and most importantly concerns internal consistency and conformance with an identified data standard.

## 7.4 Stage D – Impact Analysis

Any impact that alteration to data records made as a result of the validation process needs to be considered. One example of where an impact does occur is in the area of valuations. If any change is made to records concerning land use, zoning or services, it may also be necessary to revalue a particular parcel of land.

*R7.1 In regard to upgrading data in databases associated with the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC establish a team to investigate and evaluate the impact of alterations made to property interests data as a result of data upgrade.	QSIIC Infrastructure Committee	Investigate and evaluate the impact of alterations made to property interests data (as represented in Appendix 7) as a result of data upgrade.

Having identified the impact of such changes it will be necessary to ensure that the implication of change is accommodated after upload.

## 7.5 Stage E – Maintenance

The validation and upgrade of databases will occur at a point in time. Once this is achieved it will be necessary to ensure that integrity is maintained on an ongoing basis. One of the information hypotheses of the PIPCRP is "transactional update based on custodial agency business activity". Aspects of this issue are addressed as a component of the PIP Market Infrastructure Framework Report (See section 7.2 Production Functions – Maintaining and Updating).

## 8 CALOUNDRA TRIAL VALIDATION AND UPGRADE

An important step towards enabling the integration of information from different databases is Stage A where database keys are validated and upgraded. If this has not occurred it is possible that integration of data may not be satisfactorily achieved.

To facilitate the development of the PIPCRP technical prototype and to estimate resource requirements for extension of the PIP validation and upgrade procedures a trial of the Stage A procedures is being undertaken using the relevant data over the Caloundra City Council area.

The trial involves the Stage A activities that will enable the integration of the AS/400 rates database of Caloundra City Council with the CISP, DCDB, IVAS and ATS databases of the Department of Natural Resources. With the exception of ATS, the validation of these databases has progressed to a stage where further resource estimates can be made. Resources have not been available to commence validation procedures for ATS.

The data validation and upgrade activities undertaken for the PIPCRP are:

- Lot/Plan validation and upgrade between CISP and DCDB
- Lot/Plan validation and upgrade between CISP and IVAS
- Lot/Plan validation and upgrade between DCDB and Caloundra AS/400 rates database
- Street address validation and upgrade between IVAS and Caloundra AS/400 rates database

Resources required to undertake the upgrade component of these activities for the Caloundra City Council, together with extrapolations to extend the activities for the rest of Queensland are shown in Appendix 8.

## 9 SUMMARY OF RECOMMENDATIONS

**R3.1** *In regard to integration issues concerning graphical data, this report recommends:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC establish a working group to investigate integration issues associated with graphical property interests data.	QSIIC Products Committee	Establish a suitably skilled technical working group with representation from appropriate agencies and academic institutions to: <ul style="list-style-type: none"> <li>(a) investigate issues concerning the integration of graphical data associated with the PIP, priority being given to the integration of DCDB and MERLIN lease boundaries.</li> <li>(b) investigate issues associated with the integration of graphical data associated with further products.</li> </ul>

**R4.1** *In regard to obtaining appropriate metadata for data associated with the Property Interests Product, this report recommends:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC encourage each agency providing property interest data to capture core level metadata using the ANZLIC Metadata Standard.	QSIIC Standards Committee	Promote the benefit of the ANZLIC Metadata Standard and the value of including all collected metadata in the Queensland Spatial Information Directory (QSID).

**R4.2** *In regard to quality benchmarks for PIP data, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC recommend that agencies publish the quality standard to which they will provide property interests information (as part of a Service Charter).	QSIIC Standards Committee	Agencies will be required to validate service standard against preliminary quality benchmarks set by the PIP Specification Project to actual applications of the PIP.

**R4.3** *In regard to standards for "Data Keys" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC promote the application of data standards for property interests data keys.	QSIIC Standards Committee	<ul style="list-style-type: none"> <li>Promote the application of the Parcel Identifier Standard (August 1997) and the draft Australian Rural Road Addressing Standard for property interest data keys.</li> <li>Give priority consideration to standards associated with Urban Street Addressing</li> </ul>

**R4.4** *In regard to standards for "Duplicated Data" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC commissions the Standards Committee to identify standards issues associated with duplicated property interests data.	QSIIC Standards Committee	Duplicated property interests data elements (identified in Table 6.1) are assessed to ascertain what, if any issues require addressing with respect to data standards.

**R4.5** *In regard to standards for "Unique Data" for the PIP, this report recommends that:*

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC recommend that where unique data is of a type that is specific to one agency, an appropriate standard be adopted, details of which are to be provided by the responsible agency to the QSIIC Standards Committee.	QSIIC Standards Committee	Agencies responsible for specific unique property interests data provide documentation of the data standards for that data to the QSIIC Standards Committee. This standard should be adopted consistently across an agency. The Committee is to be advised of any amendments or proposals to amend these standards.
QSIIC recommend that where a unique data "type" has multiple occurrences across a range of agencies, eg infrastructure data: <ul style="list-style-type: none"> <li>- existing data standards are evaluated</li> <li>- a preferred data standard is identified for property interests data presentation purposes.</li> </ul>	QSIIC Standards Committee	Existing standards are to be identified and evaluated. A preferred standard is identified for property interests data presentation purposes.



**R6.1** With regard to the identification of more than one authoritative source for a particular data type, this report recommends that:

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC establish a team to resolve multiple authoritative source issues for property interests data.	QSIIC Infrastructure Committee	A team representative of both State and Local Governments addresses multiple authoritative source issues highlighted in Table 6.1 of this report.

**R7.1** In regard to upgrading data in databases associated with the PIP, this report recommends that:

RECOMMENDATION	RESPONSIBILITY	ACTION
QSIIC establish a team to investigate and evaluate the impact of alterations made to property interests data as a result of data upgrade.	QSIIC Infrastructure Committee	Investigate and evaluate the impact of alterations made to property interests data (as represented in Appendix 7) as a result of data upgrade.

## **APPENDIX 1 - Error Tolerances for the six PIP Sub-Products**

## Error Tolerance: PI-01 Strategic Development Analysis

Type of error:	Possible occurrences	Result of error	Impact on benefits	Error tolerance
<b>REFERENTIAL</b>	Attributes incorrectly assigned to Preferred Dominant Land Use, Broad Hectare Development and Mining Tenure polygons.	Parcels incorrectly labelled.	<p>Potential for wrong development decisions.</p> <p>Poor development decisions cost developers more in the long term.</p> <p>Lost time and additional costs reverting to manual methods to rectify referential errors</p> <p>Loss of credibility in info system.</p>	< 5 % for all properties in a Local Government Area.
<b>TOPOLOGICAL</b>	Unclosed polygons in the DCDB lead to zero or multiple identifiers per parcel.	Confusion over correct parcel ID	Wasted time, additional cost in reconciling parcel details	Target 0 % - but < 2 % of DCDB parcels in error in operational system.
<b>RELATIVE</b>	<p>Varying sources of data.</p> <p>Boundaries of classified areas incorrect with respect to base DCDB features eg. proposed transport route on wrong side of property boundary.</p>	Incorrect assignment of land use.	Potentially major impacts as decisions to proceed may be based on relative position of features; access; barriers etc.	+/- 50 metres
<b>ABSOLUTE</b>	Boundaries of Dominant Land Use; Broad Hectare Development in error with respect to DCDB parcel boundaries.	Wrong assignment of values, particularly for small parcels.	<p>Minor in undeveloped, large lot areas.</p> <p>May be significant if boundaries unclear for closely settled, small lot areas</p>	<p>+/- 100 metres (rural)</p> <p>+/- 10 metres (urban)</p>

## Error Tolerance: PI-02      Development Restrictions Analysis

Type of error:	Possible occurrences	Result of error	Impact on benefits	Error tolerance
<b>REFERENTIAL</b>	Attributes incorrectly assigned to Site Features (Contaminated Sites etc; and polygon layers; Flood Inundation polygons.)  Incorrect Site Coordinates	Sites incorrectly labelled.  Site incorrectly identified	Major: potential damage to sites. Wrong development decisions.  Poor development decisions cost developers more in the long term.  Minor: Potential litigation for wrong information. Loss of system credibility.	< 5 % error in wrong attribute information for all sites / restriction polygons in a Local Government Area.  1 % error in site location
<b>TOPOLOGICAL</b>				No Connectivity or Adjacency Relationships - although topological overlays are strongly relied upon
<b>RELATIVE</b>	Flooding / Slope Class boundaries out of proper relationship to DCDB lot boundaries.  Point features on the wrong side of lot boundaries	Erroneous area measurement. assignment of land use.  Incorrect inclusions or exclusions of constraints relative to lot boundaries.	Potentially major impacts - potential development in inappropriate areas.  Loss of system credibility.	+ - 10 metres at 1: 10,000  <5 % error in area estimates  + - 5 metres at 1: 10,000
<b>ABSOLUTE</b>	Boundaries of Slope Classes / Flooding mislocated with respect to DCDB parcel boundaries..	Reliance on overlay function to determine areas within each restriction class  Wrong assignment of values, particularly for small parcels.	Potentially major impacts: - works permitted in wrong areas. (potential liability issues).  May be significant if boundaries unclear for closely settled, small lot areas	+ - 20 metres at 1:10,000 (2 % linear error)

## Error Tolerance: PI-03 Services Availability Analysis

Type of error:	Possible occurrences	Result of error	Impact on benefits	Error tolerance
<b>REFERENTIAL</b>	Attributes incorrectly assigned to Utility Network - linear features.	Wrong advice to customers.  Line segments incorrectly identified	Major: potential damage to utility networks.  Potential litigation for wrong information. Loss of system credibility.  Wasted time using manual methods / field inspection to correct.	< 0 % for correct property selection and service line ID.  < 5% error in line attributes.
<b>TOPOLOGICAL</b>				No Connectivity or Adjacency Relationships .
<b>RELATIVE</b>	Services layer - features incorrectly related to boundaries.	Erroneous positioning with respect to cadastral features.	Major, - if services are incorrectly connected to properties.  Loss of system credibility.	<1.5 metres at 1:2,500
<b>ABSOLUTE</b>	Potential for absolute error increases with lineage of source data used to develop product.  Easements, networks incorrectly positioned with respect to DCDB boundaries.	Mis-information on the location of services with respect to property boundaries.	Potentially major impacts: - works permitted in wrong location - damage to services.  Potential liability issues.  May be significant time delays accessing infrastructure if services location is unclear, particularly for large lots.	1.5 metres at 1:2,500

## Error Tolerance: PI-04      Legal / Tenure Analysis

Type of error:	Possible occurrences	Result of error	Impact on benefits	Error tolerance
<b>REFERENTIAL</b>	Incorrect Lot / Plan identification -	Search site incorrectly identified  Information retrieved from other databases about the wrong parcel.	Potential litigation for wrong information.  Wasted time using manual methods / field inspection to correct.  Loss of system credibility.	< 5 % error in DCDB parcel attribute information.
<b>TOPOLOGICAL</b>				No Connectivity or Adjacency Relationships .
<b>RELATIVE</b>	Mining exploration Permits / Lease etc. areas out of proper relationship with DCDB cadastral boundaries.	Incorrect inclusions / exclusions of permit / lease area within DCDB parcel.  Erroneous measurement of DCDB parcel area under permit / lease.	Wrong advice on the status of mining activity. Possible exploration on wrong parcels. Development approved in inappropriate areas  Loss of system credibility.	2 % at 1:10,000 (+- 20 metres).  < 10 % error in area measurement.
<b>ABSOLUTE</b>	Mining lease / permit boundaries etc. mislocated (note: reliance on overlaying functionality to define impact areas).  Potential for absolute error increases with lineage of source data used to develop product.	Mis-alignment of permit / lease boundaries over DCDB parcels.  Erroneous measurement of DCDB parcel area under permit / lease	Potentially major impacts: - development permitted in wrong location.  Incorrect advice / action with respect to development decisions  Potential liability issues.  May be significant time delays reverting to manual methods to verify information.	2 % at 1: 10,000 (+- 20 metres)  < 10 % of area.





## APPENDIX 2 - DATA MODELLING QUESTIONNAIRE

## APPENDIX 3 - PIP DATA MODEL

## **APPENDIX 4 - PROTOTYPE DATA MODEL**

### **Development Proposal Analysis Service**

**Development Proposal Analysis Service**

Graphics Element	Graphics - Authoritative Source(s)	Graphics - Information System	Associated Text Attributes	Text Attributes - Authoritative Source(s)	Text Attributes - Information System
Authority to Prospect	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Cadastral Parcel	DNR	DCDB	Area	DNR	DCDB
			Contaminated Site	CalCC	GIS
				DEH	EMR/CLR
			Contaminated Site Description	CalCC	GIS
				DEH	EMR/CLR
			Heritage Site Description	CalCC	GIS
			Interim Conservation Order	CalCC	GIS
			Land Use Code (IVAS)	DNR	IVAS
			Land Use Description (LGA)	CalCC	GIS
			Lot#	DNR	DCDB
			Plan#	DNR	DCDB
			Pollution Licensing	CalCC	Admin Database
			Property Address (Physical)	BSC	Rates System
				CalCC	Admin Database/GIS
Tenure	DNR	DCDB			
Unexploded Ordinance	DEH	EMR/CLR			
Zoning	CalCC	Admin Database/GIS			
Drainage & Watercourses	CalCC (enhancements to DNR data)	GIS	Name	CalCC (enhancements to DNR data)	GIS
	DNR			DNR	
		DTDB (NOTE: Not an automated Information System)	Name	DNR	DTDB (NOTE: Not an automated Information System)
Easement	DNR	DCDB	Area	DNR	DCDB

Graphics Element	Graphics - Authoritative Source(s)	Graphics - Information System	Associated Text Attributes	Text Attributes - Authoritative Source(s)	Text Attributes - Information System
			Easement#	DNR	DCDB
Electoral Boundaries (Federal/State/LGA)	DNR (as instructed by AEC and ECQ)	Available digitally but not from an automated Information System	Name	DNR (as instructed by AEC and ECQ)	
Electoral Boundaries (LGA Divisional)	BSC	Rates System	Name	BSC	Rates System
	CalCC	GIS	Name	CalCC	GIS
Erosion Zone	CalCC	GIS	Type	CalCC	GIS
Exploration Permit (Coal)	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Exploration Permit (Mineral)	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Flood Inundation Area (Q100)	CalCC	GIS	Date	CalCC	Hardcopy
Mining Tenure	DME	MERLIN	Area	DME	MERLIN
			Mining Tenure#	DME	MERLIN
			Tenure#	DME	MERLIN
Orthophoto	CalCC	GIS	Flying Date	CalCC	Hardcopy
Place Names Gazetter Site	DNR	Place Names Gazetter	Cities/Towns/Villages (POPL)	DNR	Place Names Gazetter
			Localities (LOC)	DNR	Place Names Gazetter
Road Network	CalCC	GIS	Name	CalCC	GIS
	DNR	DCDB (road casement only, centrelines derivable)	Name	DNR	DCDB
	Infrastructure			PIP	Collaborative Research

Graphics Element	Graphics - Authoritative Source(s)	Graphics - Information System	Associated Text Attributes	Text Attributes - Authoritative Source(s)	Text Attributes - Information System
	ERSIS	BLIN Keymap (centrelines as derived from DCDB road casements and enhanced by ERSIS)	Name	ERSIS	NOTE: Name attribute is not available in BLIN Keymap
Sites of known Mineral Occurrence	DME	MERLIN	Mineral Type	DME	MERLIN
Slippage and Unstable Land	CalCC (Wilmott Study)	GIS	Class	CalCC (Wilmott Study)	GIS
Slope Constraint	CalCC (derivable)	GIS	Grade	CalCC	GIS
			Slope Area	CalCC	GIS
Soil Areas	CalCC (DPI and Wilmott Study)	GIS	Acid Sulphate Soil	CalCC (DPI and Wilmott Study)	GIS
			Potential Acid Sulphate Soil	CalCC (DPI and Wilmott Study)	GIS
			Soil Area	CalCC (DPI and Wilmott Study)	GIS
			Soil Depth	CalCC (DPI and Wilmott Study)	GIS
			Soil Type	CalCC (DPI and Wilmott Study)	GIS
Suburbs/Localities	BSC	Rates System	Name	BSC	Rates System
	CalCC (Locality only)	GIS	Name	CalCC (Locality only)	GIS
	DNR	Derivable from DCDB	Name	DNR (for the Minister)	DCDB (as confirmed from Place Names Gazetteer)
Surface Geology (Mining)	DME	MERLIN	Geological Structure	DME	MERLIN
			Mineral Type	DME	MERLIN
Surge Tides	CalCC	GIS	Range	CalCC	GIS
Topographic Contours (>=1:2500 and <=1:25000)	CalCC (joint venture with DNR)	GIS	Height	CalCC (joint venture with DNR)	GIS

Graphics Element	Graphics - Authoritative Source(s)	Graphics - Information System	Associated Text Attributes	Text Attributes - Authoritative Source(s)	Text Attributes - Information System
	DNR	DTDB (NOTE: Not an automated Information System) & Hardcopy Maps	Height	DNR CalCC (joint venture with DNR) DNR	DTDB & Hardcopy Maps GIS DTDB (NOTE: Not an automated Information System) & Hardcopy Maps
Tunnels & Shafts	DME	MERLIN	Shaft Name Shaft#	DME DME	MERLIN MERLIN
Vegetation Development Constraint	CalCC	GIS	Vegetation Type	CalCC	GIS
Watercourse Buffer	CalCC (derivable)	GIS	Width	CalCC	Hardcopy
Wildlife Development Constraint	CalCC	GIS	Type	CalCC	GIS
Zoning	BSC CalCC	Rates System GIS	Zone Zone	BSC CalCC	Rates System GIS

## APPENDIX 5 - PROTOTYPE DATA MODEL

### Tenure and Survey Analysis Service

### Tenure and Survey Analysis Service

Graphics Element	Graphics – Authoritative Source(s)	Graphics – Information System	Associated Text Attributes	Text Attributes – Authoritative Source(s)	Text Attributes – Information System
Authority to Prospect	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Cadastral Parcel	DNR	DCDB	Area	DNR	DCDB
			Lot#	DNR	DCDB
			Lot/Plans Associated with Title	DNR	ATS
			Outstanding Rates	BSC	Rates System
				CalCC	Admin Database
			Owner/Lessee	DNR	ATS
			Ownership Share	DNR	ATS
			Parish	DNR	DCDB
			Plan#	DNR	DCDB
			Property Address (Owner's)	BSC	Rates System
				CalCC	Admin Database/GIS
			Property Address (Physical)	BSC	Rates System
				CalCC	Admin Database/GIS
			Rates#	BSC	Rates System
				CalCC	Admin Database
			Sale Date (Contract/Possession)	DNR	IVAS
			Sale Price	DNR	IVAS
			Tenure	DNR	DCDB
			Title Dealing#	DNR	ATS
			Title Reference#	DNR	ATS
Title Type	DNR	ATS			
Unimproved Capital Value	DNR	IVAS			
Valuation Date	DNR	IVAS			
Valuation#	DNR	IVAS			
Queensland Spatial Information Infrastructure Project					PIP Collaborative Research

Graphics Element	Graphics – Authoritative Source(s)	Graphics – Information System	Associated Text Attributes	Text Attributes – Authoritative Source(s)	Text Attributes – Information System
			Zoning	CalCC	Admin Database/GIS
Drainage & Watercourses	CalCC (enhancements to DNR data)	GIS	Name	CalCC (enhancements to DNR data)	GIS
	DNR	DTDB (NOTE: Not an automated Information System)	Name	DNR	DTDB (NOTE: Not an automated Information System)
Easement	DNR	DCDB	Area	DNR	DCDB
			Easement#	DNR	DCDB
Exploration Permit (Coal)	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Exploration Permit (Mineral)	DME	MERLIN	Date Expires	DME	MERLIN
			Date Granted	DME	MERLIN
			Principal Holder	DME	MERLIN
			Principal Holder Address	DME	MERLIN
			Status	DME	MERLIN
			Tenure#	DME	MERLIN
Mining Tenure	DME	MERLIN	Area	DME	MERLIN
			Expiry Date	DME	MERLIN
			Mining Tenure#	DME	MERLIN
			Principle Holder	DME	MERLIN
			Principle Holder Address	DME	MERLIN
			Tenure Type	DME	MERLIN
Orthophoto	CalCC	GIS	Flying Date	CalCC	Hardcopy
Permanent Survey Mark	DNR (as registered by Surveyors)	SCDB	Permanent Survey Mark AHD Coordinates	DNR	SCDB
			Permanent Survey Mark AMG Coordinates	DNR	SCDB

Graphics Element	Graphics – Authoritative Source(s)	Graphics – Information System	Associated Text Attributes	Text Attributes – Authoritative Source(s)	Text Attributes – Information System
			Permanent Survey Mark Description	DNR	SCDB
			Permanent Survey Mark#	DNR	SCDB
Petroleum Well/Borehole Site	DME	MERLIN	Petroleum Well DME Contact	DME	MERLIN
			Petroleum Well Report Reference#	DME	MERLIN
			Petroleum Well#	DME	MERLIN
Place Names Gazetteer Site	DNR	Place Names Gazetteer	Cities/Towns/Villages (POPL)	DNR	Place Names Gazetteer
			Localities (LOC)	DNR	Place Names Gazetteer
Road Network	CalCC	GIS	Name	CalCC	GIS
	DNR	DCDB (road casement only, centrelines derivable)	Name	DNR	DCDB
	ERSIS (derived from DCDB road casements)	BLIN Keymap (centrelines as derived from DCDB road casements and enhanced by ERSIS)	Name	ERSIS	NOTE: Name attribute is not available in BLIN Keymap
Suburbs/Localities	BSC	Rates System	Name	BSC	Rates System
	CalCC (Locality only)	GIS	Name	CalCC (Locality only)	GIS
	DNR	Derivable from DCDB	Name	DNR (for the Minister)	DCDB (as confirmed from Place Names Gazetteer)
Topographic Contours (<1:2500)	CalCC	GIS	Height	CalCC	GIS
Tunnels & Shafts	DME	MERLIN	Shaft Name	DME	MERLIN
			Shaft#	DME	MERLIN

## APPENDIX 6 - PROTOTYPE DATA MODEL

### Built Environment Analysis Service

**Built Environment Analysis Service**

Graphics Element	Graphics – Authoritative Source(s)	Graphics – Information System	Associated Text Attributes	Text Attributes – Authoritative Source(s)	Text Attributes – Information System	
Building Footprint (from As Constructed Site Plan)	CalCC	GIS	As Constructed Site Plan#	CalCC	Rates System	
			As Constructed Site Plan Submission Date	CalCC	Hardcopy Copy	
			Building Sewer Plan#	CalCC	Hardcopy only	
	NOTE: No Graphics Element for BSC			As Constructed Site Plan#	BSC	Hardcopy only
				As Constructed Site Plan Submission Date	BSC	Hardcopy (currently being entered into GIS)
Cadastral Parcel	DNR	DCDB	Building Description	BSC	Rates System	
				CalCC	Admin Database	
			Building Permit Applicant	BSC	Rates System	
				CalCC	Admin Database	
			Building Permit Application Date	BSC	Rates System	
				CalCC	Admin Database	
			Building Permit LGA Contact	BSC	Rates System	
				CalCC	Admin Database	
			Building Permit Status	BSC	Rates System	
				CalCC	Admin Database	
			Building Permit#	BSC	Rates System	
				CalCC	Admin Database	
			Building Plan(s)#	BSC	Rates System	
				CalCC	Admin Database	
			Development Applicant	BSC	Rates System	
				CalCC	Admin Database	
			Development Application Date	BSC	Rates System	
				CalCC	Admin Database	
Development Application Description	BSC	Rates System				
	CalCC	Admin Database				
Development Application LGA Contact	BSC	Rates System				
	CalCC	Admin Database				
Development Application Status	BSC	Rates System				
	CalCC	Admin Database				

Graphics Element	Graphics – Authoritative Source(s)	Graphics – Information System	Associated Text Attributes	Text Attributes – Authoritative Source(s)	Text Attributes – Information System
			Development Application#	BSC CalCC	Rates System Admin Database
			Development Timing	BSC CalCC	Rates System GIS (confidential)
			Lot#	DNR	DCDB
			Plan#	DNR	DCDB
			Property Address (Owner's)	BSC CalCC	Rates System Admin Database/GIS
			Property Address (Physical)	BSC CalCC	Rates System Admin Database/GIS
			Drainage & Watercourses	CalCC (enhancements to DNR data) DNR	GIS DTDB (NOTE: Not an automated Information System)
Drainage Infrastructure (closed: stormwater & open: channel)	CalCC	GIS	Capacity Depth Type	CalCC CalCC CalCC	GIS GIS GIS
Easement	DNR	DCDB	Area Easement#	DNR DNR	DCDB DCDB
Orthophoto	CalCC	GIS	Flying Date	CalCC	Hardcopy
Place Names Gazetteer Site	DNR	Place Names Gazetteer	Cities/Towns/Villages (POPL) Localities (LOC)	DNR DNR	Place Names Gazetteer Place Names Gazetteer

Road Network	CalCC DNR	GIS DCDB (road casement only, centrelines derivable)	Name Name	CalCC DNR	GIS DCDB
	ERSIS (derived from DCDB road casements)	BLIN Keymap (centrelines as derived from DCDB road casements and enhanced by ERSIS)	Name	ERSIS	NOTE: Name attribute is not available in BLIN Keymap
Sewage Infrastructure	BSC	Rates System	Capacity	BSC	Rates System
			Depth	BSC	Rates System
			Type	BSC	Rates System
	CalCC	GIS	Capacity	CalCC	GIS
			Depth	CalCC	GIS
			Type	CalCC	GIS
Suburbs/Localities	BSC	Rates System	Name	BSC	Rates System
	CalCC (Locality only)	GIS	Name	CalCC (Locality only)	GIS
	DNR	Derivable from DCDB	Name	DNR (for the Minister)	DCDB (as confirmed from Place Names Gazetteer)
Topographic Contours (<1:2500)	CalCC	GIS	Height	CalCC	GIS
Topographic Contours (>=1:2500 and <=1:25000)	CalCC (joint venture with DNR)	GIS	Height	CalCC (joint venture with DNR)	GIS
	DNR	DTDB (NOTE: Not an automated Information System) & Hardcopy Maps	Height	DNR	DTDB (NOTE: Not an automated Information System) & Hardcopy Maps

Water Reticulation Infrastructure	BSC	Rates System	Capacity	BSC	Rates System
			Depth	BSC	Rates System
			Type	BSC	Rates System
	CalCC	GIS	Capacity	CalCC	GIS
			Depth	CalCC	GIS
			Type	CalCC	GIS

## APPENDIX 7 - PROTOTYPE DATA REQUIREMENTS

DATA THEME	Graphic Entities	Attributes
<b>PARCEL SELECTION</b>		
	Cadastral Parcel	Lot Number
		Plan Number
		Parish
		Property Address (Physical)
	Easement	Easement Number
		Easement Plan Number
	Road Network	Road Name
<b>PLANNING / ADMINISTRATION</b>		
	<b>Cadastral Parcel Related</b>	Interim Conservation Order
		Land Use Code (IVAS)
		Land Use Code Description (IVAS)
		Land Use Code (LGA)
		Land Use Code Description (LGA)
		Tenure
		Unexploded Ordnance
		Zoning
		Heritage Site: Name
		Use
		Category
		Criteria
		Condition
	Local Government Divisional Electorate Boundaries	Division Name
	Suburbs / Localities	Name
<b>ENVIRONMENTAL / PHYSICAL</b>		
	<b>Cadastral Parcel Related</b>	Contaminated Site
		Contaminated Site Description
	Flood Inundation Area (Q100)	Date Code (flooded or not)
	Natural Drainage and Watercourses	Feature Names
	Sites of Known Mineral Occurrence	Mineral Type
	Slippage and Unstable Land	Class
	Slope Constraint	Grade
		Slope Area
	Soil Areas	Acid Sulphate Soils
		Potential Acid Sulphate Soils
		Soil Area
		Soil Depth
		Soil Type

DATA THEME	Graphic Entities	Attributes
	Surface Geology (Mining)	Geological Structure
	Surge Tides	Range
	Topographic Contours	Height
	Vegetation Development Constraint	Vegetation Type Priority
	Watercourse Buffer (Veg. Clearing)	Width
	Wildlife Development Constraint	Type
<b>LEGAL DETAILS</b>		
	<b>Cadastral Parcel Related</b>	Area Lot/Plans associated with Title Outstanding Rates Owner / Lessee Ownership Share Property Address (Owner) Rates Number Sale Date (Contract/Possession) Sale Price Tenancy Type Tenure Title Dealing Number Title Reference Number Title Type Unimproved Capital Value Valuation Date Valuation Number
	Easement	Area
<b>MINING TENURE DETAILS</b>		
	Authority to Prospect	Date Expires Date Granted Principal Holder Principal Holder Address Status Tenure Number
	Exploration Permit (Coal)	Date Expires Date Granted Principal Holder Principal Holder Address Status Tenure Number
	Exploration Permit (Mineral)	Date Expires Date Granted Principal Holder

DATA THEME	Graphic Entities	Attributes
		Principal Holder Address
		Status
	Mining Tenure	Area
		Expiry Date
		Mining Tenure Number
		Principal Holder
		Principal Holder Address
		Tenure Type
	Petroleum Well / Borehole Site	Petroleum Well DME Contact
		Petroleum Well Report Ref. Number
		Petroleum Well Number
	Tunnels and Shafts	Shaft Name
		Shaft Number
<b>SURVEY CONTROL DETAILS</b>		
	Permanent Survey Mark (PSM)	PSM AHD Coordinates
		PSM Easting
		PSM Northing
		PSM Description
		PSM Number
<b>BUILDING DETAILS</b>		
	Building Footprint (from as Constructed Site Plan)	As Constructed Site Plan Number
		As Constructed Site Plan Submission Date
		Building Sewer Plan Number
		Building Stormwater Plan Number
	<b>Cadastral Parcel Related</b>	Building Description
		Building Permit Applicant
		Building Permit Application Date
		Building Permit LGA Contact
		Building Permit Status
		Building Permit Number
		Building Plan (s) Number
		Development Applicant
		Development Application Date
		Development Application Description
		Development Application LGA Contact
		Development Application Status
		Development Application Number
		Development Timing ?????
<b>INFRASTRUCTURE</b>		
	Drainage Infrastructure (closed: stormwater & open: channel)	Capacity

DATA THEME	Graphic Entities	Attributes
		Depth
		Type
	Sewage Infrastructure	Diameter
		Material
		USIL
		DSIL
		Expire Date
		Last Maint. Date
	Water Reticulation Infrastructure	Diameter
		Material
		Condition
		Depth
		Bedding
		Remain Life

## APPENDIX 8 - DATA KEY UPGRADE ESTIMATES

**Lot/Plan Upgrade between CISP and DCDB**

	<b>Number of Parcels in DCDB</b>	<b>Number of Errors</b>	<b>Estimated resources to upgrade</b>
Caloundra	33,692	200 / 120 *	\$980 / 58 hrs
<b>Queensland</b>	1,720,308	8348 / 5,000*	\$40,600 / 1450 hrs

**Lot/Plan Upgrade between CISP and IVAS**

	<b>Number of IVAS Records</b>	<b>Number of Errors</b>	<b>Estimated resources to upgrade</b>
Caloundra	37,915	1,345 / 807 *	\$6,500 / 390 hrs
<b>Queensland</b>	1,763,575	13639 / 8,500*	\$70,000 / 2500 hrs

\* Validation procedures indicated error levels to be the first figure shown, however approximately 40% of these errors are due to time delays in updates between the associated databases. These errors will be automatically overcome. The second figure is a more realistic estimate of the true number of errors present.

**Lot/Plan upgrade between DCDB and Caloundra AS/400 rates database**

	<b>Number of Parcels</b>	<b>Number of Errors</b>	<b>Estimated resources to upgrade</b>
Caloundra	35,908	802	\$10,000 / 360 hrs
<b>Queensland</b>	1,593,657	35,600	\$448,000 / 16,000 hrs

**Street address upgrade between IVAS and Caloundra AS/400 rates database**

	<b>Number of Addresses</b>	<b>Number of Errors</b>	<b>Estimated resources to upgrade</b>
Caloundra	34,641	19,084 / 4134	\$4,600 / 165 hrs
<b>Queensland</b>	1,471,051	851,850 / 175,500	\$196,000 / 7000 hrs

Note: Cost estimates are based on AO4 level + 26% on costs.