BLUEPRINT FOR BUILT ENVIRONMENT INFORMATION

A PROGRESS REPORT TO THE QLIC ON THE BUILT ENVIRONMENT THEME COORDINATION PROJECT

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EXECUTIVE SUMMARY

The QLIS Built Environment Theme Coordination Project was established by QLIC under, the coordination of the Department of Emergency Services (DES), in December 1995 to:

- define the extent and appropriate contents of the Built Environment Theme, particularly those features identified in the *QLIS Foundation Information Standard*; and,

- to design, develop and pilot a process to coordinate the development of the Built Environment Theme.

This report covers progress achieved to date, identifies key issues associated with built environment information, makes recommendations relating to those issues and identifies the tasks that remain to be completed.

THEME DEFINITION

The Built Environment Theme includes the following *QLIS Foundation Information Standard* components:

5. Community Features		
27. Powerlines	)	
28. Pipelines	)	Utility Features
29. Telecommunications	)	

The utility feature components are relatively self explanatory and are adequately defined in the *QLIS Foundation Information Standard*.

The community features component, by contrast, is less well defined or understood. It is clear, however, that users are increasingly demanding multi-dimensional, multi-application GIS-compatible ('intelligent') information rather than the one dimensional cartographic data that has been the traditional focus. To provide the essential data elements on which to build such information, community features have been re-defined as providing, as a minimum, the:

> name, location and use or function of any built feature in the landscape that is referred to by the community to communicate position, direction or relative location.

The development of quality and sustainable built environment information is largely dependant on the availability of quality and sustainable information from components managed by other QLIS Themes, especially the Land Administration Theme. Slow progress in the production of comprehensive street address data, the implementation of standard locality boundaries and the enhancement of the DCDB to make it more amenable to applications other than legal/fiscal definition, represent the greatest inhibitors to achieving the QLIS vision - at least as far as built environment information is concerned.

Overlaps with other QLIS Themes, such as the treatment of some transport features, can be managed effectively through consultation between the respective Theme Coordinators.

DESIGN AND DEVELOPMENT

Significant progress has been made in designing and developing a QLIS Theme Coordination process. The key achievements include:

- establishing the Built Environment Theme Coordination Committee (BETCC) to provide key stakeholder's input to the QLIS Theme Coordination process;

- completion of the first stage of an audit of public sector built environment information collections. The second stage, focused on utility information at local government and utility level, has commenced via a survey jointly funded by QLIC and the Information Collection and Data Interchange Standardisation Group (ICDISG);

- a draft data model and data dictionary covering community features information has been prepared and is submitted with this report for QLIC endorsement;

- a pilot study of the various technical, administrative and applications aspects of built environment information has been concluded, based on Cairns. This pilot provides an excellent environment in which to test wider aspects of the role of QLIS as a Spatial Data Infrastructure, especially the development of an information clearinghouse, the application of a wide range of standards and the development of information partnerships;

- accumulation of community features information covering South-East Queensland to meet DES needs, and its transformation to meet the draft data model, has commenced; and,

- development of the 'Moreton Model' to aid the transfer of 'as constructed' utility information is making good progress under the leadership of the ICDISG and with the collaboration of the four largest local governments in South-East Queensland.

KEY ISSUES IDENTIFIED

In developing the Project to this stage a number of key issues have been identified that impact on the development of the QLIS Theme Coordination process. They require debate and consideration beyond the scope of the Built Environment Theme.

Clearly the most significant issue is the general lack of awareness, especially within the various public sector utility providers, of the operational and economic benefits of utilising intelligent, integrated corporate data to satisfy their full range of information needs including assets management, planning, revenue collection, public safety, system operation and control (SCADA) and so on. There is an urgent need to mount an education program aimed at decision makers within those organisations and their contractors (especially from engineering, surveying and cartographic disciplines) to make them more aware of the significant benefits available from the integration of both graphic and attribute information in a more appropriate way. Such a campaign could be mounted by QLIS in collaboration with industry associations (eg AURISA and AM/FM International), vendors and academic bodies such as AKCLIS.

The second key issue relates to the role of the DCDB as the fundamental spatial reference framework for the vast majority of built environment information. Effective exploitation of the DCDB in this role has been inhibited by the long standing reluctance of DCDB administrators to

add to that database, data elements that would make it more broadly useful. Non-technical issues relating to the DCDB, especially its availability, cost and 'ownership', also distract and distort development of the overall QLIS Theme Coordination process.

Perhaps the third most significant issue identified is the clear preference of users of utility and community features information to employ street address or locational association (eg in relation to a property boundary), rather than parcel (lot/plan) ID or geometric coordinates, as the spatial reference key. This reflects the fact that users of built environment information want to find the feature in the real world, consequently a 'real world' reference that provides adequate precision and relative accuracy, at a small cost, is more acceptable. Little effort has yet been devoted to the development of appropriate standards and protocols for street address allocation and use at either State or national levels.

RECOMMENDATIONS

A list of recommendations that have emerged from this study to date, and keyed to the text of the report, follow this summary.

THE NEXT STAGE

Completion of the Built Environment Theme Coordination Project Phase will involve:

- finalisation of the community features and utility data models and data dictionaries;
- delivery of an appropriate education program to raise the level of awareness of decision makers in the utility industry of the benefits of integrated corporate built environment information;
- completion of a user needs study for both community features and utility features information;
- integration of built environment information into the QLIS Spatial Data Infrastructure;
- build comprehensive and sustainable collections of built environment information to satisfy DES and other departmental needs; and,
- conduct an external review of data models, data dictionaries and internal standards and protocols for conformance with SDTS and other national standards.

CONCLUSION

The Built Environment Theme embraces an extremely complex and diverse range of topics in which there are many competing interests. The QLIS Theme Coordination approach provides an effective and appropriate mechanism to cope with this complexity and to bridge the differences between those various interests.

RECOMMENDATIONS

Recommendation 1: That the Community Features entry in the *QLIS Foundation Information Standard* be amended as indicated in Section 2.2.

Recommendation 2: That the Land Administration Theme, with the active assistance and support of the Built Environment Theme and other interested parties, give the highest priority to the introduction of street address standards for QLIS and actively promote their implementation throughout the State at all levels (Section 2.3).

Recommendation 3: That the Land Administration Theme, with the active assistance and support of the Built Environment Theme, promulgate a strategy to implement the Australian and New Zealand Land Use Classification (ANZLUC) standard (due to be published in September 1996) to replace existing 'improvement code' classification systems at both State and local government levels (Section 2.3).

Recommendation 4: That when finalised, QLIC endorse the Community Features draft data model and data dictionary as a QLIS Standard (Section 4.3).

Recommendation 5: That QLIC endorse the use of the Cairns pilot study to test the operational viability of a QLIS Spatial Data Infrastructure and its extension to ANZLIC's consideration of the Australian Spatial Data Infrastructure (Section 4.4).

Recommendation 6: That DAR, as a function of their Lead Agency responsibility, identify an appropriate officer to closely monitor international and national developments and research into the management of the temporal dimension of spatial information and disseminate information to QLIC members. They should also encourage research into 4-D information management through AKCLIS and other academic institutions (Section 5.1).

Recommendation 7: That DAR, as a function of their Lead Agency responsibility, in conjunction with the QLIS Theme Coordinators, and in collaboration with vendors, academic institutions and industry associations, develop and sustain an effective educational and promotional program aimed at increasing the awareness of decision makers of the advantages of adopting best practice standards in relation to the use of spatial information as a corporate asset. This program should give priority to mounting displays, demonstrations and presentations to meetings of State and regional Local Government Associations and bodies such as the Institute of Municipal Engineering (Section 6.1).

Recommendation 8: That the Built Environment Theme actively assist the Land Administration Theme to identify and promote strategies to maximise the cost-effective application of the DCDB and, where necessary, develop products derived from it, such a street address index, to meet the needs of the widest possible constituency,(Section 6.2).

Recommendation 9: That QLIC endorse the use of the interim Australia Standard *Classification of methods for determining location of spatial objects* and *Geographic information - Data requirements and guidelines for utility assets* and encourage their incorporation into transfer methodologies such as the 'Moreton Model' (Section 6.3).

Recommendation 10: That the Land Administration Theme, with the active assistance and

support of the Built Environment Theme and the Socio-Economic Theme, urgently develop and implement, in cooperation with the LGAQ, strategies to produce agreed locality boundaries for all of Queensland. Those strategies, and their implementation, should ideally be developed in close collaboration with the Telstra Address Guide (Section 6.4).

Recommendation 11: That the IPB widely promote and encourage the use of AS 4212 throughout the State public sector (Section 6.4).

Recommendation 12: That Queensland input to the joint ANZLIC/ICSM working party on Unique Feature Identifiers incorporates and addresses the needs of users of built environment and socio-economic information (Section 6.5).

Recommendation 13: That DAR, as a function of their Lead Agency responsibility, develop for QLIC a report on the issues (including costs and benefits) involved in implementing a State-wide register of land development proposals (Section 6.8).

Recommendation 14: That DAR, as a function of their Lead Agency responsibility, present a series of seminars/workshops to spatial information custodians on the metadata standards and their expectations of compliance, especially in relation to input to QLID (Section 6.9).

Recommendation 15: That DAR, as a function of their Lead Agency responsibility, establish a program of liaison with counterpart bodies in other States and in New Zealand to monitor the impact of privatisation or corporatisation, especially of utility providers, on their respective spatial information infrastructures so that potential impacts on QLIS of such developments in Queensland may be better anticipated (Section 6.10).

Recommendation 16: That ANZLIC be requested to review and update their 1990-92 studies relating to legal issues affecting land information administration (Section 6.11).

Recommendation 17: That the Built Environment Theme Coordinator monitor and assist the development of any ‘call before you dig’ system to ensure that its use of spatial information is consistent with QLIS standards and philosophies (Section 6.12).

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1. BACKGROUND

The Built Environment Theme Coordination Project was established to:

- define the extent and appropriate contents of the Built Environment Theme, particularly those features identified in the *QLIS Foundation Information Standard*; and,

- to design, develop and pilot a process to coordinate the development of the Built Environment Theme.

Department of Emergency Services (DES) agreed to take on the role of Built Environment Theme Coordinator and the Project commenced in December 1995. It is scheduled to run for twelve months. Significant funding support for the project was provided by QLIC from its cross-agency fund. This report has been prepared for QLIC consideration and provides an outline of progress to date; makes recommendations on issues already identified; and comments on the future direction of the Project.

2. DEFINITION

2.1 Background: The scope of the Built Environment Theme has been established by QLIC as embracing the following *QLIS Foundation Information Standard* components:

5. Community Features
27. Powerlines)
28. Pipelines) Utility Features
29. Telecommunications)

The utility feature components are relatively self explanatory and are adequately defined in the *QLIS Foundation Information Standard*. The spatial accuracy specifications identified for the utility features are appropriate and generally within existing standards and practices; attribute accuracy is probably appropriate, but difficult to measure; the currency requirement (1 year in each case) may be adequate for the wider Department of Natural Resources (DAR) map production requirement, it should be recognised that it is clearly inadequate for custodians and those who rely on data currency to meet their operational needs. As a **minimum** standard, however, the *QLIS Foundation Information Standard* for utility information currency is adequate at this stage.

The community features component, by contrast, is less well defined or understood. This perhaps reflects the way in which the component has been evolving from the (cartographically) 'significant cultural feature' approach of the first version of the *QLIS Foundation Information Standard* to the emerging emphasis on the multi-dimensional and multi-application definition

demanded by the modern spatial information industry, as evidence from studies undertaken in several Australian States, from international literature. This has been reinforced and confirmed by the views expressed by a good cross section of Queensland users consulted to this stage.

This involves a mind-shift from an emphasis on placing an appropriate symbolic representation (with or without an annotation) of a narrowly defined range of cultural features at an appropriate position on a map of a given scale, to an emphasis on providing a scale-independent definition and description of a built spatial entity that is considered significant to the community. There should be no restriction on the type or size of feature that can be included, the test to be applied is the feature's significance to the user - ie it must be capable of including absolutely any built feature in the landscape.

2.2 Suggested changes: The following is suggested as a replacement text for the 'Definition/Explanation' for the Community Features component of the *QLIS Foundation Information Standard* (**Recommendation 1**):

> *Name, location and use or function of any built feature in the landscape that is referred to by the community to communicate position, direction or relative location. Features covered by the road network, rail network, powerlines, pipelines and telecommunications foundation information components are, however, generally excluded. The scope of community features thus includes:*
>
> | | |
> |---|---|
> | *accommodation* | *manufacturing* |
> | *trades & services* | *transport & storage* |
> | *agriculture, forestry & aquaculture* | *mining & extractive industries* |
> | *cultural & recreation* | |
>
> *Features may be at any stage in their life cycle (ie under construction, in use or abandoned/derelict, or temporary). The location of community features will be related to, or associated with, cadastral boundaries in most instances.*

The base level specifications should be amended to be identical to those established for the closely related Street Address component.

The text of the 'Statement/Map of existing coverage' entry should also be amended as follows:

> *Location should be capable of reference, as a minimum, to a single point (eg the centroid of the bounding polygon) even though the feature may be represented graphically as a polygon at larger scales*.

2.3 Dependancies: The community features and utility features components are both closely linked to, and in some cases dependant on, Foundation Information components that are embraced by another QLIS Theme. Whilst not wishing to extend the boundaries of the Built Environment Theme, those external but closely related components must be discussed here in the context of their significance to this Theme. The associated components fall into two categories: those that are integral to defining or describing a built environment feature (eg street address); and those that overlap to the extent that their features can also be regarded as built environment features (eg bridges that are part of the road or rail network). These linked components are

shown in the Table 1.

Table 1: Related Foundation Information Components

INTEGRAL COMPONENTS	OVERLAP COMPONENTS
2. Cadastral boundaries & descriptions	4. Natural features
3. Street address	25. Road network
12. International, national & state boundaries	26. Rail network
13. Local government boundaries	31. Dwelling statistics
16. Postcode boundaries	
17. Suburb & locality boundaries	
20. National land use code	

The Integral Components shown in bold in the table have the greatest influence on built environment information. Cadastral boundary information provides the spatial frame of reference for the vast majority of built features and is specified in the *QLIS Foundation Information Standard* as being the reference framework for pipeline and telecommunications features. (In practice it is also the reference framework for powerlines, at least in urban areas.) Street address, locality boundary and land use together are seen as providing the essential locational definition of the majority of community features.

These integral components all come under the Land Administration Theme, though none, with the notable exception of the cadastre, appear to have attracted any significant priority until very recently. The lack of progress in this area is already inhibiting the development of built environment (and socio-economic) information. These issues, and their consequences are discussed at greater length below (**Recommendations 2 and 3**).

There are, conversely, features that are included within the community features component that overlap the ambit of the Transport Theme. These include airfields, ports and associated facilities such as boat ramps and navigation marks. Given the immediate focus of the Transport Theme on road and rail components, it is proposed that the basic spatial treatment of those transport features continue to be covered by the Built Environment Theme. Such overlaps do need to be addressed in a coordinated fashion to ensure that data models or data dictionaries are not duplicated. This is probably best done through the proposed QLIS Theme Coordinators Committee, however, the effectiveness of such a group will be largely dependant on the level of support it receives from the DNR Land Information Integration Unit as the successor to the dedicated QLIS Unit.

This support and coordination is most needed in areas such as the provision of the essential link to national and international agencies involved in the development of spatial data standards such as ANZLIC and ICSM. There is a clear need for standards and conventions established within the QLIS environment to be consistent with national and international practice. This is not a task

that can be effectively carried out by individual QLIS Theme Coordinators.

3. DESIGN & DEVELOPMENT

In establishing the Project, the following key targets were accepted by QLIC:

a. establish the Built Environment Theme Coordination Committee (BETCC) and stage a major client/stakeholder workshop by the end of February 1996;

b. complete an audit of public sector Built Environment information holdings and client needs analysis by the end of March 1996;

c. deliver a draft data model and data dictionary (for community features data) for QLIC endorsement by May 1996;

d. complete a pilot implementation of Built Environment information management covering the Gold Coast, Logan, Brisbane, Ipswich and Cairns local governments, including at least those priority elements identified by the needs analysis by the end of June 1996;

e. expand the pilot implementation for priority elements to cover the remainder of South-East Queensland by December 1996 and the remaining provincial urban centres by June 1997; and

f. report to QLIC on the development of theme coordination and other issues with the view to confirm a Theme Coordination operational plan by December 1996.

The target dates were based on the assumption that a Research Officer would be available to support the Project by early January 1996. Unfortunately, this position was not filled until 1 July 1996. That delay, and the development of a broader understanding of the issues involved in built environment information, have caused modifications to this program.

4. PROGRESS TO DATE

4.1 a. BETCC and workshop: The BETCC has been established with the following membership:

Department of Emergency Services	Ken Granger (Chair)
Department of Emergency Services	Alice Zamecka (Secretary)
Department of Natural Resources (QLIS Unit)	Graham McColm
Department of Natural Resources (DCDB)	Russell Priebbenow
Department of Natural Resources (Water Commercial)	John Cantor
Department of Public Works & Housing (QBIS)	Mark Blair
Department of Public Works & Housing (Q-Tel)	Tony Althouse
Department of Main Roads	David Paice
Department of Local Government & Planning	Bruce Thompson

ICDISG[1] & Ipswich City Council	Geoff McMahon
LGAQ & Caloundra City Council	Ben Pow
Brisbane City Council	Bob Peters
Telstra	Rod Kendall
Allgas Energy	Harold Unkles
Powerlink	John Houston

The Committee met for the first time on 26 January 1996 and has met three times subsequently. Its role has been defined as being:

> *to provide a mechanism through which the key stakeholders in Built Environment information will have input into the development of appropriate policies, standards, conventions and practices under the Queensland Land Information Strategy (QLIS). As such it will provide the formal link between the key stakeholders (the various public and industry segments with functional responsibilities for built environment information), the Theme Coordinator and the Queensland Land Information Council (QLIC).*

A copy of the BETCC Terms of Reference is included as Attachment A.

It was agreed at the first meeting of the BETCC that it would be premature to hold a stakeholder's workshop until the Project had developed a clearer view of the 'built environment' and some concrete proposals for managing built environment information.

4.2 b. Public sector audit: The custodians/administrators of the major collections of community feature-related information identified thus far within the State public sector have been contacted and sample data and other details obtained. A summary of these collections is included in Attachment B. Interviews with officers responsible for most of these databases have been conducted to obtain an impression of their needs for, and use of, such information. The survey of local governments and other utility providers throughout Queensland and interstate, being jointly sponsored by the ICDISG and QLIS, will provide a comparable overview of the utility sector when completed in September.

Information gathered during this process will be made available as input to the QLIS Cost/Benefit Study.

4.3 c. Data model and dictionary: A draft data model and data dictionary for community features has been circulated to QLIC agencies and other interested bodies for comment. It is anticipated that a final version will be submitted to QLIC for endorsement as a QLIS Standard at its December 1996 meeting (**Recommendation 4**). It is intended that this data model be implemented on an evolutionary basis, ie new databases should adopt the model from the outset;

[1] The Information Collection and Data Interchange Standardisation Group (aka *the alphabet soup group*) - a group consisting of private sector surveyors and consulting engineers, local governments, private utility providers and QLIS.

databases that are under re-development or structural upgrade should incorporate the model; existing databases should not change until a major upgrade is undertaken.

A comparable coverage of the utility section is being developed as part of the 'Moreton Model' for the transfer of 'as constructed' utility information under the general oversight of the ICDISG.

4.4 d. Pilot studies: Of the pilot studies proposed, only that on Cairns has been implemented. That study, however, has been at very high resolution and has provided considerable insights into a wide range of built environment issues and their linkages to data covered by other QLIS Themes. Given the very wide range of data sources and data types embraced by the Cairns pilot study, it appears to be a suitable model against which to test the wider spatial data infrastructure requirements of QLIS (and indeed the higher level Australian Spatial Data Infrastructure (ASDI) being considered by ANZLIC). A proposal has been put to ANZLIC by the Department of Natural Resources (on behalf of QLIS) to progress such a trial and demonstration (**Recommendation 5**).

The philosophical basis for a national spatial data infrastructure is well expressed in the preamble to US Executive Order 12906 of 13 April 1994 which established that country's NSDI, namely:

> *Geographic information is critical to promote economic development, improve our stewardship of natural resources, and protect the environment. Modern technology now permits improved acquisition, distribution, and utilisation of geographic (or geospatial) data and mapping. The National Performance Review has recommended that the executive branch develop, in cooperation with State, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology.*

There is yet to emerge in Australia an agreed vision of the form of such a construct though in essence QLIS already has the main components needed to fulfil such a role. In essence the ASDI will consist of:

- mechanisms, agreements and technologies that collectively form a distributed network of data producers and users connected through the Internet or other means (termed a '**clearinghouse**' in NSDI);

- a suite of agreed **standards** for data documentation, collection and exchange to enable data to be shared across State and local boundaries on many different hardware platforms and with many different software programs; and,

- procedures and **partnerships** to develop a digital spatial data framework that would include important basic categories of data that has been agreed to be of significance to a broad range of users.

The Cairns pilot project will test these various components in a broadly based user environment.

Given the delays in commencing the other pilot projects and the progress made in the Cairns project, it is now proposed to proceed directly to the development of a comprehensive collection of community features information covering all of South-East Queensland. Emphasis will be given to those data elements identified as being either 'high' or 'medium' priority to the implementation of DES Computer Aided Dispatch systems and community vulnerability projects. These elements are detailed in Attachment C.

4.5 e. Extended implementation: The targets set (ie completion of South-East Queensland by December 1996 and provincial centres by June 1997) are still achievable with the resources available. This is also well within the time frame established in the *QLIS Foundation Information Standard* to meet the requirements of the SEQDA Project.

4.6 f. Reporting to QLIC: This is the first detailed written report to QLIC. Oral reports have been made by the Theme Coordinator to the April and July 1996 meetings.

5. BUILT ENVIRONMENT INFORMATION IN PERSPECTIVE

It is clear from the work completed over the first eight months of the Project that built environment information displays the following key characteristics. These characteristics must be considered in the development of strategies and standards to manage this very diverse class of information.

5.1 Volatility: Utilities networks and other elements in the built environment are extremely dynamic and volatile. As new services are required, so the infrastructure changes to provide those services. This volatility imposes a significant maintenance burden on custodians and provides a significant information management challenge for users. It extends across the various stages of project development from conceptual design to construction, operation and maintenance. The communication of change and establishing an audit trail, are issues of concern in coordination.

There has been little theoretical or technical development in the field of 4-D information management (ie x and y spatial dimensions, the z attribute dimension and the t temporal dimension) on which to base standards or protocols thus far, though it should be noted that the ISO has recently released a working draft *Temporal Subschema* (ISO 15046-8) of the Geospatial Data Models and Operators for review and comment (**Recommendation 6**).

5.2 High resolution: Built environment information, especially relating to utilities, tends to be captured at significantly greater resolution than cadastral or topographic data. This applies not only to the level of detail captured in spatial dimensions, but also to the resolution of attribute data attached to each object. To some degree, the demand for increasingly high resolution spatial and attribute information is being forced along by the needs of local governments and other utility providers to develop comprehensive assets management systems to comply with Australian Accounting Standards for assets management such as AAS27. Those standards do not, however, provide any assistance in defining 'assets' as physical entities and significant variation has been noted between (and within) utility providers as to the resolution to which assets are defined.

The emphasis on multi-dimensional detail tends not to sit comfortably with the cartographic tradition that has tended to influence the development of built environment data under the *QLIS Foundation Information Standard* to date. That tradition typically requires only limited attribute data and is highly selective in the objects portrayed.

5.3 Tangible: All of the entities included as built environment information are tangible objects. This is in clear contrast to cadastral and other administrative-type data which deal essentially with abstract constructs.

5.4 Urban focus: The great majority of built environment entities are located in urban areas. Entities in rural areas are generally confined to well defined corridors ('lifelines') which link urban centres or with major 'source' works such as dams and power stations. Whilst not strictly 'built', a case can be made for rural properties (as landscape features) to be addressed under the 'built environment' given that they have, to varying degrees, been 'created' by human effort.

5.5 Eclectic: The range of entities or entity themes that can be included within the Built Environment Theme is almost endless. Whilst it is unlikely that all themes will be significant to all users at all times, they will certainly be significant to many users at least some of the time. The trick is in prioritising the effort to collect and maintain data on a given theme and to spread the load between the various custodians.

5.6 Diverse sources: Given the wide range of entity themes of interest and the shear size of the State, it is clear that the range of potential sources is extremely diverse. With the 'local' focus of built environment information, however, it is likely that local governments will have the single greatest concentration of relevant and current data.

There is, within the State Government, a very wide range of Departments that collect and maintain information relating to premises such as hospitals, schools, recreational facilities, hotels and workplaces (ie community features). This information is generally related to licensing or other administrative requirements. A significant number of these collections are maintained by agencies that are not normally considered as being within the QLIC ambit (see Attachment B). Likewise, there are numerous collections in the private sector (eg UBD, taxi dispatch companies, Telstra, etc) and with community organisations.

5.7 Clear custodial boundaries: Despite the diversity of entity themes involved, there are generally quite clear custodial boundaries. Most utility providers (local government, public enterprise and private sector) own and maintain their data for their own operational requirements. A similar situation seems to exist with the community features components as well, though there is clearly a significant degree of duplication and overlap in some areas.

5.8 Lack of coordination: The clarity of boundaries between jurisdictions would seem to have mitigated against the development of coordination between custodians, even within the same theme (say water supply) and within the same jurisdiction. There is even significant diversity in the use of key data elements such as the form of spatial reference (street address v lot/plan ID v AMG coordinate, etc). This lack of coordination appears to be an outcome of commercial, discipline and/or jurisdictional competition and a general lack of awareness of the savings and benefits to be achieved through coordination and the development of a corporate

approach to information management. This has led to the development of 'islands' of technology, within organisations rather than integration.

This should be contrasted with the clear advantages of working within an environment that facilitates the **combination** of the various forms of spatial reference and the **sharing** of attribute information.

5.9 Relative v absolute accuracy: Most **users** of built environment information (especially, but not exclusively, the community features component) require locational information that enables them to actually find the feature in the real world. Referencing systems such as street address, or relative positions associated with other features (such as distance from a boundary fence or distance along a road), are the most widely employed. By contrast, most **providers** of utility feature and cadastral data capture and store the location of their assets in a coordinate-based (ie absolute) frame of reference. The proponents on each side of the absolute/relative dichotomy have unfortunately taken on the fervour of a combatants in a religious war!

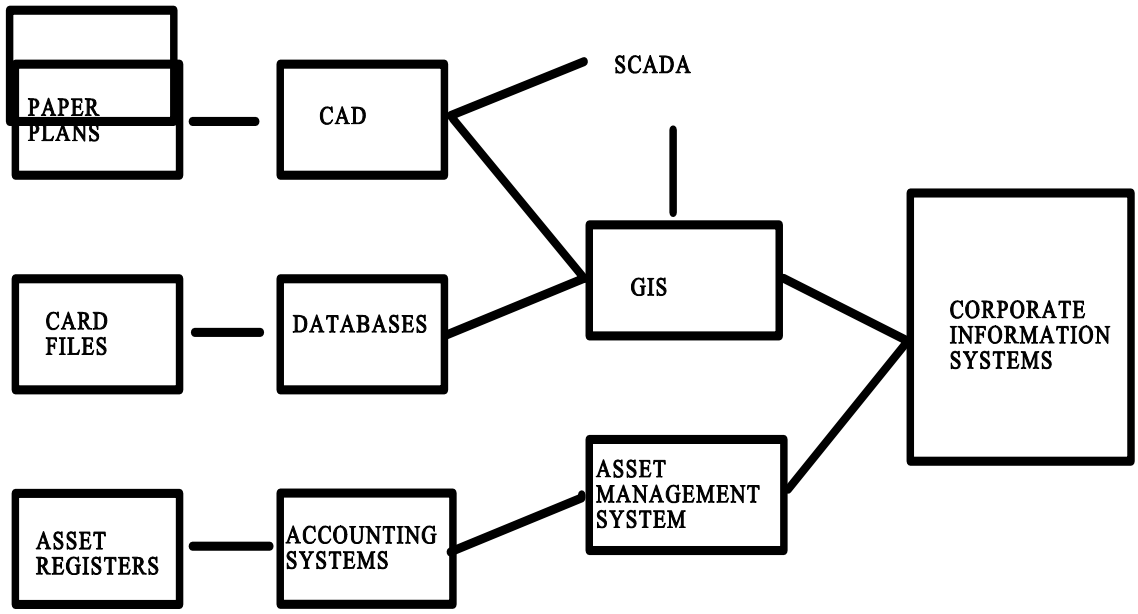
There is clearly a need for relative accuracy to be catered for **in addition to** the traditional emphasis on the absolute accuracy demanded in legal/fiscal data such as the DCDB and in many engineering/construction applications. It is also clear that the locations of utility and community features are typically related to the cadastral framework and that their position can best be indicated relative to the cadastre (ie the pipeline or cable is shown as being on the correct side of the boundary) regardless of their true or absolute position. Where the DCDB is spatially accurate and stable, the absolute (coordinate-based) location of utility and community features will provide that spatial associativity with accuracy. Unfortunately the DCDB is neither spatially accurate nor stable in many areas, consequently a utility or community feature mapped to absolute accuracy may not be shown in correct association with the current representation cadastral boundary, thus giving a false relative location.

The requirement for 'associativity' has been recognised in the draft *Data Requirements and Guidelines for Utility Assets* standards under SDTS (DR95480), however, this approach is not well regarded by the 'absolutists'. That standard does not yet suggest a widely accepted methodology to provide that linkage. Unless some common ground can be reached this debate will continue to distract attention away from reaching a practical and useful solution to a very real problem.

5.10 Attribute linkage: There is an increasing need for built environment information to be developed as multi-dimensional 'intelligent' (GIS) data rather than simply graphical 'spaghetti' (CAD) data. To date, however, the tendency has been to separate the graphic information, typically developed in CAD systems, from their associated attribute databases, or to simply record those attributes as annotations on the CAD drawing. This tends to confirm the impression that the majority of public sector utility providers has yet to move beyond the second stage in the evolutionary process from hard copy plans (manual systems), to automated (digital) plans, to integrated decision support systems, as illustrated in Figure 1. The need for asset management decision support is likely to drive change towards an integrated corporate GIS-based solution rather than stay with the less flexible CAD approach.

Figure 1: Evolutionary path for built environment information management

A number of solutions have been identified that are aimed at facilitating the evolutionary process. One is the 'Moreton Model' being developed under the auspices of ICDISG, and the other is the 'Caloundra Model' implemented by Caloundra City Council to 'translate' both



graphic and annotation data from AutoCAD into intelligent ARC/Info format.

6. KEY ISSUES

From these features the following issues have been identified as being central to the successful and sustainable implementation of the QLIS Built Environment Theme.

6.1 Value of intelligent data: The evidence gathered to this stage clearly indicates that very few public sector utility agencies currently hold both their graphic data and their asset attribute information in an integrated environment. There appear to be very few such agencies that are handling their data completely within an intelligent GIS environment. Rather, they are using CAD systems and confining their asset attribute information to little more than annotations on a paper plan. This situation even prevails within agencies that have a mature GIS serving most other functions (such as Brisbane City Council). An equivalent situation does not seem to exist within any of the private sector utility providers operating in Queensland. All of these providers appear to have already moved to the integration, corporate data model environment, at least for assets management. Even here, however, the full benefits have yet to be realised.
A good example of this has emerged from the Q-Tel analysis of the State Government's total telecommunications needs. They have determined that whilst both Telstra and Optus have well developed GIS for managing their physical assets and systems for operating their billing, they lack a link between those two components that would enable the production of a client-oriented view of the physical network. Such a view has had to be constructed by Q-Tel in an effort to rationalise the whole-of-government 'shared packet switching public network'. They estimate that by developing a detailed view of the State's needs embracing both spatial and aspatial

aspects, it is possible to make savings of between 20 and 30% of the data network costs - ie savings of between $3 and 4 million per year - and at the same time permit an increase in bandwidth capacity of as much as three time. There is a compelling case for such intelligent data to be provided by the utilities as a mandatory requirement in future telecommunications contracts.

There is an urgent need to mount an education program aimed at decision makers within those organisations and their contractors (especially from engineering, surveying and cartographic disciplines) to make them aware of the significant benefits that they would achieve if they began to integrate both graphic and attribute information in a more appropriate way. The benefits of following down the integrated, intelligent, corporate information path in enabling agencies to comply with the Australian Accounting Standards for assets management, alone, are considerable. **This lack of awareness of such 'best practice' strategies probably represents the greatest single threat to achieving the QLIS vision because of its impact on all Themes.** It also has implications for the successful implementation of national competition policies and public utility privatisation.

There is an acknowledged role and responsibility for QLIS to be actively engaged in promoting best practice throughout Queensland's spatial information industry, in conjunction with other key stakeholders such as the vendor community, research and educational institutions (such as AKCLIS) and industry associations (such as AURISA and AM/FM International). Indeed, it can be argued that QLIS will never achieve its vision until it is driven more by **demand** from the community rather than by **supply** from an arm of government (**Recommendation 7**).

6.2 Relationship with the DCDB: There is a significant consensus that the DCDB provides the most appropriate spatial framework against which to develop, maintain and relate built environment information. An insular view of the need to preserve the 'purity' of the DCDB as a cadastral database serving only legal/fiscal needs, commonly encountered within the Department of Natural Resources, does not, however, encourage this approach. Effective linkage of built environment information to the DCDB will only be possible when that database either evolves to embrace other applications by linkage of attributes such as street address and to greater concordance with topographic features, such as the coastline and drainage features; or a new range of DCDB-linked products such as an address index, are developed.

Non-technical issues relating to the DCDB, especially its availability, cost and 'ownership' still holds the potential to distract and distort the development of the Built Environment Theme Coordination process **(Recommendation 8**).

6.3 Utility data interchange standards: One of the key issues identified by the utility community is the need to improve the capacity to exchange data between contractors (notably consultant surveyors and engineers) and utilities, especially in the 'as constructed' phase of the project. A number of groups have undertaken work on this data interchange problem within the utility services arena. They have covered, or seek to address elements including:

water reticulation
sewerage systems

stormwater systems
energy transfer (eg gas distribution)
electrical power supplies
telecommunications networks
road design and as constructed details
roadside furniture.

At the highest level, the joint Standards Australia and Standards New Zealand Committee IT/4 is coordinating the drafting of a standard:

> *to provide users of public utility asset information with requirements and guidelines for the purpose of handling the information with consistency and accuracy in an efficient manner.*

This standard (*Geographic Information - Data requirements and guidelines for utility assets*) is designed to be used in conjunction with SDTS (AS/NZS 4270). This standard, and a companion document (*Classification of methods for determining the location of spatial objects*) will be released as interim standards in 1997. It is important that these standards be adopted within the utility community as quickly as possible (**Recommendation 9**).

Considerable effort has been expended within Queensland by the ICDISG in developing a common database structure for local government use for cadastral, earthworks, roadworks, stormwater drainage, sewerage, water reticulation, topography and other categories. It has been proposed that this database model become the basis for the transfer of all subdivisional 'as constructed' information from the development sector and their consultants to the local government.

Known as the 'Moreton Model', this approach is coordinate-based and stipulates the use of licensed surveyors or engineering surveyors. It has involved collaboration between the four largest local governments in the South-East (Gold Coast, Logan, Ipswich and Brisbane). The 'Moreton Model' emphasises the linkage of attribute and graphic data relating to the same entity in a system-independent, comma delimited ASCII file format. It has been reviewed by Dr Richard Hume of AUSDEC and has been found to be consistent with the requirements of the Australian Geographic Information Standards and SDTS. It is clear that, when finalised, the 'Moreton Model' will provide appropriate tools for the transfer of utility data from a CAD-based environment (eg AutoCAD, Microstation, etc) to an 'intelligent' GIS-based environment.

A similar, but perhaps more elegant, approach has been developed by Caloundra City Council to transfer 'as constructed' data from CAD packages used by consultants and developers into their corporate GIS. They have developed a software package that takes the graphic data and associated annotations from (typically) AutoCAD and translates them into an ARC/Info file which integrates both graphic and attribute (annotation) data. The development of similar software to transform data from AutoCAD to other commonly used GIS formats should not be a significant task.

Most smaller local governments appear to be reserving judgement on the 'Moreton Model' and are continuing to emphasise the 'drawing' as the primary output. Data transfer is likely to remain

reliant on the widespread use of DXF as the standard interchange format for graphic data for some time to come. There seems to be only limited effort at this time directed towards facilitating the linkage of attribute and graphic data, though there are some outstanding exceptions to this approach stage, such as the 'Caloundra Model'. Whilst it is likely that similar models have, or will be, developed elsewhere, the 'Moreton Model' and 'Caloundra Models' reflect their development within the Queensland land information environment and their use, where appropriate, in Queensland should be encouraged, at least as an interim solution.

6.4 Spatial 'key': Most utility agencies (and other users of built environment data) need to link their information to street address as well as (or rather than) lot/plan ID. Considerable effort is currently being expended by the Department of Natural Resources, in conjunction with local governments, to develop a comprehensive street address file linked to the DCDB. This is being done principally to validate and/or correct data held in IVAS (the Department's valuations database), though it is clearly recognised as having far wider application.

This project does not, however, embrace closely associated addressing issues including formalising locality boundaries (eg suburbs, townships, etc) across the State and the adoption of ANZLUC as the standard form of classifying the use or purpose of the property.

A street address consisting of number and street name, by itself, is not a sufficiently unique method of identifying a property (Recommendations 2 refers). It has been the clear experience of operational users of addressing data including DES, Telstra, the Australian Electoral Commission. Australia Post and the Australian Bureau of Statistics that the lack of standard locality boundaries in Queensland is a significant problem. Indeed, Queensland appears to be the only state in Australia that has not moved to establish such boundaries on a state-wide basis.

Telstra is developing its own national Telstra Address Guide (TAG) to cover minimum address requirements and has developed a structure of alias addresses to cover such things as vanity addressing. In discussions with Telstra, it became evident that the absence of formal or agreed locality boundaries is the most significant issue faced in Queensland (**Recommendation 10**).

Other national agencies with an interest in developing street address information and standards include the Australian Bureau of Statistics, the Australian Electoral Commission and Australia Post. There are both legal, commercial and administrative risks in this trend towards 'independent' top-down solutions to the question of standard addresses, not least of which is the failure to recognise the fundamental role of local governments. There may be some benefit in ANZLIC and AURISA being approached to convene a national summit on street address standards and conventions.

The diversity of 'community features' databases, and the lack of common address formats within them, is another area of concern. It appears that AS 4212 (address transfer standard) has yet to be implemented to any significant degree within the public sector, indeed its very existence is not widely known (**Recommendation 11**).

6.5 Unique ID: Because of the volatile nature of built environment data, there is a fundamental need for incremental data update. This is not possible without the use of unique IDs for each entity of relevance. Similarly, the creation of sustainable associativity between the DCDB and built environment features or administrative boundary entities demands the allocation

of unique IDs to each DCDB node and segment.

Some systems of ID already exist (eg asset numbers, valuation numbers or rate assessment numbers), however, further study is needed to determine the practicality and acceptability of a 'standard' form of ID. It is clear that there are some sensitivities about 'intelligent' ID schemes, especially at the local government level. There are also questions as to whether these IDs should be allocated by the data custodian or by some central agency.

At the national level, both ANZLIC and ICSM have agreed to form a joint working party to investigate the question of unique feature identifiers (UFI). There is some concern, however, that UFIs developed by this group may emphasise cartographic applications rather than wider applications of spatial information. Queensland will be represented on this working party and it is essential that the needs of the Built Environment Theme are taken into account in that representation (**Recommendation 12**).

6.6 Entity definition: It is obvious that clear definitions of what constitutes a 'feature' (as distinct from its components) will be important, not only because of the UFI issue, but also from a data dictionary and data modelling perspective. There is currently no widely used data dictionary that is tailored to built environment data. SDTS, for example, simply contains a definition for BUILDING. Similarly, the ICSM draft data dictionary relating to 'Topographic Data' is clearly inadequate for much of the built environment requirement.

Implementation of the Australia and New Zealand Land Use Classification (ANZLUC), due to be published in September 1996, will go some way to addressing this issue, however, there remain a number of areas that require further work. There is considerable confusion generated within QLIS, for example, by the use of terms such as 'lot', 'parcel' and 'property' for the same thing; 'precinct', 'location', 'locality' and 'suburb' generate similar problems. A further source of confusion is the non-standard use of abbreviations. These specific issues are addressed in the draft community features data model included as Attachment C.

6.7 Accuracy 'lifespan': The volatile nature of built environment data imposes specific demands on the accuracy of data. The location and attributes associated with a given feature will differ throughout its lifespan from the conceptual/design stage; to the planning stage; to the construction stage; to the operational stage; to the maintenance stage; and so on. In many applications there is a need to archive or audit these historic conditions given that each stage may have different requirement for spatial accuracy and attributes. Standards for data currency and the way in which both spatial and attribute relationships change over time, both within the one feature and between a feature and others in its proximity, will need to be looked at.

This issue is recognised by the Department of Primary Industry in the design of its Agricultural Property System (APS) which embraces the need to cater for the seasonal and other historical changes in use or activity. It is also an issue that DES has yet to confront in satisfying both the 'real time' and historical information management demands associated with supporting operational emergency decision making (refer to Recommendation 6).

6.8 Development coordination: Clearly, the most widely identified strategic issue is that of the lack of coordination between individual utilities, developers, councils and contractors across the planning, design and construction stages of the development process. Considerable savings

can be made and risks avoided where the sharing of trenches or conduits can be maximised and changes to utility layout design are minimised. There are even suggestions that legislation may be introduced by some jurisdictions to require utilities to share trenches etc to minimise costs and disruption and to maximise public amenity. The increasing use of combined transport and infrastructure corridors may help with coordination, however, some of the anecdotal evidence suggests otherwise.

At a more fundamental level, greater coordination and staging of development would create significant savings and greater efficiencies in the provision of services such as schools and utilities.

Coordination would be greatly enhanced by establishing a procedure by which details of development proposals are disseminated as widely as possible between utility providers and other stakeholders, thus permitting the subsequent progress on the development proposal to be tracked by stakeholders. Significant duplication of effort is expended by stakeholders in attempting to track development proposals. The development of a central public record of development applications, linked to the DCDB, is, however, a land administration, rather than built environment issue (**Recommendation 13**).

There are clearly limits to the coordination of built environment data and there is little likelihood that there will be a single comprehensive repository of built environment data - commercial sensitivities alone preclude this. It may, however, be possible and practical to develop a single directory or spatial key in which a minimum amount of information can be maintained.

6.9 Metadata: Effective coordination and interchange of built environment information is dependant on custodians adhering to established metadata standards and in providing access to that metadata through QLID. It is also dependant on the custodians of the integral components also adhering to metadata standards. Little more than lip service, however, appears to have been paid to adopting those standards within QLIS thus far (**Recommendation 14**).

Both the 'Moreton Model' and the community features data model proposed in this report include detailed metadata requirements.

6.10 Privatisation: It seems inevitable, if interstate experience is a fair guide, that the privatisation of public utilities such as water supply, sewerage and power supply will occur in Queensland. The 'corporatisation' of Brisbane Water and the 'privatisation' of the Noosa sewerage system indicates that the process has already begun. Whilst privatisation will probably speed up the process of evolution towards integrated corporate information management, the degree of influence and/or control that can be exerted by QLIS on standards and other spatial data infrastructure issues could be diminish considerably. The impact of the privatisation of the utilities on spatial information infrastructures in other jurisdictions should be reviewed and monitored closely (**Recommendation 15**).

6.11 Legal issues: Privacy considerations can limit the exchange of information. This is typically confined to situations where the name of an individual (eg a subscriber or occupant) is linked to the feature. The *Privacy Act* (Cwlth) applies only to Commonwealth agencies, however, is being interpreted very narrowly by most of those agencies and it may be necessary to seek an opinion from the Privacy Commissioner relating to these matters. Whilst personal

privacy must be preserved, there is a risk that overzealous interpretation will seriously limit access to associated, but not personal, information.

Security and commercial sensitivities will undoubtedly be significant in many circumstances. In Australia's open society little thought is generally given to the potential risks associated with making information on sensitive infrastructure information, for example, generally available. Concern has been expressed that, in the extreme, collections of built environment data could be seen as a 'terrorist's guidebook'. In many neighbouring countries such as Indonesia, Singapore and Malaysia, this type of information is protected by national security-related legislation. At a more pragmatic level, commercial sensitivities will undoubtedly restrict general access to some information - even to the existence of that information.

Copyright issues can be extremely complex and there is little case law to act as a guide in issues such as 'derived' or 'inherited' copyright. This occurs where one set of data (eg a pipeline location) has been developed from another source (eg DCDB). The degree to which the pipeline data set inherits copyright from the DCDB is difficult to determine. This is clearly a threat to the widespread development of 'value added' information.

Third party damage and public liability litigation and costs associated with the use of data is yet to become widespread, but must be anticipated. The threat of exposure to third party damages claims has led Air Services Australia (former the Civil Aviation Agency), for example, to restrict access to their detailed database of airfields and landing grounds. They argue that it is not possible to maintain the database to reflect the day-to-day operational condition of private landing grounds and that it could mislead pilots to use private airfields without permission or without checking their status. At least one insurance company is now offering indemnity cover for data providers against awards of compensation to users who have suffered as the result of defects in that data.

These issues are certainly not unique to the Built Environment Theme or QLIS, as evidence by the series of papers published by ANZLIC under the general title of 'Issues in Land Information Management'. Of particular relevance are:

Paper 1 *Data Custodianship/Trusteeship* (1990)
Paper 2 *A General Guide to Copyright, Royalties and Data Use Agreements* (1990) and
Paper 5 *Privacy, Confidentiality and Access to Information in Land Information Systems* (1992).

There has, however, been considerable development in legal and administrative awareness and understanding of these, and issues such as 'intellectual property', since those papers were written and it would be a great service to users of spatial information if ANZLIC was to update those papers (**Recommendation 16**).

6.12 Public safety: Sustainable access to accurate and current built environment information continues to be a major priority of DES. In addition to the priority attached to developing comprehensive community features databases, attention is now being given to utility 'lifeline' issues. 'Lifelines' are those features such as water supply, sewerage, power supply and telecommunications, that sustain the community. Their loss or disruption during a disaster will exacerbate the impact on the community.

A national workshop on 'lifelines' was held at the Australian Emergency Management Institute at Mount Macedon in June 1996. This workshop aimed at developing guidelines for emergency and utility managers to facilitate the coordination of preventive, response and recovery procedures when utilities are affected during a disaster. One of the main issues to emerge from this workshop was the inter-dependancy of utilities (water pumps rely on electricity which rely on telecommunications and so on). Whilst not focused on information issues, the workshop clearly pointed to the need for a strong network of personal contacts within and between those agencies involved. The Built Environment Theme should form a key part of that network.

DES is planning to develop a pilot 'lifelines' study of Redcliffe City to test the operational and information flow issues involved. It is also intended that the Cairns pilot will be expanded to also include 'lifeline' information.

At the workplace safety level, built environment information is also important. Here, as elsewhere, coordination, or at least conformity, of information is essential, particularly if a 'call before you dig' telephone inquiry service for excavators, as implemented now in Sydney, Melbourne and Perth, is to be introduced in Queensland. The Director-General of the Department of Public Works and Housing has agreed to 'sponsor' the development of such as system for Queensland to the point where it can be taken on by the utility stakeholders acting in consortium. It was the consensus of a meeting on 24 July 1996, convened by PW&H, of representatives from the major utility providers that such a service is needed and that a Queensland 'call before you dig' service would follow the 'clearing house' model employed in Melbourne and Sydney. Such a development may cause utility providers to look more closely at the nature and quality of their spatial information. There is clearly a role for the Built Environment Theme Coordinator in this process (**Recommendation 17**).

Fortunately, most agencies involved in the built environment arena acknowledge that they have a duty of care to provide for public safety.

6.13 Priorities: In the absence of a stakeholder's workshop it has not yet been possible to identify whole-of-government priorities for built environment information. To some degree, however, this lack has been offset by extensive consultation with agencies at state and local government levels and in the private sector. That consultation has tended to confirm and reinforce the priorities identified in various studies undertaken within DES over the past six. These are outlined, at the macro level, in Attachment C.

6.14 Commercialisation: A commercial potential clearly exists for much of the information that is embraced by the Built Environment Theme. Certainly, data brokers such as ERSIS, Telstra and BCC, are offering feature information (eg major city buildings, traffic lights, etc) as commercial products. Demand will clearly increase with the growth of 'intelligent vehicle navigation systems' and from increased use of computer aided dispatch systems in the commercial world (pizza deliveries, taxi dispatch, service repairs and so on).

The legal and commercial sensitivities involved in commercialising built environment information are, undoubtedly considerable.

7. THE NEXT STAGE

Completion of the project phase of establishing the Built Environment Theme Coordination process will involve the following activities:

Date models - finalise the development of the community features and utilities data models and data dictionaries for consideration by QLIC as QLIS Standards;

Awareness - the development and delivery, in conjunction with industry associations such as AURISA and AM/FM International, of educational seminars, demonstrations and workshops to raise the level of awareness of decision makers in the utility industries of the benefits of a corporate and integrated approach to built environment information;

User needs - following the analysis of the ICDISG/QLIS survey of utility providers, run workshops in Southport, Brisbane, Nambour, Rockhampton, Townsville, Cairns and Toowoomba to determine more accurately the needs and desires of users of built environment information. These workshops will serve to explain and promote the standards proposed under the Theme at technical and operation levels and could be coincided with the awareness campaign;

Spatial information infrastructure - play a leading role in testing and demonstrating the concepts of a QLIS (and Australian) Spatial Data Infrastructure (including issues such as standards, metadata, clearing house, communications technologies, etc) through the use of the Cairns pilot project;

External review - subject the data models and data dictionaries developed under the Built Environment Theme to external independent review; and,

Datasets - complete the accumulation of appropriate built environment information to satisfy the operational needs of DES in South-East Queensland and establish appropriate custodianship arrangements to ensure sustainability of that information.

8. CONCLUSIONS

It is clear that the Built Environment Theme embraces an extremely complex and diverse range of topics spread across a wide range of organisations with a great array of operational interests and priorities. It is evident that this diversity is significantly greater than found in other QLIS Themes with the possible exception of the Socio-Economic Theme. There are, however, many fundamentals that bridge those differences. The Theme Coordination process has made substantial progress in identifying and strengthening those bridges, however, long term sustainable progress is, to a significant degree, dependant on progress being made in a concerted and combined effort by all QLIS Themes to advance fundamental issues such as street address and locality boundaries.

ATTACHMENT A

BUILT ENVIRONMENT THEME COORDINATING COMMITTEE

TERMS OF REFERENCE

(January 1996)

Role

The Built Environment Theme Coordinating Committee's role is to provide a mechanism through which the key stakeholders in Built Environment information will have input into the development of appropriate policies, standards, conventions and practices under the Queensland Land Information Strategy (QLIS). As such it will provide the formal link between the key stakeholders (the various public and industry segments with functional responsibilities for built environment information), the Theme Coordinator and the Queensland Land Information Council (QLIC).

Scope

The Built Environment Theme covers the following information components under the Queensland Land Information Strategy Foundation Information Standard:

5. Community Features
27. Powerlines
28. Pipelines
29. Telecommunications

The principal tasks of the Theme Coordination process have been identified by the QLIC Chairman as:

- the identification of the Built Environment Theme data components to be embraced by the QLIS Foundation Information Standard;
- the negotiation and recommendation of information custodianship arrangements;
- coordination of management arrangements for the inclusion and integration of Built Environment Theme data and systems within the Theme and the overall QLIS concept;
- the development and recommendation of standards specific to the Built Environment Theme;
- providing input to the QLIS Strategic Plan;

- facilitating the ongoing consultation and liaison between the appropriate agencies in relation to the Built Environment Theme; and

- supporting the interests of all users of Built Environment Theme data.

Whilst the day-to-day conduct of these activities are the responsibility of the Theme Coordinator, the Theme Coordinating Committee will provide the essential consultative and liaison function and technical and operational guidance.

Membership

The Built Environment Theme Coordinating Committee will be made up of representatives nominated by the following agencies:

State Government
- Queensland Emergency Services (Theme Coordinator and Chair)
- Department of Lands
- Department of Administrative Services
- Queensland Transport
- Department of Housing, Local Government and Planning
- Department of Primary Industry

Local Government
- Local Government Association of Queensland GIS Group
- Brisbane City Council
- ICDISG

Industry
- Telstra
- Algas Energy
- Powerlink Queensland.

This membership may be expanded if other key stakeholder groups are identified.

Reporting

The Committee will report quarterly to the QLIC on its activities and progress against the Built Environment Theme Coordination Operational Plan.

ATTACHMENT B

COMMUNITY FEATURES DATABASES

DATABASE	SUBJECT	CONTACT	COMMENTS
APS (Agricultural Property System)	All rural properties; considerable attribute information relating to crops, livestock, etc; property name; owner, manager, etc; built to facilitate stock and crop quarantine issues but has wider applications.	Som Cusack, Systems Coordinator DPI ph 3896 9617 fax 3896 9606	Spatial reference by lot/plan, lat/long, address (but limited because of lack of rural road addresses); digital (Ingres engine); privacy and confidentiality issues; approx 30,000 records; constant maintenance.
Business Register	All registered business names	Bob Johnstone, Office of Consumer Affairs ph 3xx9 0962	Spatial reference by street address; digital; linked to Workplace Register; constant maintenance; 180,000 records.
Bridges	All bridges on State roads (plus some other local roads); considerable attributes relating to capacity and dimensions etc.	Bill Semple, Dept of Main Roads ph 3834 2385 fax 3834 2065	Spatial reference by distance along road and AMG; digital and hard copy maps.
CFDB (Community Features Database)	Community features of interest to Emergency Services; complete coverage of fire, ambulance, police, etc stations; other data accumulated from a wide variety of sources	Graham Lee-Lovick, Dept of Emergency Services ph 3247 4114	Spatial reference by street address, lat/long/ and lot plan; held in separate theme files within MapInfo/Foxpro; restricted access to some data; constant maintenance
C'wealth Gazetteer	All place and feature names included on the 1:250,000 series mapping	AUSLIG	Spatial reference by lat/long (some questions about accuracy); hardcopy and digital versions available; entries classified by type (simple classification); update cycle unknown.
Contaminated Sites Register	All known contaminated sites, including those registered due to prescribed purpose use such as service stations, chemical storage, etc; limited attribute information; much input direct from local governments.	April Gunning-Davis, Registrar Contaminated Sites ph 3225 1974 fax 3227 8341	Spatial reference by lot/plan and street address; digital (Ingres); restricted access; 30,000 records at end of June 95; use classification by early version of Land Use Code (likely to changed to ANZSIC or ANZLUC); constant maintenance.

Environmental Health Licenses	Details of all people and premises licensed under the *Health Act* for activities such as pest control, fumigation, poisons wholesale and retail, etc	Paul Florian, Dept of Health ph 3234 0963 fax 3234 1480	Spatial reference for premises information by street address; digital (Oracle 6); constant maintenance at regional level.
Explosives Licenses	People or companies that are licensed to use, make, store, sell or import/export explosives.	Bob Sheridan, Chief Explosives Examiner, Dept of Mines ph 3237 1386 fax 3237 9989	Premises information uses street address (where available) as spatial reference; bulk of information relates to licensed individuals or companies rather than facilities; digital with considerable site information such as plans of storages held in paper files; some restricted information.
FAMIS (Facilities Assets Management System)	Location of all state and most private schools; comprehensive attributes on pupil and staff numbers, emergency contacts etc.	Tim Mellish, Dept of Education ph 3237 0848	Spatial reference by lot/plan and street address; accurate for state schools but poor for private schools; digital (MapInfo); updated annually.
GFIS (Graphical Facilities Information System)	Details of all facilities and infrastructure on Aboriginal Communities; currently under development; AUSLIG contracted to build mapping and database	Ramon Davis, Housing & Infrastructure Officer, Aboriginal Coordinating Council ph 070 31 2623	Very detailed mapping including building footprints; reference by a range of local references including a form of street address; digital.
Liquor Licensing	All premises licensed under the *Liquor Act* to sell or serve liquor; attributes include premises name.	Clive Lowe, Senior Licensing Officer, Liquor Licensing Division, Tourism, Small Business & Industry ph 3224 7086 fax 3220 0039	Spatial reference by street address; digital (DBQ); about 4,500 records; constant maintenance.
LOGEMS (Local Government Environmental Management System)	All businesses licensed under the *Environmental Protection Act*; extensive attributes including business name and activity and contact details; data collected and maintained by local governments	Ian Wilson, DEH ph 3227 7779	Spatial reference by street address and lot/plan; digital (CITEC-built shell)

Official Placenames Gazetteer	All officially named places in Queensland such as topographic features, settlements, counties, parishes etc	Natural Resources	Spatial reference by lat/long; digital; entries classified by simple code; update cycle unknown.
PIF (Premises Information Forms)	Fire safety details of selected premises; collected by individual fire stations under a standard format; considerable variation in the range and completeness of material collected.	Owen Vickers QFS ph 3247 9074	Spatial reference by street address and AMG coordinate; **paper records only**.
QBIS (Queensland Building Information System)	Queensland Government owned and leased buildings; comprehensive attributes including cost and maintenance data.	Mark Blair, Principal Project Officer, Housing & Public Works ph 3225 8847 fax 3224 4754	Spatial reference by GLR (not lot/plan) and street address; activity classified by ANZSIC; digital (dBQ?); periodic update?.
QINDIS (Queensland Industry Information System)	Queensland industries, especially those with export potential; includes considerable attribute information including products and materials imported or exported; contact names.	Heather Hardy, Office of Business & Industry ph 3234 1816 fax 3234 1399	Spatial reference by street address; digital (Paradox - DOS version, or Rally); about 9,000 records, annual update by survey
Radioactive Substances Register	Details of all premises at which radioactive substances and irradiating apparatus (eg X-ray machines) are stored or used	Paula Veevers or Steven Carter, Dept of Health ph 3252 5446	Spatial reference by street address; digital; constant maintenance.
Recreation Facilities	Details of all sporting and recreation facilities; considerable attribute data; maintained by regional offices	John Tervo, Office of Sport ph 3235 4159 fax 3235 4161	Spatial reference by street address; digital (DBQ and some MapInfo geocoded); some 20,000 records; periodic update from regional offices.
SARNORTH (Search & Rescue - Northern Australia)	Airfields and landing grounds across northern half of Australia; covers all of Queensland; comprehensive attributes including contact details and resident aircraft.	Tony Marshall, A/Manager Search & Rescue, Airservices Australia ph 03 9339 2508 fax 03 9339 2615	Spatial reference by decimal lat/long; digital (dBase IV); restricted access; inclusion of contact names introduces complication of privacy; some 3,000 records; periodic update through survey and collaboration with others eg RFDS, QES, etc.
SOTI (State	Telecommunications sites owned by the State	Tony Althouse Q-tel	Spatial reference by lat/long

Owned Telecoms Infrastructure)	Government including microwave up links, base stations and HF sites	ph 3224 4974 fax 3210 0588	
TAFE	Location of all TAFE campuses	Gill Greenhill TAFE ph 3247 5265	Spatial reference by street address, digital
Telstra Business Finder	All entries in the Yellow Pages including business name, category, location and telephone number.	Telstra	Spatial reference by street address (problems of address accuracy have been experienced); digital (available as CD-ROM product); enterprises classified by both ANZSIC and the Yellow Pages classification; product update half yearly.
Timber Preservation Register	All licensed timber treatment plants; limited range of attributes.	Jack Norton, OIC Chemistry & Wood Preservation Section, Forestry Service ph 3877 9753 fax 3371 2217	Spatial reference by street address and lot/plan; digital (rBase); periodic update.
Welfare Resources	Details of registered child minding centres, welfare centres, refuges, hostels, etc	Rick Lennon, Dept of Family, Youth & Community Services ph 3xx4 6014	Spatial reference by street address; digital; significant privacy issues; constant maintenance
Workplace Register	All registered workplaces under Workplace Health and Safety regulations; considerable attributes relating to staff numbers, site conditions, hazardous materials, etc.	Jim Carmichael, Workplace Health & Safety ph 3227 4997 fax	Spatial reference by street address though there is clearly a proportion of errors in recording postal address rather than physical location; also SLA and postcode; function classified by ANZSIC; digital (Oracle) some 150,000 records; constant maintenance.

ATTACHMENT C

DEPARTMENT OF EMERGENCY SERVICES
BUILT ENVIRONMENT INFORMATION PRIORITIES

ANZLUC	FEATURES	PRIORITY	COMMENTS
1100	Residential accommodation	Medium	Address & classification only
1200	Institutional accommodation	High	Name, address & classification; alarm details if present
1300	Commercial accommodation	High	Name, address & classification; alarm details if present
2100	Food, beverage & tobacco manufacturing	Medium	Name, address & classification; alarm details if present
2200	Textile, clothing, footwear & leather manufacturing	Medium	Name, address & classification; alarm details if present
2300	Wood & paper product manufacturing	Medium	Name, address & classification; alarm details if present
2400	Printing, publishing & recorded media	Medium	Name, address & classification; alarm details if present
2500	Petroleum, coal, chemical & associated manufacturing	High	Name, address & classification; nature of associated hazards; alarm details
2600	Non-metallic mineral product manufacturing	Medium	Name, address & classification; alarm details if present
2700	Metal product manufacturing	Medium	Name, address & classification; alarm details if present
2800	Machinery & equipment manufacturing	Medium	Name, address & classification; alarm details if present
2900	Manufacturing n.e.c.	Medium	Name, address & classification; alarm details if present
3100	Wholesale trade	High/medium	Name, address & classification; nature of associated hazards, alarm details
3200	Retail trade	High/medium	Name, address & classification; nature of associated hazards, alarm details
3300	Personal services & hospitality	High/medium	Name, address & classification; alarm details if present
3400	Finance & insurance services	Medium	Name, address & classification; alarm details if present

3500	Business services	Medium	name, address & classification; alarm details if present
ANZLUC	**FEATURES**	**PRIORITY**	**COMMENTS**
3600	Government administration & defence services	High	Name, address & classification; alarm details if present
3700	Education, health & community services	High	Name, address & classification; alarm details; occupancy details
3760	Public services - emergency	High	Name, address & classification; resource details
3800	Culture & recreation services	Medium	Name, address & classification; alarm details if present
3900	General services	Medium	Name, address & classification; alarm details if present
4100	Transport	High	Name, address & classification; alarm details if present
4200	Storage	High/medium	Name, address & classification; nature of associated hazards; alarm details
4300	Utilities	High	Name, address & classification; associated hazards; alarm details
4400	Communications	High	Name, address & classification; alarm details if present
5100	Livestock (agriculture)	Medium	Name, address & classification only
5200	Field crops (agriculture)	Medium	Name, address & classification only
5300	Horticulture - trees	Medium	Name, address & classification only
5400	Horticulture - row crops	Medium	Name, address & classification only
5500	Forestry	Medium	Name, address & classification only
5600	Aquaculture	Medium	Name, address & classification only
6100	Coal, oil & gas (mining)	Medium	Name, address & classification; nature of associated hazards
6200	Metal ores (mining)	Medium	Name, address & classification; nature of associated hazards

6300	Industrial minerals (mining)	Medium	Name, address & classification only
6400	Gemstones (mining)	Medium	Name, address & classification only
6500	Building & construction materials	Medium	Name, address & classification only
ANZLUC	**FEATURES**	**PRIORITY**	**COMMENTS**
6700	Mining & extractive facilities	Medium	Name, address & classification; nature of associated hazards
7100	Protected areas	Low	Name, address & classification only
7200	Cultural sites	Low	Name, address & classification only
7300	Outdoor recreation	Medium	Name, address & classification only
9100	Land not in use	Low	Name, address & classification only
9200	Environmental rehabilitation activities	Low	Name, address & classification only
9300	Catchment protection	Low	Name, address & classification only

Notes:

1. High priority relates to:
    a. those facilities which represent a **special risk** in terms of concentrations of people or at which hazards are associated; and
    b. public safety and emergency resources.

2. Medium priority relates to:
    a. features with which there are moderate risks associated; and
    b. name, address and classification is likely to be of value for incident location purposes.

3. Low priority relates to:
    a. features with which there are low or minimal risks associated; and
    b. name, address and classification may be of value for incident location.

4. In some areas of identified exposure to hazards such as flood, cyclonic winds, storm tide and earthquake, a high priority may be applied to **all** buildings for the purposes of evaluating community vulnerability.