

Land Management System Conceptual Design

For

Pennington County and the City of Rapid City, South Dakota

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A. Overview

The City of Rapid City and Pennington County have embarked on a study to examine current practices related to the development of property. This effort is intended result in the design of a framework for the selection and implementation of a land management system (LMS) to serve all aspects of the City and County's land development process.

The Situation Assessment defined the "as is" of the land development process at the City. It outlined current organizational structure, business practices and the technology, data and applications currently in place that the City utilizes throughout the development process. This document serves as a foundation upon which the City can begin to implement a LMS that will support land management needs of both the City and County.

This document presents a system conceptual design of the project based upon GeoAnalytics' recommendations. This conceptual system design is a model of the system that captures how the land development process "should be" and how an application will be utilized to implement this process. It includes a discussion of data and application integration, organizational change as well as the scope and expectations of the system to be procured.

Upon completion and review of this document, the project will culminate in an implementation plan that defines the "when", "where", and "how" aspects of the system as well as making recommendations as to "who" and "how much".

B. LMS Goals and Objectives

Two primary goals for implementation of a LMS at the City and the County have been determined. They are:

- *Implement Enterprise LMS Software.* This goal involves the implementation of enterprise LMS software so that all pertinent City and County staff can effectively and efficiently forecast, log, track and retrieve specific and summary data on development activities.
- *Develop One Stop Shopping for Land Development at the City and County.* This customer service focused goal seeks to implement LMS software as a first step toward overall one-stop shopping at the City and County.

Objectives related to the two goals stated above have also been identified. They are:

- *Improve Customer Service.* This objective seeks, in part, to provide customers a web application so that they can both submit and query City and County land management information.
- *Improve Staff Communication.* This objective seeks to provide staff the ability to easily and readily access current and historic data about properties, projects, permits, inspections, complaints or business licenses.
- *Enhanced Productivity.* This objective will be accomplished by standardizing business activities and workflow for all phases of the development process.

C. LMS Recommendations

GeoAnalytics has identified recommendations regarding LMS design constraints. These constraints directly influence how the system will be defined, developed, and implemented.

1. Organizational Recommendations

- a. The LMS must be able to replicate the City's current organizational structure. At the same time, the system must be flexible to organizational change if the City makes revisions over time.
- b. The system must be available to all pertinent users at their desktop.
- c. The system will provide the County with the opportunity to manage any County permits and possibly key in permits issued by other communities in the County.

2. Business Processes Recommendations

- a. The LMS must have the following business functions in its repertoire:
 - 1) Tracking planning projects
 - 2) Permit processing
 - 3) Plan review comments
 - 4) Inspection scheduling and logging of results
 - 5) Report production
 - 6) Email messaging both internally and to applicants
 - 7) Web access for property data retrieval, project/permit/complaint submittals and permit status querying
 - 8) Linking of digital files (e.g., Microsoft documents, digital images, etc.) to permits, complaints, plan reviews and inspections.

- b. The LMS must allow the City and County to replicate their workflow within each permit type and provide the ability for each department to set up their permits as required
- c. The LMS must provide administrative tools to allow City staff to manage the business processes
- d. The LMS must allow for tracking of activities at the property, building and suite levels (i.e., linking permits and other actions to all three levels)

3. Data Recommendations

- a. Relevant data should be housed in a centralized property control database with linkages to an enterprise database that supports other City and County applications such as CAMA and taxation.
- b. The LMS should allow for the conversion of legacy project, permit and inspection data
- c. Logical and physical database models with associated written documentation must be available.
- d. A data dictionary must be provided describing all fields.

4. Technology Recommendations

- a. The LMS must be able to work on a Windows NT network
- b. The City wants to use Microsoft's SQL Server to power the application. The LMS should provide for this ability as well as the option to use other ODBC-compliant relational databases
- c. The LMS must provide the ability for future expansion into field-based computing, remote access and interactive voice recognition
- d. The LMS should provide an API to allow City and County development staff the ability to hit core software functionality from independent programming environments.

5. Application Recommendations

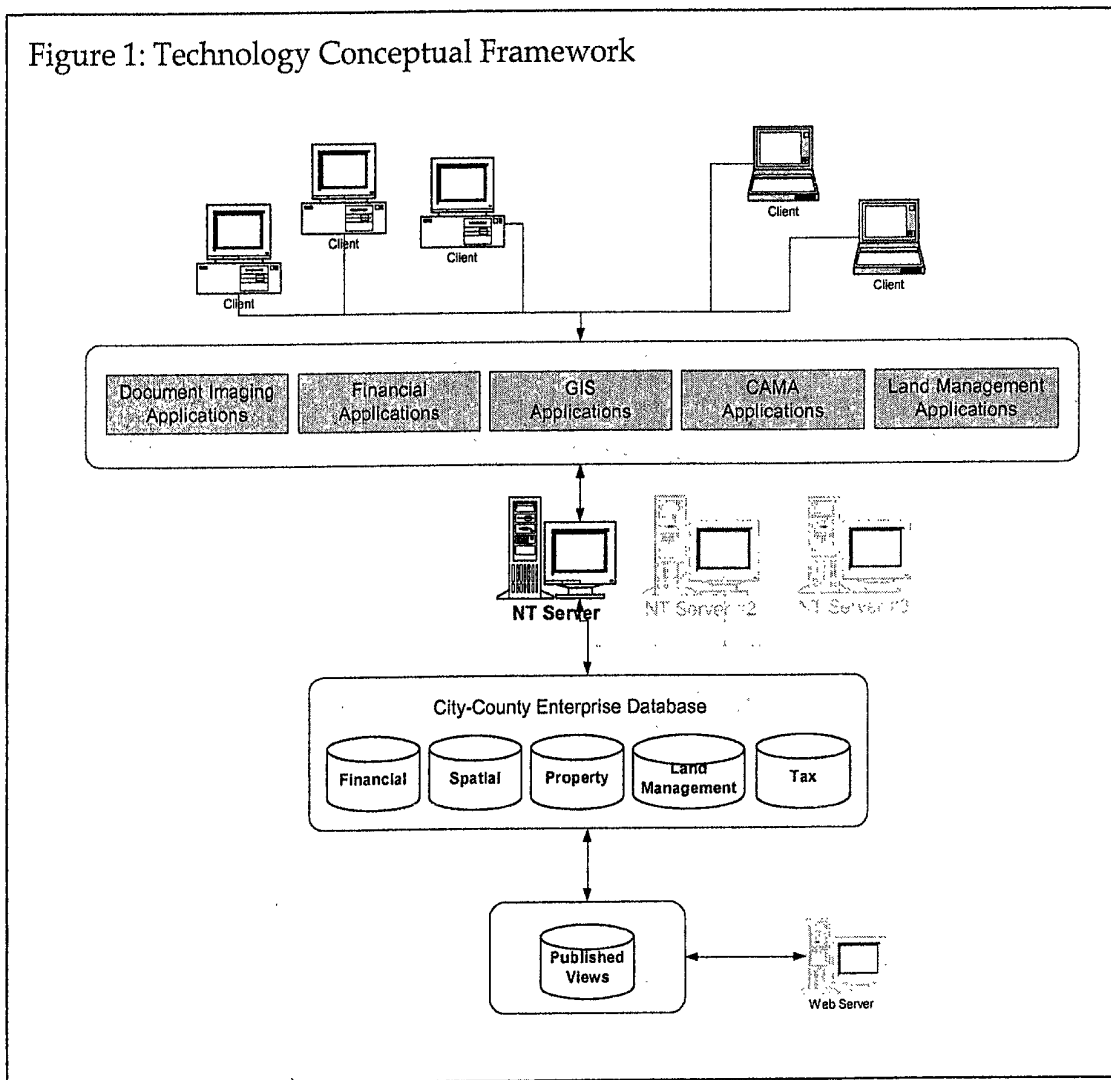
- a. Current application functionality must be replicated within the new system.
- b. The LMS must allow City staff to modify both the GUI and database content.
- c. The LMS must integrate (i.e., pass data back and forth) with Environmental Systems Research Institute's ArcView software on the desktop and ArcIMS on the Internet or over the City/County wide area network.

D. Conceptual Design Analysis

1. Proposed Enterprise Database Design

A primary issue in the implementation of a land management system at the City is the organizational vision of property-based data throughout the City and County. Currently, most data resources are available to both organizations via the HP3000. Both groups wish this to remain so with any new applications.

Recommendation: Phase out the HP3000 out over time and replace it with a series of Windows NT/2000 servers managing "corporate" data. Applications, subject to defined user rights, can be implemented to create, manage and access data. A high level model of this design is shown below.

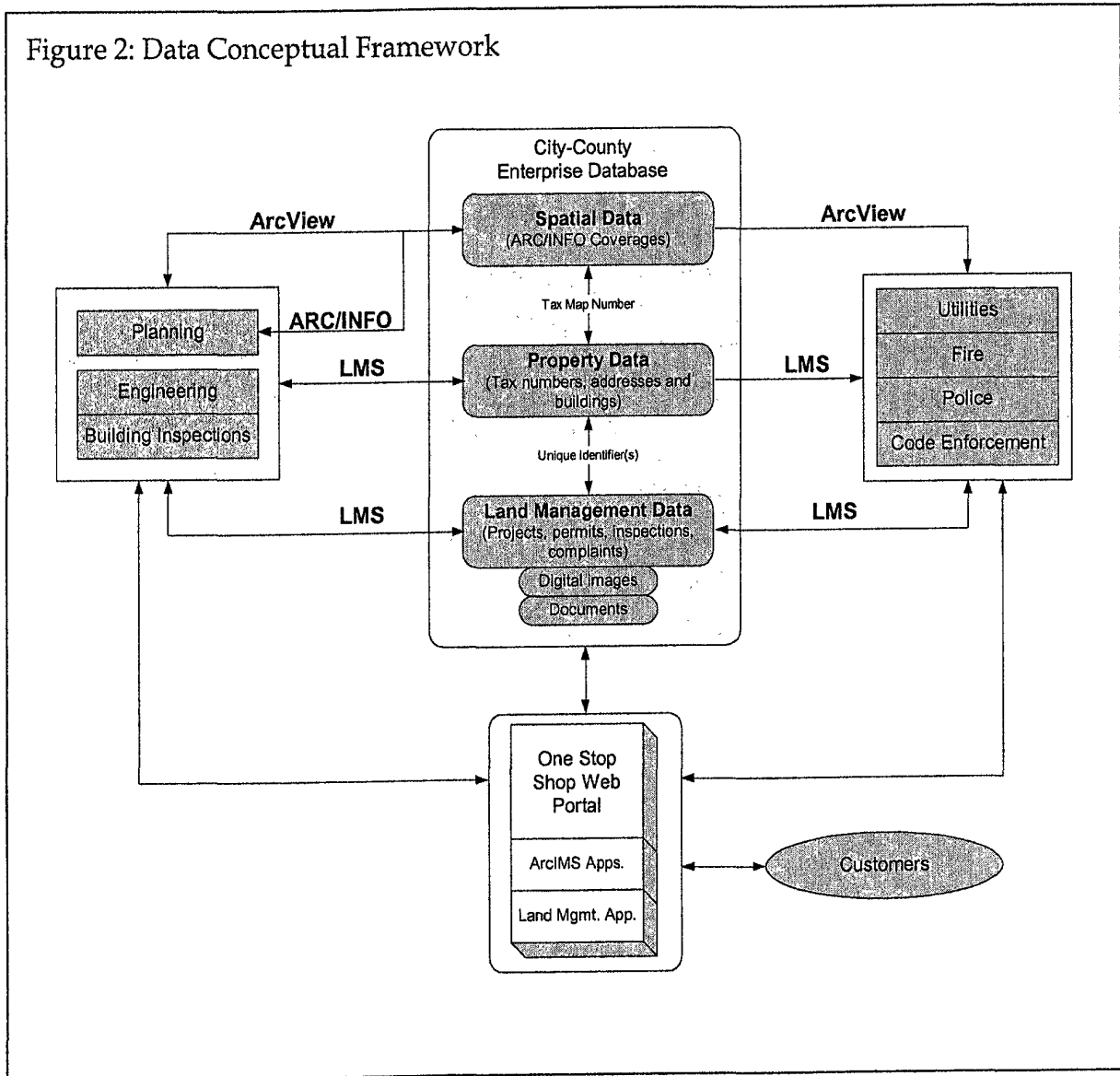


2. Proposed Data Management Model

With an enterprise database approach as outlined above, both the City and County must clearly delineate how data will be managed, who will maintain it and the maintenance procedures they will follow.

Recommendation: It is anticipated that City and County staff will use different tools to create, maintain and utilize both non-spatial and spatial components of the enterprise database. The land management application will most likely create property records and manage their basic attributes.

Figure 2: Data Conceptual Framework



3. Number of Users

The project team has estimated that there are approximately 88 users throughout the two organizations that may have a need to access the LMS at one point during the land development process. These users are spread throughout virtually all Departments and Divisions. It is anticipated that only a fraction of those users would utilize the software at any given moment. The following table breaks down the users by organizational component:

Table 1: User Matrix

Organizational Unit	Total Number of seats	Concurrent Seats
• Finance	2	2
• Planning	17	6
• Building Inspection	11	7
• Engineering	15	6
• Fire	15	6
• Code Enforcement	3	3
• Police	3	1
• Public Works	3	1
• Water Utility	6	3
• Mayor's Office	2	2
• Department of Equalization	1	1
Total	88	37

Recommendation: To reduce initial project costs, the City should procure approximately 25 concurrent licenses initially with additional concurrent licenses purchased as usage and needs dictate.

4. Project Phasing

It is imperative that the phases by which the LMS is implemented are tangible with clearly defined deliverables.

Recommendation: GeoAnalytics recommends that the LMS be implemented in the following order; property control (including the design and implementation of a enterprise database), planning/ plan review, permits and inspections, code enforcement and business licenses. The implementation of this project should fall in line with the City's vision of *RapidChange* in that the system should be flexible, system-

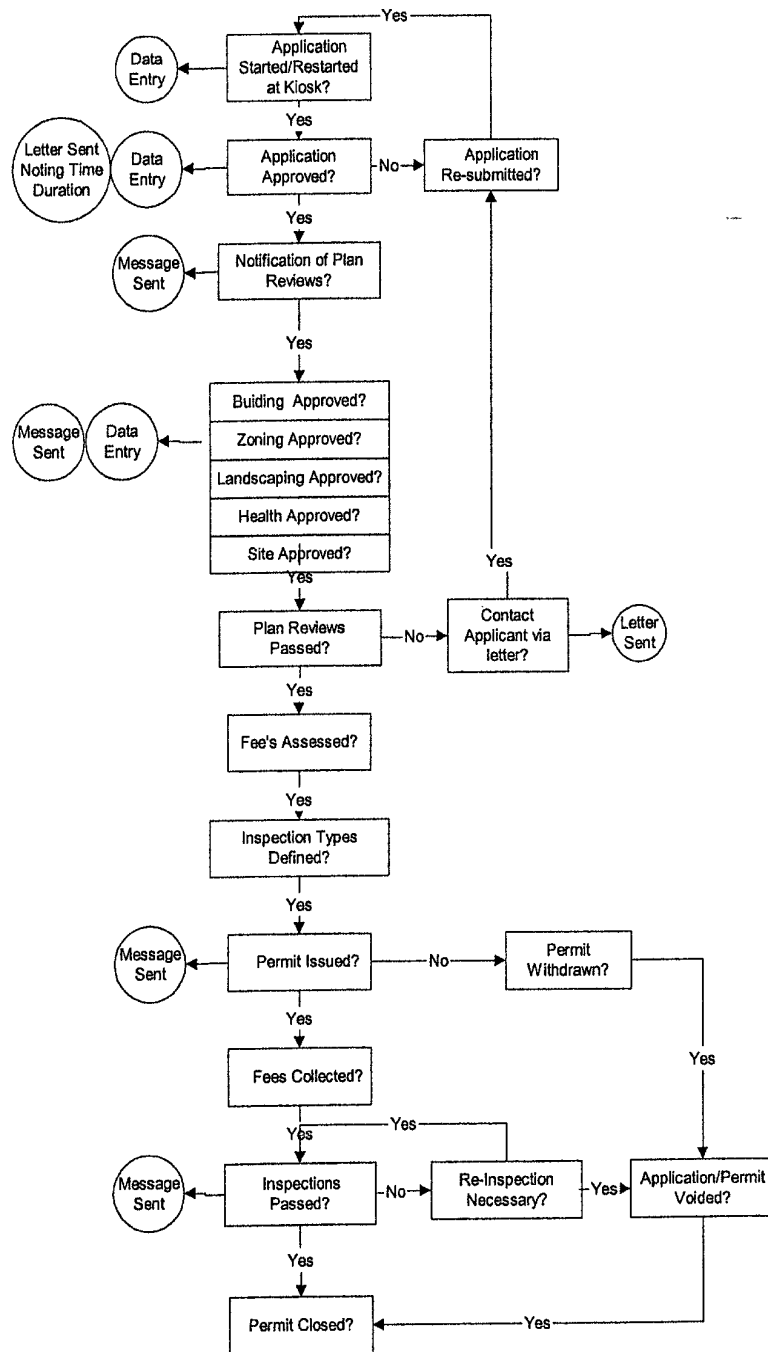
wide and provide effective customer service and present new opportunities to City staff. Specifics relating to project phasing will be defined in the implementation plan.

5. Business Process Design

The City has an interest in some business process design. However, significant business process redesign will be hampered by the need to implement the system as soon as possible.

Recommendation: Because of this, it is anticipated that very little business process redesign will be completed as part of the project. However, to expedite

Figure 3: Example Process Model



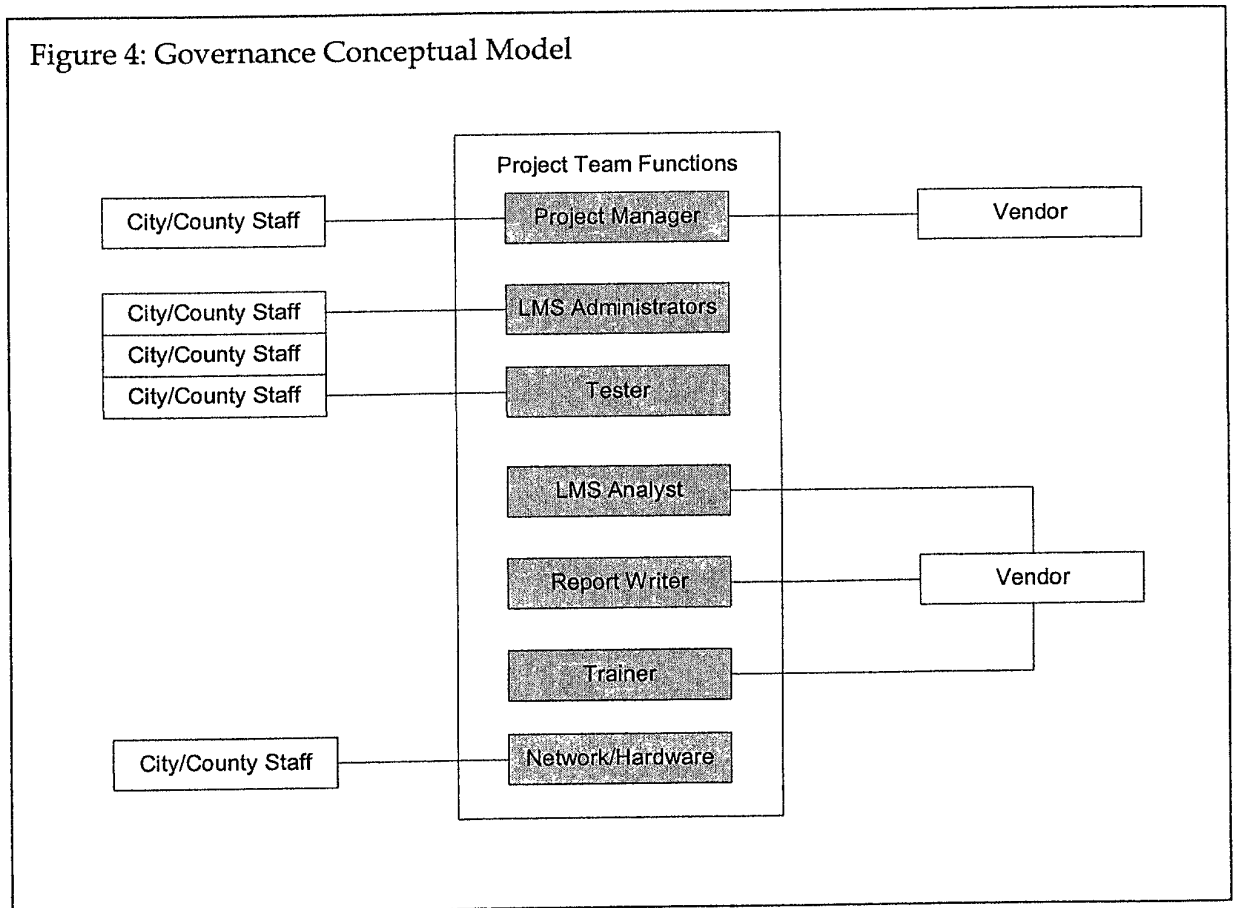
implementation of the project and to reduce some of the service costs, the City should begin to diagram business processes behind the planning, permitting and code enforcement processes prior to that phase beginning so that flow charts will exist prior to implementation. The City anticipates some redesign may need to occur as well as

some “retrofitting” in conjunction with the chosen software’s capabilities. An example conceptual diagram is shown below.

6. Governance Model

Implementation of a LMS is most often successful when it is supported by a project team comprised of staff from all aspects of the organization. Clear definition of the roles and responsibilities of the project team members is also crucial.

Recommendation: A multi-departmental committee should be formed to; a) guide the implementation of the software, b) become trained in its maintenance. It is anticipated that this committee will be made up of approximately 7 people comprised of both management, clerical and field staff. The selected vendor should provide sufficient staff to manage the project. Limited City staff resources require the vendor to play an active role in installing, customizing and implementing the software. Once deployed, the LMS would be maintained predominantly by the LMS administrators located in Planning, Building Inspections and Engineering. The following diagram defines the roles and subsequent assignments to the project team and vendor staff.



7. Web Solutions

The City wants to implement a variety of web capabilities. Of primary interest is the ability to retrieve parcel-related data, check on the status of pending permits, and to submit over-the-counter permits and complaints. The City has been experimenting with ESRI's ArcIMS software. ArcIMS has the ability to not only provide viewing access to the City's spatial data, but also to query property attributes.

Recommendation: The City should implement a LMS that not only provide web services as listed above but also one that utilizes standard technology to allow for integration with other software such as ArcIMS.

8. Data Conversion

If the City is committed to maintaining a centralized database design, then existing data sets will need to be converted into the enterprise database.

Recommendation: Because of limited City staff resources, the selected vendor will most likely complete these conversions. The table below lists the data sets that must be converted into the LMS.

Table 2: Data to be Converted

Data Set	Number of Features
• Property Control	15,000
• Planning projects	500
• Permits	7500
• Inspections	25,000

9. Other Technologies

There are additional technologies that can assist City staff in efficiently collecting, approving and managing the land development process. The project team has expressed an immediate interest in implementing the linkage of multimedia documents to permits, inspections and complaints as well as long term interests in remote access and interactive voice recognition technologies (i.e., for code enforcement staff and inspectors).

Recommendation: The multimedia linkages are standard in many LMS packages and can be implemented without a full-fledged document imaging system in place. However, this capability would require at a minimum the ability to digitize the data to be linked. In some cases, Microsoft documents, digital camera images, etc., data is

already in digital format. However, for data currently captured only on paper, it would require scanning. This will need to be looked at in more detail. Remote access and interactive voice recognition should be postponed until the enterprise database is in place and the LMS is up and running. At this time, further expansion of the system can be discussed.