
FINAL REPORT

PLANNING DATA STANDARDS Guidelines and Best Practices

Prepared for:

**The Regional Planning
Commissioners of Ontario**

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EXECUTIVE SUMMARY

This document is the Final Report of the Planning Data Standards, Guidelines and Best Practices study. The project was initiated by the Regional Planning Commissioners of Ontario through the Regional Information Systems and Planning Data Standards Working Groups and was prepared by MGP Information Systems Ltd.

The primary objective of the project was to identify and document a set of standards to guide the collection maintenance and dissemination of key planning data elements associated with "properties". The project was carried out through interviews and review of reference materials and reports provided by many Regional and Area Municipalities and Provincial Agencies, such as Ontario Property Assessment Corporation, Teranet Land Information Services Inc., Land Information Ontario, MMAH, MNR and Urban Development Institute.

PDS CONCEPTUAL MODEL

The report describes the Conceptual Database Model that addresses municipal planning needs and shows how the PDS Base Property Model relates to existing or proposed database standards that are available in Ontario, such as Municipal Infrastructure Data Standards (MIDS), Municipal Reference Model (MRM), and Single Line Road Network (SLRN). The main point of analysis was to examine the relationships between entities in the PDS Base Property Model and entities residing in other standards. The report concluded that as long as spatial standards are compatible, the entities in two databases can generally be maintained independently, which allows various organizational options for data maintenance. Some of the relationships are more complex, partially based on the fact that the entities may refer to the same real world objects. This leads to issues of entity duplication or overlap. The report identified the need to reconcile the various models and standards in Ontario.

PLANNING PROCESS

The project reviewed planning processes in a range of municipalities (Regional, Area and single-tier) and encompassed the following range of activity: planning applications, policy development, permitting and inspection, complaints and inquiries, and standards and enforcement. The project identified the triggers used to initiate, create, modify and delete data within the Detailed Property Model. The report also identified best practices in the planning process, including development of integrated business systems, enhanced cooperation between levels of municipalities and external agencies, digital data submission standards, data standards within and between levels of municipalities, business function review processes, emphasis on customer service, and information management plans.

PDS BASE PROPERTY MODEL

This section describes the Detail Property Model. The overall objective of this component was to document a consistent set of data elements and their relationships that can be used in support of an evolving set of standards and best practices pertaining to the Ontario Municipal Planning Processes. A key component of the Model includes the concept of municipally-defined parcels. The timing of the subdivision (split or merge) process that creates and retires parcels is such that Provincially-defined processes (taxation and ownership) lag in the creation and deletion of their versions of parcel. Municipalities require a view of parcels that precedes the Provincial definition.

A prototype was prepared to identify a potential implementation of the detailed property model concepts.

RECOMMENDATIONS

The report identified cross-organizational issues that result from a miss-match of respective business processes by the various stakeholders; including Teranet, OPAC, the Province and Municipalities. This usually means that it is not possible for one or other organization to unilaterally act on the recommendation to resolve the issue. The parties involved will need to cooperate to solve the issue with the full understanding that there will be a cost to both parties. This cost will usually be the cost of modifying current work flows, databases or systems.

1) View of Parcel Creation

Inconsistent business processes, as they relate to views of parcel creation and change, leads to multiple identifiers for any one particular parcel. There is currently no satisfactory process to match these different identifiers and gather all of the information available about a parcel. The recommended option is for Teranet and OPAC to provide an "identifier" service to municipalities. When a municipality creates a new parcel, the municipality would ask OPAC and Teranet for an Aroll and PIN respectively. The municipality would use these identifiers for its planning process and ensure that the pre-assigned numbers are passed back to OPAC and Teranet, along with the transaction. The assumption is that the savings to the municipality resulting from solving the identifier problem would more than off-set any potential cost to the municipality of such a service. This recommendation implies an initial study and negotiation with Teranet and OPAC to determine the cost of the service and the promotion of the concept of an identifier service to municipalities.

2) Use of Draft Plan Definitions

The current problem of parcel identifier creation is due in large part to the time lag from when a municipality is working with a new parcel definition to the time when Teranet or OPAC sees the new parcel definition. Teranet currently doesn't see a new parcel until it is submitted for registration. By this time, the parcel may have existed for a long time in draft plan form. The "identifier service" (Recommendation #1) would be greatly facilitated if draft plans were available to Teranet and OPAC as early as possible.

It is recommended that municipalities institute a process to post electronic copies of draft plans on publication servers which could be accessed by Teranet or OPAC over a network. This recommendation would require pilot projects to establish proof of concept and define the benefits.

3) Parcel Custodian

There is a data quality issue involving the duplication of common parcel attributes, such as address, and currently there is no easy way to bring data from various databases to a higher level of consistency. The report recommends the

concept of one steward of the database that manages the incorporation and authentication of parcel information. This common database of parcel information would contain some key attributes, such as address and legal description. Each of the players (Municipality, Teranet, OPAC) would still keep their own organization-specific attribute sets about the parcels. The recommendation is for the Planning Commissioners to facilitate Municipalities, OPAC and Teranet adopting a stewardship concept and would involve a project to refine the concept, to negotiate with Teranet and OPAC and to work with municipalities to implement the concept. A pilot project in a municipality would be required to prove and actually refine the actual operation.

4) Work Towards Adopting an Addressing Standard

Any particular address point may have several different address values in different databases which may be valid for the function, but may not reflect the municipalities legal address authority. The report recommends that for any point in space there is only one valid address for that point and that all users and keepers of addresses use that one valid address. The report recommends that a data definition project for addresses should be undertaken jointly by OPAC, Teranet, Municipalities and Land Information Ontario (LIO). LIO, as the Provincial Government representative, would coordinate this effort with Federal departments and agencies, such as Canada Post. The coordination of the building of the actual address database should be undertaken by LIO, which requires ongoing business and funding relationships to be established with individual municipalities.

5) Data Model Stewardship

The PDS Base Property Model is only a start at reconciling issues of parcel definition and needs to be further refined and promoted. The report recommends two organizational instruments. A steering committee whose role is to oversee and steer the evolution of the model, and a steward to deal with the operational aspects of the model, including ongoing design, relevant documentation, promotion of the model and its concepts.

6) Teranet and OPAC

A historical anomaly that needs to be addressed is the distinction made between the mapping of ownership parcels and taxation parcels. The history of the different Provincial departments and the manual processes involved made it difficult to reconcile the distinction. While there is a small percentage of cases where the parcels represented are different, the potential benefits of merging the definitions far outweigh the overheads of dealing with the exceptions. Addressing this issue requires cooperation between Teranet and OPAC. The report recommends that there are a number of ways that the Planning Commissioners and Municipalities could encourage this cooperation. The mandate and activities of OPAC will be driven in large part by the Municipalities, who have a direct stake and direct representation on the Board of OPAC. The Planning Commissioners could encourage their Municipalities to support OPAC in moving in the direction of amalgamating parcel fabrics.

7) Digital Submission Standards

Various attempts at imposing digital data standards on the development community have met with varying degrees of success, partially due to the lag of adoption of digital techniques within the development community. The ideal situation is that submitted plans could be easily incorporated into municipal databases, which implies that the data is submitted in a form that conforms to data standards for attributes and to digital mapping standards. The rules and formats should be standardized throughout the Province. The report recommends that municipalities utilize by-laws requiring submissions in a digital form; but this requires that a clear digital standard be prepared. The report recommends initiating a project to create an endorsed standard for digital submission, involving municipalities with experience, plus the Urban Development Institute that must live with the standards.

1.0 INTRODUCTION

1.1 Background

This document is the final report of the “Planning Data Standards, Guidelines and Best Practices” Study. The project was initiated by the Regional Planning Commissioners of Ontario, through the Regional Information Systems and Planning Data Standards Working Groups.

MGP Information Systems Ltd. was retained to conduct a study regarding the creation of a set of standards concerning property data and the relationship to the Planning Process.

The project consisted of a number of interviews with various interested stakeholders throughout the Province. A wide variety of materials were provided to MGP Information Systems Ltd. by these stakeholders, including planning process documentation, data models, and system designs.

This material and the interviews were consolidated and analyzed to produce the results of the Study.

1.2 Objectives

The primary objective of the project was to identify and document a set of standards to guide the collection, maintenance, and dissemination of key planning data elements associated with “properties”.

The final report was to:

- 1) provide an inventory of sources of data for the database model
- 2) outline appropriate sources of data.
- 3) provide a detailed Property Database Model for “property”
- 4) provide a Conceptual Data Model relating data sources to the Detail Model
- 5) define a “best practices” Planning Process Model and relate it to the Detail Model
- 6) provide strategic recommendations concerning maintenance of property-related data within the context of the Database Model

One part of the project was also to develop an example database and prototype that would illustrate the concepts of the Detail Property Model.

1.3 Document Contents

This document and the associated material contain the results of the project.

The particular parts are:

- ***Planning Process***
This section contains the results of the “Planning Best Practices” study. Also included is the information about sources of data that are needed to support these processes.
- ***Detail Property Model***
This section contains the actual Detail Model. This includes the model diagrams and the rationale for the various design decisions made in the model. As well, the example database and browser (“prototype”), is outlined.
- ***Conceptual Model***
This section contains the Conceptual Model, along with an explanation of how this higher level model relates to the Detail Model.
- ***Recommendations***
This section lists a number of specific recommendations that have resulted from the Study.

The **Appendices** contain:

- ***Data Sources***
This is a detailed list of data that are used in the planning process. This list is presented by classification of type and source of data.
- ***Detail Property Model***
This is the technical detail of the Entities and their attributes that constitute the Detail Property Model.
- ***Processes***
This section contains detailed supporting information that shows the processes as found in different municipalities throughout the Province.

- **Prototype**

The example database and browser (“prototype”) is provided on a CD. This section of the document contains the installation instruction for the software on the CD.

1.4 Project Chronology

1.4.1 Information Collection and Interviews

This activity consisted of many meetings with various RISWG committee participants as well as other stakeholders in the province. The list of participants included:

- Region of Waterloo
- City of Kitchener
- City of Toronto
- York Region
- Town of Markham
- Region of Ottawa-Carleton
- Land Information Ontario / MNR
- Ministry of Municipal Affairs & Housing
- Region of Halton
- Ontario Property Assessment Corporation (OPAC)
- Teranet Land Information Services Inc.

There was also a large amount of reference material that was given to the project. This material consisted of Data Models, Process Models, Procedure Manuals, and System designs. As well, the study participants provided a number of reports that had investigated data sources and classification.

The following is a list of materials provided for use in the project.

1.4.1.1 City of Toronto

- Development Approval Manual – Procedures to follow for various planning and approval related processes

- Preliminary Business Process Review – report on the updating of business processes that will be needed as a result of amalgamation
- Toronto Municipal Code : Development Approvals – council report defining development approvals
- Condominium Process – updated condominium approval process
- Site Plan Approval – Draft procedure for site plans, updated for amalgamation
- Site Plan Approval – Old procedures used in the former 6 cities in Toronto
- Folder Data Definition – Code tables and attribute lists required in planning “folders”
- GDI Model Diagram– diagram of data model for Land Parcels
- GDI Model Entities – entity definitions with attribute definitions
- Toronto Property System Model – data model diagrams and entity definitions
- Central Property Registry - detailed technical definitions
- Planning Application Tracking System (PATS)

1.4.1.2 Region of York

- Data Dictionary - Full list and description of attributes
- Markham Property Characteristics Data Model - data model diagrams and entity/attribute definitions

1.4.1.3 Town of Richmond Hill

- Property Data Model - diagram and entity/attribute definitions for property model

1.4.1.4 Town of Markham

- LIS Data Dictionary - Diagram and entity/attribute definitions for property characteristics

1.4.1.5 Region of Waterloo

- Information Management Plan – Business activities and information products
- Development charges process – planning processes for subdivision application review
- SLRN Design – model diagram and entity/attribute definition

- Corporate Data Model – overview diagram
- Corporate Data Model – entity/attribute list
- Corporate Data Model – subject categories and conceptual entity definitions
- Digital Development Plan Submission Standard – process and data definitions

1.4.1.6 *City of Kitchener*

- Reference database – diagram and implementation plan
- Reference database – S-Designor model file

1.4.1.7 *Region of Ottawa-Carleton*

- Property Data Model - S-Designor model file

1.4.1.8 *Region of Halton*

- Integrated Halton Area Planning System
- Development Application Tracking System
- Digital Data Sets
- Halton View

1.4.1.9 *Province of Ontario*

- NRVIS as source for Screening/ Plan review – table of requirements and sources of data
- Land Information Management for Provincial Policy Statement – report
- Information Technology Strategy - report

1.4.1.10 *OPAC*

- OASYS Manual

1.4.1.11 *Teranet Land Information Services Inc.*

- Implementation Manual

1.4.1.12 *Urban Development Industry*

- Development Industry Template

1.4.2 Modeling

The modeling phase of the work consisted primarily of analyzing and combining the various materials provided to the project. The intent was to “distill” from the various models a common view of parcel data, and to augment this model with information about planning processes.

This same process was repeated for the “Best Practices” model and the Conceptual Data Model.

There were several iterations of obtaining feedback on the work from the various RISWG Committee representatives, as well as other experts on the subjects.

1.4.3 Strategy Analysis

The recommendations came from a number of activities. The interviews provided a rich set of opinions and suggestions that were incorporated into the recommendations. Also, during the modeling process, a number of issues kept emerging. These issues formed the basis of some of the recommendations.

2.0 Planning Data Standards CONCEPTUAL MODEL

2.1 Introduction

This document describes a Conceptual Database Model that addresses Municipal Planning needs. The model shows how the Planning Data Standards (“PDS”) Base Property Model relates to a number of existing or proposed database standards that are available in Ontario. This model is not intended to be a comprehensive database design; rather it is the basis for further research into data standards.

2.1.1 Process

The model was created through an analytical process. The various data standards were examined, and the key relevant entities were diagrammed. This was combined with the PDS Base Property Model.

Further analysis of the standards revealed which of the standard entities had a relationship or overlap with the PDS Base Property Model. These relationships were diagrammed in the model. The critical overlaps are described in more detail in later sections.

2.1.2 Objectives

The main objective of the analysis is to show how the PDS Base Property Model fits into the overall information needs of the municipal planning process. The Conceptual Model illustrates the types of data that are required to support the full planning process. The Conceptual Model also shows where this data may be found.

Another purpose of the analysis is to highlight any duplication among the standards. This is of primary importance to those organizations that may wish to implement the PDS Base Property Model. For example, if the implementing organization already has a populated MIDS implementation, then the Conceptual

Model would show where the MIDS database could be used to integrate with the PDS Base Property Model database.

A more strategic objective is to use the analysis to define the areas that require further research and standardization efforts. It is precisely in those areas where there is overlap between standards and models that require better definitions.

2.1.3 Technical Consideration

The model is expressed in terms of an Entity Relationship Diagram. However, this is used primarily as a formalism to illustrate high level relationships, and it is not to be interpreted in a strict relational database paradigm.

2.2 Standards

A number of standards for data are available in the Province of Ontario. Some of these standards are formally articulated; some of them are *de facto* standards that are imbedded in actual databases. This section provides a brief description for each.

2.2.1 Single Line Road Network (SLRN)

The SLRN is an Ontario wide standard for the design of labeled road network databases. This standard is formally described and a number of municipalities have adopted variations of the design. The scope of this standard is limited to representing all roads as single line centrelines, with addresses represented as offsets from intersections. The lines and intersections form a network that is suitable for routing and other such applications.

2.2.2 Municipal Infrastructure Data Standard (MIDS)

This is a standard used in Ontario for the design of databases containing information about municipal infrastructure (such as roads, sewers, etc.). This standard is stewarded by The Joint Venture (a cooperative effort of MISA and the TRI-Committee). Databases designed according to the standard have been implemented by a number of municipalities.

2.2.3 Land Information Ontario (LIO)

LIO is the Ontario Governments initiative for the ongoing rationalization and maintenance of land related information. Under this initiative, there are a number of data standards and databases that are of interest to Municipal Planning.

2.2.3.1 *NRVIS Data*

The Ministry of Natural Resources (MNR) maintains a large database of thematic information that is useful to Municipal Planning. This includes environmental data, resource information, etc.

2.2.3.2 *Digital Base Maps*

The most common Ontario wide source of large scale mapping is Ontario Base Mapping (OBM). This mapping standard establishes a commonly used set of feature representations and symbology. There is considerable data available in this form.

2.2.3.3 *Other Databases*

The LIO project is coordinating the upgrade and continued maintenance of a number of other databases held by the Ministries in the Land Cluster. This includes such information as Well Data.

2.2.4 Municipal Reference Model (MRM)

The Municipal Reference Model is a standard stewarded by the Joint Venture. This standard is more *functional description* oriented, but it also contains the primary high level entities that are of concern in most municipal processes. This is a reference model only and not intended for direct implementation.

2.3 Conceptual Model

The following diagram illustrates the different models and their relationship to the Property Base Model. Note that the diagram is not to be interpreted in a strict relational database paradigm.

2.4 Analysis

This section examines in detail how the various models and standards relate to each other. The basis for the analysis was to examine the various entities and their attributes in order to discover duplication and to categorize cross model relationships.

This type of analysis is important to database implementers who need to combine the data standards in an implemented system, or who need to consider how data from various sources can be used to populate their databases.

This analysis is also useful to standard setting bodies to highlight the areas where better coordination between groups is required or where more research and standards rationalization is needed.

The following discussion highlights some of the more important findings.

2.4.1 General Relationships

The main point of analysis was to examine the relationships between those entities in the PDS Base Property Model (inside entities) and those entities that reside in the models representing the various other standards (outside entities).

A majority of the entities that are found outside of the PDS Base Property Model have a simple, general relationship to the entities within the PDS Base Property Model.

Typically, these generally related outside entities are spatially described by points, lines or polygons that *overlay* the PDS Base Property Model parcel fabric.

The attributes of these generally related outside entities are distinct from the attributes of the entities within the Property Model.

There are no static relationships that need to be maintained between the instances of the external entities and the instances of the entities within the Property Model.

The relationships that exist are dynamic and they are determined by spatial operations. For example, the Municipal parcel entity does not have an attribute that describes soil information. To determine the soil information for a particular parcel, the spatial representation of the parcel is overlaid with the spatial representation of the Soils entity. The Soils entity attribute value then can be dynamically associated with the parcel.

This general relationship is depicted in the diagram as a dashed line between the groups of entities in the different standards.

From an implementation point of view, the main issues have to do with the spatial representations used by the PDS Base Property Model and the other database. The correctness of the relationship is determined by the accuracy, the datum, the projection etc. of the spatial representations.

As long as the spatial standards used are compatible, the generally related entities in the two databases can be maintained independently. For example, as the polygon set for Soils is updated, there is no requirement to check the Parcel fabric to maintain referential integrity.

This implies that for generally related entities, the data could be maintained in an organization other than the Municipality, using unrelated processes. This allows various organizational options, including purchasing data, or Wide Area Network data sharing based on a stewardship model.

2.4.2 Specific Relationships

Some of the entities that are found outside of the PDS Base Property Model have a more complex relationship to the entities within the PDS Base Property Model. This complex relationship may be based on the fact that the outside entity and the inside entity both refer to the *same* real-world objects (e.g. buildings).

Another type of complex relationship may exist between outside and inside entities that refer to *different* real-world objects, but because these real-world objects have a logical or physical relationship, the entities representing them are also related.

The implication of these complex types of relationships is that the storage and maintenance of data has to be far better coordinated than for the simple type of relationships.

The two types of complex relationships can be classed as *entity duplication* and *attribute overlap*.

2.4.2.1 Entity Duplication – General Comments

Certain entities are duplicated in several of the models. These entities describe the same physical features. This is quite understandable, since the different models are designed to deal with different aspects of essentially the same physical geography.

For example, the "Streets" entity appears in some form in several models. The problem that this creates is that in an implementation of these models, information about the same feature may appear in different databases. This can lead to some general problems:

2.4.2.1.1 Attribute mismatch

The value of the same attribute about the same feature may be different between databases. For example, one database may spell a street name as "Scarborough" while the other database spells the same street as "Scarboro". The attribute values can also be the result of different update cycles, or of different measurement methodologies.

2.4.2.1.2 Existential Mismatch

A physical feature may be represented as an entity instance in one database while not appearing in another. This usually results from the processes that are used to update (create, delete) instances in the databases. For example, the Property database may contain the instance of a street in a new subdivision, while the MIDS database has not been updated with an instance of that street.

2.4.2.1.3 Definitional Mismatch

The same features may be defined differently in the different models. An example of this is that one model may define a street segment entity as spanning between centre points of intersections, while the other model defines the street segment entity as spanning the boundaries of the polygons defining intersections. This leads to different (yet valid) attribute values. For example, the “length of segment” attribute values will be different.

While the first two types of problems are implementation and operational specific, the third problem needs to be addressed at the standard setting level. In fact, the third type of problem is the hardest to work with.

2.4.2.2 Specific Duplicated Entities

The analysis resulted in the identification of a number of entities that are duplicated. The particular entities that appear in several models and are of most concern are listed below.

2.4.2.2.1 Streets

Streets are represented differently in the various standards. This is primarily due to the different perspectives of the models. MIDS has to deal with infrastructure in the road right-of-way, while the SLRN is concerned with addressing. This leads to different ways of defining segments (definitional mismatch).

2.4.2.2.2 Street Names

The various models use street names and have different attributes for the representing entity.

This difference is primarily due to lack of standards rather than any technical considerations. Since street naming is a standardized activity outside of data modeling (e.g. most municipalities maintain an authority list of street names), there is no reason why the various models should not adopt a standard street name entity definition.

2.4.2.2.3 *Easements*

The duplication of easements in the models is similar to problems with street segmentation. There is no standard for defining the extents of easements.

From an implementation perspective, however, the PDS Base Property Model does not demand a particular segmentation strategy for easements. The definition of easements used in the Parcel model implementation can be modified to conform to any existing definitions implemented in the MIDS.

2.4.2.2.4 *Address Points*

There is a basic conceptual difference between the PDS Base Property Model and the SLRN in how addresses are viewed. In the PDS Base Property Model, addresses are distinct identifiable points that are associated with a parcel. In the SLRN, the address points are offsets along the centreline of road.

This difference can have major implications on implementation or in sharing data between databases based on the two models. In particular, in the generation of notifications based on proximity, there can be major differences in the content of the resulting mailing lists. Other issues arise in the way Condominiums are represented.

This whole area of address representation that is standardized yet meets the various needs of different users needs concerted efforts on the part of the various organizations involved. In particular, Municipal governments, Provincial Ministries, Teranet, OPAC, Utility companies and Federal organizations such as the Post Office and Elections Canada all have a stake in creating a good definitional standard as well as a good authority list of actual addresses.

2.4.2.3 *Attribute Overlap*

The Attribute Overlap type of complex relationship may exist between outside and inside entities that refer to *different* real-world objects, but because these real-world objects have a logical or physical relationship, the entities representing them are also related.

Problems may arise when attribute values are inconsistent with the real-world relationship of the entity instances. This issue can be dealt with when the entities in question are in the same database through checking procedures. However, if the entities are maintained in different databases based on different standards, then it's not possible to check consistency.

In the context of the Property Base Model and other related models, this problem is of concern when dealing with land usage.

2.4.2.3.1 Land Use: Zoning

The various entities in the different models that pertain to land use will be different in both definition and in the domains of the attribute values used.

The actual land areas that are classified will probably be non-collinear. This means that it is not possible to get an instance to instance match. For example, the Zoning boundaries defined by the Municipality will likely be different from the boundaries defined in the NRVIS database for land use designation. So the same physical piece of land will be represented in the overlap of two different entities.

Further, the actual land usage codes and classifications are usually different; hence the values of instances are not easily translatable. For instance, one classification scheme may use a code from 1 to 10, while another uses a letter code from A to Z.

This is a very complex problem to overcome when either trying to merge standards in a design, or when data is to be used from databases based on different standards.

2.5 Conclusions

The analysis of the models and standards that impact the Planning Process points out that there are overlaps and conflicts both between the various standards and also between the standards and the Property Base Model. This is to be expected, since these models were all developed independently of each other, and their

design criteria addressed different objectives and needs. Hence there is no implication that they are deficient. It is only when one tries to combine their designs or the data that is stored according to their designs that problems arise.

The purpose of this report was to examine how these different models fit together. The identification of the various issues points out that the task of proceeding to a better integration of data sources is not trivial.

Any implementation of systems or databases that involve more than one of the existing standards has to proceed with careful analysis of the issues presented in this report. Design decisions have to be taken to reconcile the overlaps.

There are a number of directions for further work that needs to be undertaken:

A process should be put in place to reconcile the various models. This would involve a committee composed of the various model stewards whose role would be to modify the models so they can be implemented harmoniously.

The issue of the Address entity is a special case that should be attacked independently of the various models. This entity is used in nearly all of the models, and it is of operational significance to a large number of stakeholders at all levels of government.

There are two initiatives needed, one to define a data standard for address, the other to create a mechanism for creating and maintaining a province wide authority list of addresses.

The first initiative would create a data definition that could be adopted by all the different models. It should be possible to define some universal standards for values and format of the attributes of these entities, including a standard for address value syntax. This exercise would involve a working group of all stakeholders. The key consideration that would set this effort apart from previous such efforts would be a broadening of scope. In the past, such efforts were keyed on particular applications (e.g. routing, emergency response), hence the results were not universally usable. What is needed is a standard that covers all applications.

The second initiative is to create an operational system in the province that creates and maintains one authority list of valid addresses. This is a massive organizational exercise that needs strong leadership from the Province. In fact, the measure of success of such an effort would be if the major address databases (held by Bell, other Utilities, Canada Post, Municipalities, Teranet, OPAC, LIO, etc) were reconciled to one authority list.

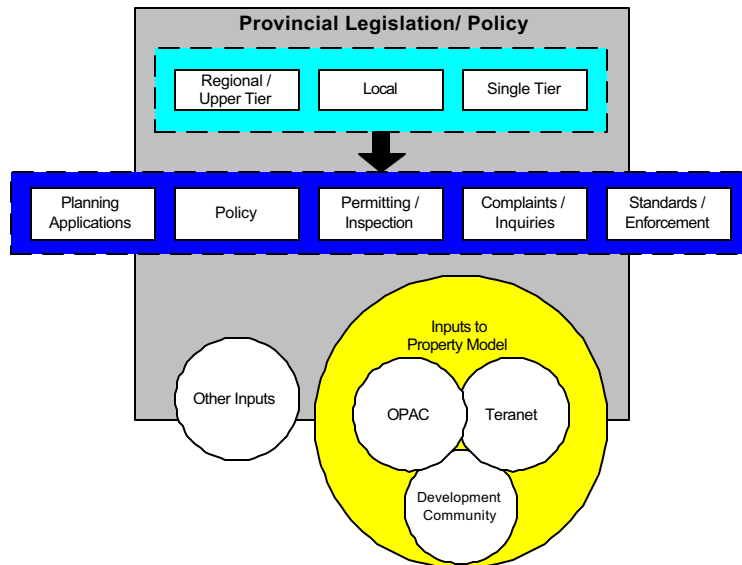
3.0 PROCESS

The project looked at a generalized Planning Process Model based on current legislation and best practices, in order to identify the triggers used to initiate the creation, modification and deletion of data within the detail database model. The Planning Process Model is a major component leading into the database design and the ultimate strategies for implementation of planning data standards.

The Planning Process Model was to consider a broad range of municipalities from large urban regions to smaller, lower-tier jurisdictions. Plate 1 identifies the scope of the planning process that was examined for this project. The process recognizes the relationship between Provincial legislation and policy statements that direct and guide the planning process in Ontario, and the impact on Regional/upper-tier municipalities, local municipalities and single-tier urban municipalities. We observed that the data inputs and outputs were substantially similar between the levels of municipal government and that what varied were the sources of data and complexity and breadth of data required.

PLATE 1

SCOPE OF THE PLANNING PROCESS



The Planning Process, for the purpose of this study, was defined as covering five key areas:

- Planning Applications
- Policy Development
- Permitting and Inspection
- Complaints and Inquiries
- Standards and Enforcement

This definition of the scope of the planning process recognizes that not all of these activities typically occur within a single municipality. Some functions may be the responsibility of Public Works or Engineering Departments. The broader scope was required in order to cover the full spectrum of the land development and planning process. This provided the opportunity to look at the widest range of data inputs and outputs as they relate to all of the components of a property data model, regardless of the level of municipal responsibility. For example, this enables us to analyze the planning processes which creates proposed parcels in plans of subdivision or severance applications, right through to building permits and construction, which result in new structures and to the maintenance of integrated records to deal with complaints, inquiries, standards and enforcement. The key emphasis for this project was placed on the planning applications, policy development and permitting and inspection functions.

Table 1 indicates the business functions as they were categorized under the planning process model. For example, planning applications considered the full range of applications under the Planning Act and other legislation ranging from regional and local official plan amendments, to minor variances and specialized legislation, such as the Niagara Escarpment.

TABLE 1

CATEGORY OF BUSINESS FUNCTIONS				
Planning Applications	Policy	Permitting / Inspecting	Complaint & Inquiry	Standards / Enforce.
<ul style="list-style-type: none"> • Regional OP Amendment • Local OP Amendment • Zoning • Subdivision • Condominium • Part Lot Control • Consent • Rental Housing Protection Act • Site Plan • Minor Variance • Holding / Interim Control • Cash-in-lieu of Parking • Provincial • Niagara Escarpment • Parkway Belt • unique local • Ravine (Toronto) 	<ul style="list-style-type: none"> • Regional OP • Local OP • Forecast / Projections • Monitoring Change • Distribution 	<ul style="list-style-type: none"> • Application Intake <ul style="list-style-type: none"> — Building Permit — Demolition Permit — Sign Permit — Heating / Plumbing Permit — Other Related Approvals <ul style="list-style-type: none"> - Street Allowance Construction - Heritage Conservation Authority approval - Rooming House / Health • Plan Review • Field Review/Inspection • Permit Issuance 		

In order to define the best practices in a range of municipalities, the following interviews and report collection were taken with:

- Region of Waterloo
- York Region
- Region of Ottawa-Carleton
- Region of Halton
- City of Toronto
- City of Kitchener
- Town of Markham
- County of Oxford
- Town of Richmond Hill

In addition, interviews were carried out with:

- Land Information Ontario
- Ministry of Natural Resources
- Ministry of Municipal Affairs and Housing
- Ontario Property Assessment Corporation
- Teranet Land Information Services Inc.
- Urban Development Institute

3.1 Zoning and Official Plan Amendment Process

Plate 2 defines the high level business process for the zoning and official plan amendment business processes. Generalized categories of data input and output are defined relative to the business functions. The high level process model attempts to define the processes, regardless of the level of municipal government responsible for zoning and official plan amendment functions and the size and scale of the municipality.

It was our experience in going through the interviews and document collection phases, that the best practices were being developed in the details of the business functions and that the general process across the range of municipalities was consistent with the requirements of Provincial legislation and policy.

Municipalities have the responsibility in the zoning and official plan amendment process to ensure that both Provincial policy requirements and legislation are being maintained and that the local requirements, as documented in regional or local official plans, are implemented or effectively analyzed. Based on these requirements, the development industry has a responsibility to satisfy municipalities with a wide range of data about a zoning or official plan amendment application. Through the work of the Urban Development Institute (UDI), these data requirements are documented in the appendices. The data requirements frequently may be required in the form of detailed inventories and studies carried out by planning applicants, including environmental assessments, market studies, transportation and servicing analysis.

We noted in the interview and research process that many of the special studies and inventories enhance the property information base, but are difficult to link into municipal information systems in order to retain the results of these specialized studies. In large development projects, such as large secondary plans in the Toronto area, there are multiple disciplines involved and municipalities have not effectively found a mechanism of coordinating the systematic inventory and collection of data required for planning applications.

We did observe that municipalities are recognizing this issue and are starting to develop standards for developers and planning applicants to submit standardized data that could be more readily integrated into existing municipal databases.

The Zoning and Official Plan Amendment Process required municipalities to review and analyze the property and planning history for site specific applications. Planning applications do not occur in isolation. They are frequently related to previous decisions on the same or adjacent properties. Development may go through many variations before the final project is constructed and municipalities have a need to be able to extract and review the past history on the same or adjacent/similar properties. This access to historical records was identified in all municipalities as a major issue that was time consuming and difficult to achieve. The ability to track property and planning history is further complicated by the changes that the property database may go through as it moves through a planning process. In many municipalities, files were stored by original developer's name, commonly known names for developments, or legal descriptions that may change as property is developed. The common municipal identifiers of Assessment Roll Number or municipal address also change over time, which further complicates the retrieval of information stored against these common identifiers. It was our experience that municipalities require to effectively retrieve past history, which may be very relevant to current zoning and official plan amendment applications.

A similar problem is encountered with respect to storing the application information regarding specific zoning and official plan amendment applications. In the development tracking systems that we reviewed, they were stored against Assessment Roll Number, municipal address or owners' name. All of these identifiers are likely to change over time and that complicates the ongoing retrieval of application history.

A number of municipalities were in the process of implementing development tracking systems, such as Amanda, and relating it to digital mapping. However, they were encountering difficulty in the development tracking system linking to the evolving history of the parcel fabric.

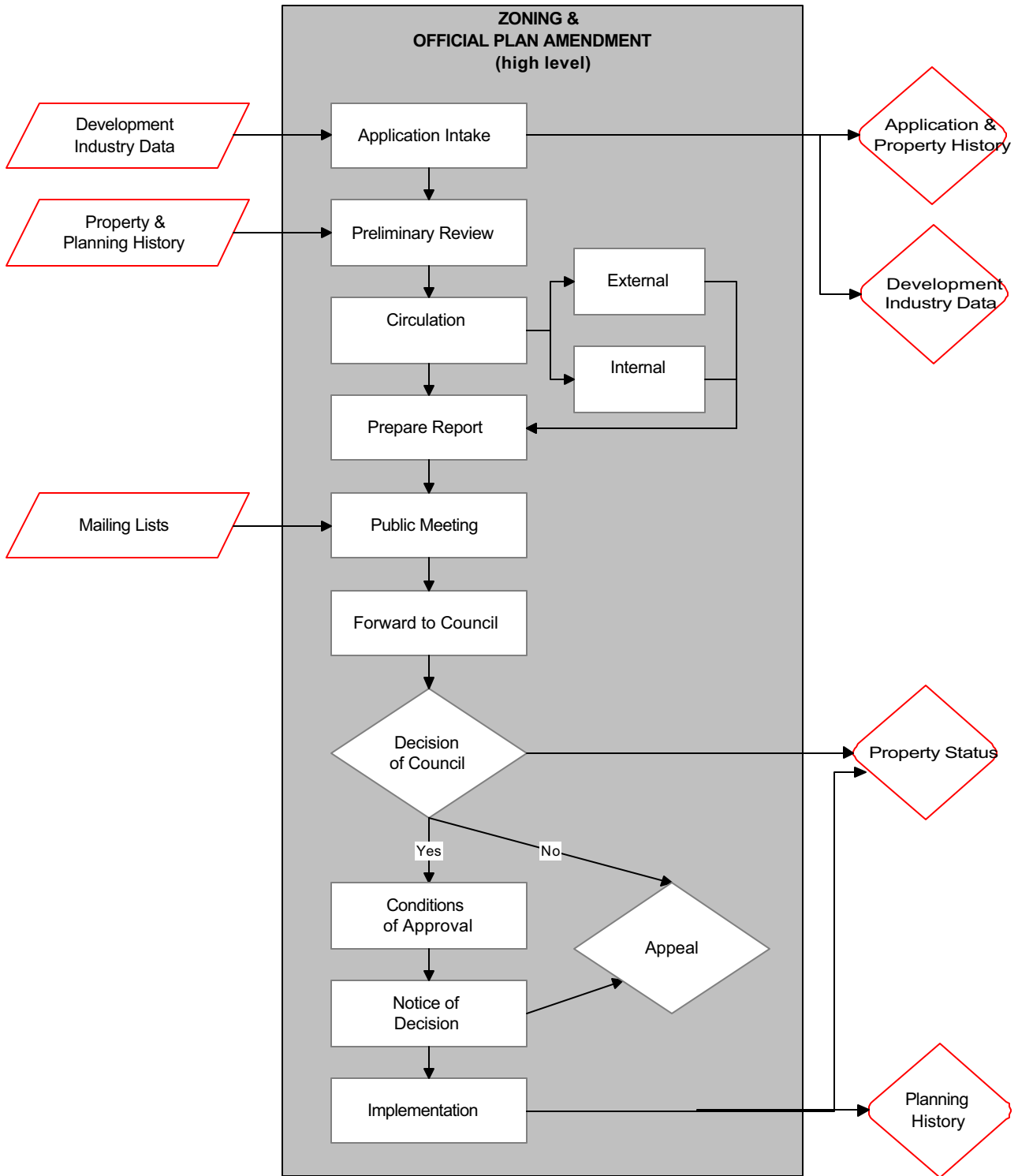
The outcome of the zoning and official plan amendment application process was that:

- The status of a particular property could change based on the results of the application review and council decision.
- The change in the property status could affect density of development permitted.
- A range of land uses could be permitted, which could have broad municipal implications for the provision of infrastructure and facilities.

At this stage in the planning process, the planning approval represents an intent to develop that may or may not be carried out to construction. It is important for municipalities to be able to track the pending status of approved zoning and official plan amendment applications, because of the potential that they represent for impact on municipal capital investment.

PLATE 2

ZONING & OP



3.2 Property Division

Plate 3 defines the business process for the Property Division functions. These include plans of subdivision, condominium and severances. This is a critical process for the property data model as it defines the majority of changes that occur over time to the ownership parcels.

It is the property division process that requires multiple views of the same parcel of land in order to adequately relate the multiple stages that parcels move through. For example, a parcel may be a proposed parcel, in a draft plan of subdivision, which needs to be considered in infrastructure planning, vacant land forecasting, or determining facility requirements. The proposed parcel co-exists with existing parcels, which also have a legal status, planning history or existing agreements that may be associated with the existing parcels.

The Property Division process also requires a significant amount of data in response to Provincial policy requirements. In many cases, the development industry is responsible for providing this detailed information to assess the conformity with Provincial policy.

The Property Division process represents the most complex municipal planning process in which to track property related information. This is due to the fact that it is the process that changes the configuration and identifiers of the parcel fabric. We observed a number of mechanisms in which municipalities attempt to track parcels in order to store information from the Property Division process. Several municipalities identify their own unique property identification numbers and maintain the control of assigning those numbers as subdivisions or severances are approved and multiple lots created.

Municipalities, which are looking at the development of digital plan submission standards have typically identified and recognized the importance of geo-referencing the digital information to a framework that fits within the municipal spatial database. However, those submissions do not include identifiers for proposed lots. In some cases, the identifiers are assigned by the municipalities as their own unique numbers, as applications move through the property division process.

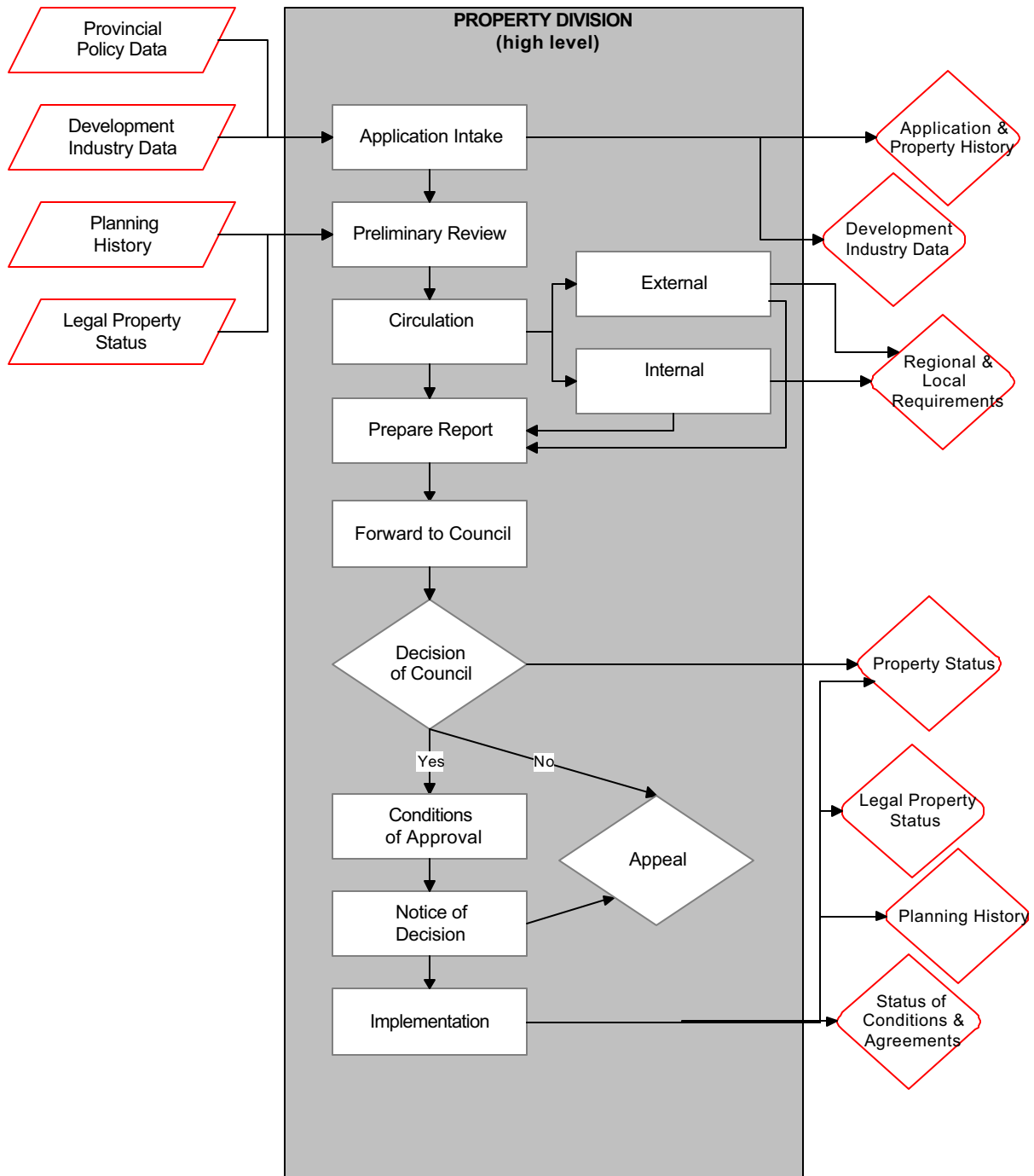
The Region of Ottawa-Carleton is developing a procedure whereby draft plans of subdivisions are filed related to the POLARIS property database that exists in Ottawa-Carleton and the digital plans are submitted to Teranet. Teranet is responsible for assigning pending PINs to individual lots and properties approved by the Region. It is recognized that not all pending PINs on draft plans of subdivisions may result in actual PINs in registered plans. The difficulty for municipalities in maintaining the structure of the property database is to maintain the ongoing linkages between the municipal property identifiers or POLARIS property identifiers to Assessment Roll Numbers.

Section 4 of this report has identified the process and the time lags involved in the creation of municipal, ownership and assessment parcels. These time lags lead to the complexity of storing data against those major identifiers.

The Property Division process produces significant data output including the revised legal status of the property and conditions and agreements that may be registered or required against that property over time. This can include retaining knowledge about easements and development conditions which may require monitoring over time.

PLATE 3

PROPERTY DIVISION



3.3 Permitting

The permitting process is the activity that results in the issuance of construction and occupancy permits. It is the activity that results in the update of structure records, which could include construction, demolition, moving or change of use or occupancy permits. Plate 4 defines the high level permitting process in municipalities.

The permitting process is a critical component of the property database structure in that it defines the changes to structures and buildings. We found that it may occur within the Planning Department, within other Departments of the same municipality, or at different levels of municipal government. The plan review for permits requires the approving authority to determine the legal status of the property and to determine conformity with previous planning approvals, conditions or agreements registered on title. In some applications, it could require a review of existing structures on the property in order to determine conformity and compliance with the full spectrum of municipal regulations affecting construction.

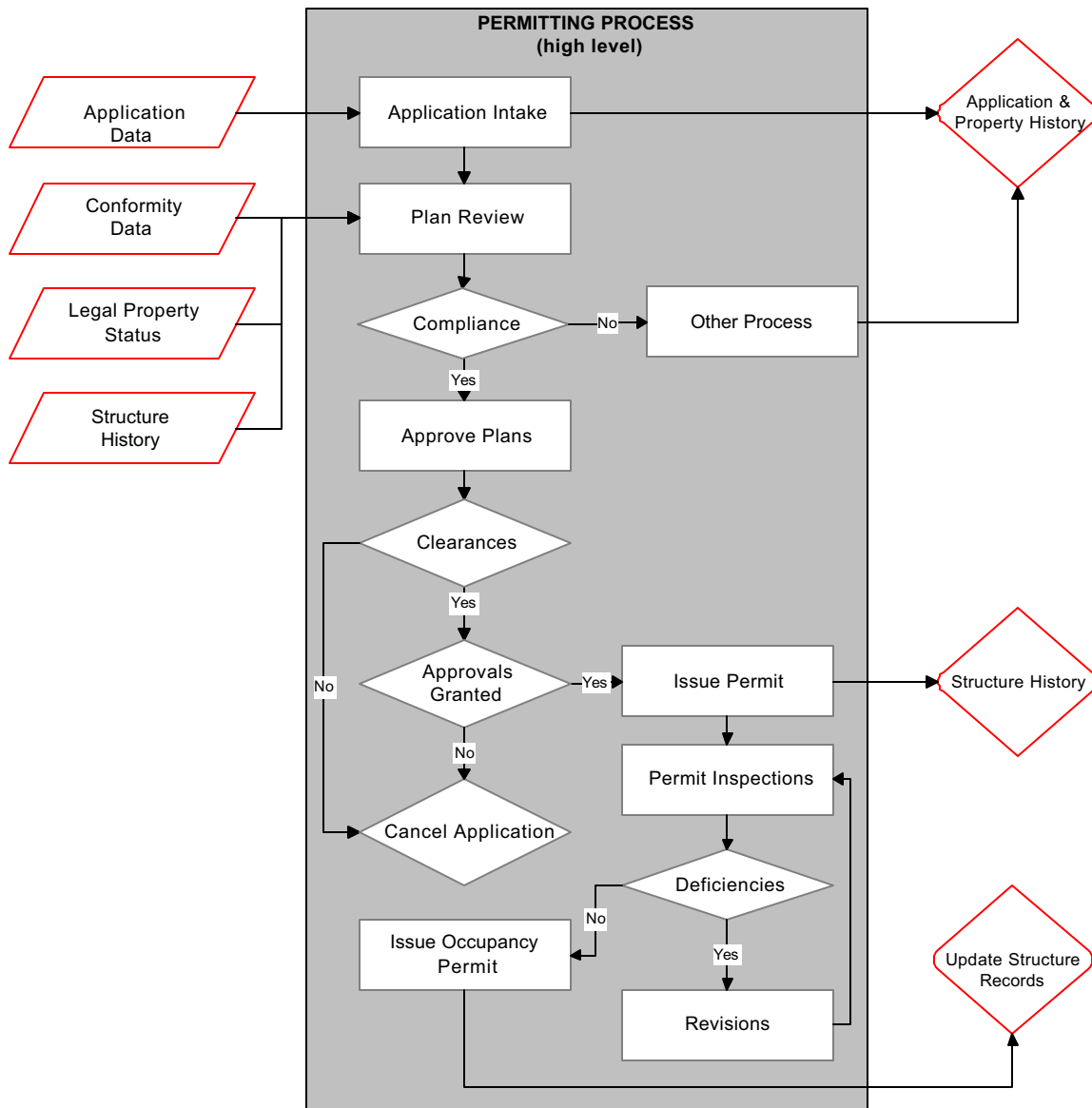
The data outputs from the permitting process provides a mechanism for municipalities to update structure records, as construction is completed either with the issuance of occupancy permits or final clearance of building or demolition permits.

The identification of structures, which can have a multiple relationship to properties, is also complex, as there may be multiple structures on a property, or the property configurations may change after construction, which frequently occurs in the condominium process.

The proposed property data model reflects this complexity and the concepts of maintaining the history of permitting activity against a changing parcel structure.

PLATE 4

PERMITTING



3.4 Best Practices in the Planning Process

The following section describes the best practices that were observed through the interview and material review processes.

3.4.1 Development of Integrated Business Systems

Many of the changes in the planning process which require integration of Provincial data, complex requirements for determination of development charges and tracking of the relationships between planning applications and infrastructure requirements and capital budgeting were leading to the development of integrated business systems within the municipal structure.

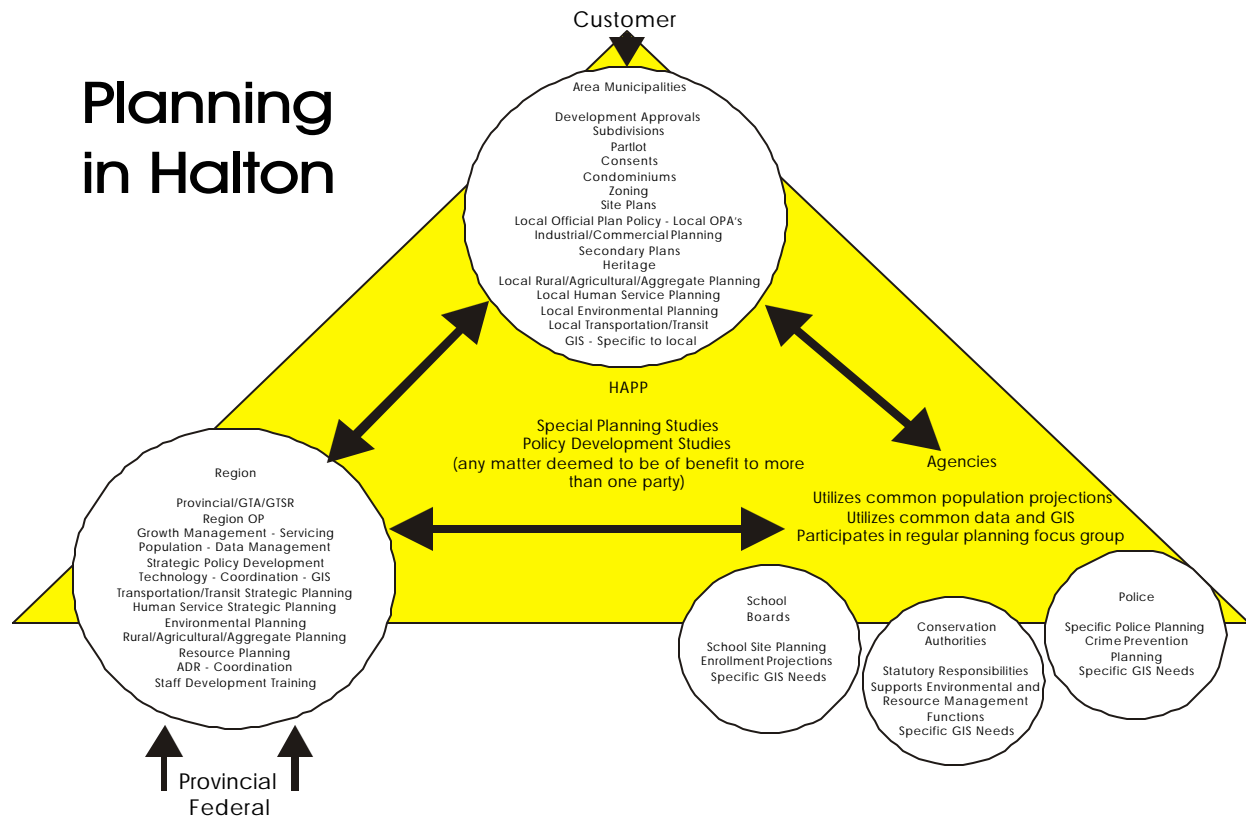
Many municipalities were going through complex modeling exercises to determine the relationship of planning, engineering, infrastructure and financial data as generated by a variety of municipal processes. Most of these activities were at design or early implementation stages, but they clearly demonstrated the need for data and feature relationships, which we have built into the property data model.

3.4.2 Enhanced Cooperation Between Levels of Municipalities and External Agencies

There is an increased awareness that no one level of municipal government or external agency is self-contained in terms of the information required to feed the planning process models or the development of integrated business systems. The same issues are evident across regional areas of the Province.

Some municipalities were developing more structured mechanisms in order to ensure data integration across municipal levels. An example is the Region of Halton, which has developed a memorandum of understanding in order to create an integrated Halton Area Planning System. The memorandum identified responsibilities between Provincial/Federal, Area and Regional municipalities and external agencies such as school boards and conservation authorities, and clearly recognized the need for integration and a common framework for data collection and sharing. Plate 5 identifies the integration and relationship of the planning processes and data in Halton Region.

PLATE 5



Graphic provided by the Region of Halton

3.4.3 Digital Data Submission Standards

Several municipalities were working to develop standards for digital submission of plans of subdivision. This requires the development industry to be able to prepare plans of subdivision within the common reference framework of the municipality, so that information can be integrated and maintained within municipal systems. An area that could assist the development industry in meeting this requirement, would be a common data model for municipalities in Ontario and common specifications for submission of digital applications.

3.4.4 Data Standards Within and Between Levels of Municipalities

A number of municipalities have recognized the need to develop data standards and data models to enable the exchange of property related data between municipal levels. The City of Toronto, Region of York and Region of Waterloo were several examples where there were efforts to coordinate data modelling in order to facilitate data exchange.

3.4.4 Business Function Review Processes

As municipalities are facing increases changes in the functions and businesses that they carry out and are responsible for, many municipalities have been reviewing how their business functions interact and how to best carry out those functions. The business function review processes that we examined clearly indicated a need for common data standards in order to facilitate the exchange of information across related business processes.

3.4.5 Emphasis on Customer Service

Often, as part of the business function review processes, municipalities are placing increased emphasis on the requirement to provide customer service. This requires business functions to be carried out more efficiently and more accurately. One of the key requirements in order to enhance customer service was to improve the access for accurate and timely information, generally, across municipal departments and between levels of municipal government. This information requirement also requires the support of a common property data model to facilitate this information access.

3.4.6 Information Management Plans

Municipalities were moving away from stand-alone information applications within Departments to integrated information systems and corporate databases. Many municipalities were developing comprehensive information management plans to assist them in moving to corporate data standards and management. The development of enterprise solutions clearly recognizes the need for information sharing between departments and levels of government and would be strongly supported by a common property data model.

4.0 PDS BASE PROPERTY MODEL

4.1 Introduction

This section describes the Detail Property Model. The overall objectives of this phase of the project is to document a consistent set of data elements and their relations that can be used in support of an evolving set of standards and best practices pertaining to Ontario Municipal planning processes.

4.1.1 Process

The model was created through a process of amalgamation of a number of existing models from various municipalities (Region of Ottawa-Carlton, City of Toronto, City of Kitchener, Region of York, Town of Markham, Town of Richmond Hill). Some of these models reflected actual operational systems, while others were in design stage. Common concepts from these models were used, as well as some innovative ideas that were identified as “best practice”. Another source of input was from the design of commonly used existing data sets.

The initial version of the model was presented to a number of municipalities and other organizations. Input from various stakeholders was used to refine the concepts in the model.

4.1.2 Scope

The scope of the model is the planning process and those municipal processes that affect the creation and retirement of parcels. The model does not attempt to address the full spectrum of municipal business functions. However, to a large extent, there was an effort to ensure that the model could be extended to support other municipal functions, or that the model was compatible with other Municipal models (MIDS, MRM) or commonly used applications.

It should be noted that this is a reference model only and not a design for direct implementation. It can be used to verify those system designs or commercial packages can support the information needs of the planning process. The model could also be used to aid the initial design efforts of Municipal system building.

4.1.3 Design Objectives

The guiding design objectives of the model were:

- ensure that all entities are identified that pertain to the planning processes as it relates to property
- ensure that the critical spatial and non-spatial relationships between these entities are identified
- provide a data design that can be used to form the basis for expansion. This means that it should be possible to easily fit other non-property entities into the model
- ensure that the result reflects the commonalities and best practices of the models currently in use by Municipalities
- provide a practical reference that can be used in the future for building actual operational databases and systems

There are a number of key issues involved in the actual business processes related to defining land division. Most of these issues arise during subdivision approval processes, but they can also impact on other municipal processes. The modeling exercise took these issues into consideration, and tried to ensure that the data and data relationships were sufficient to manage these issues:

- multiple, conflicting divisions of land. This issue arises from the particular way that ownership information and taxation information is kept in separate databases by separate organizations in the Province of Ontario.
- process and timing sequence of property split/merge. This activity is initiated at the Municipal level, but there is a considerable lag before the taxation or the ownership databases reflect the activity.
- tracking the history of parcel creation and retirement. This is of particular concern to the planning process.
- tracking multiple planning scenarios. This issue has taken on a higher level of importance in order to allow the management of development charges as they relate to capital budgeting and infrastructure planning.

- ensuring data from multiple sources can be related to both existing and to planned parcels. In order to evaluate planning applications, data from many sources (e.g. environmental) must be related to the subject parcels. A lot of this data is not stored by their owners in a form that readily allows this to occur.

4.1.4 Technical Considerations

The model is expressed in terms of Entity Relationship Diagrams. This formalism is technical in nature and assumes a Relational Database Paradigm. However, the model does not demand a Relational implementation, and the concepts could be carried through to Object Oriented designs.

The model is kept in S-Designor, a software tool that allows ER modeling.

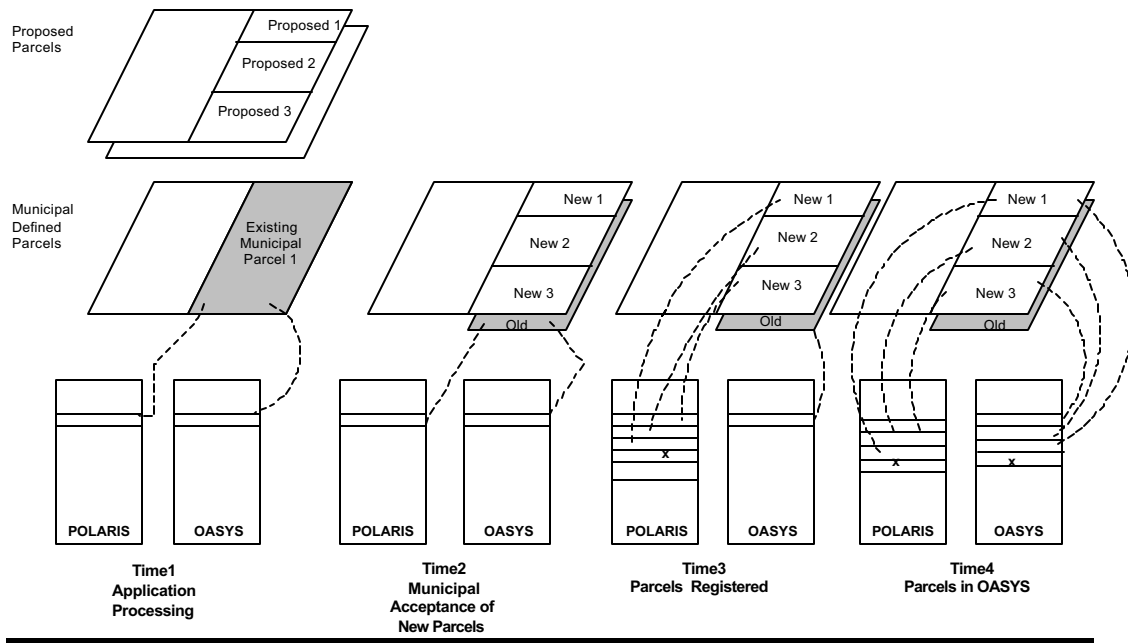
4.2 Subdivision Process

In order to understand the motivation for the design of the model, one has to understand the underlying process that creates and manipulates the data represented by the model. This process is the subdivision approval process, whereby developers make application to the municipality for permission to subdivide land, create serviced lots, build on those lots, etc.

This section describes, from an information processing perspective, how the municipal processes create and retire the division of lands.

Plate 6 illustrates the four major time frames in this process.

PLATE 6



4.2.1 Time 1

This is the initial phase, when the developer first makes application for the subdivision. This usually involves an existing parcel or parcels, and a plan for how the existing boundaries are to be modified.

In the example, there is one parcel (Existing Municipally Defined Parcel 1) which is to be divided into three new lots (Proposed 1, Proposed 2 and Proposed 3).

The existing defined parcel is known to the taxation database (OASYS) and to the property ownership databases (POLARIS).

In order to judge the viability of the application, there has to be information available that references the existing parcel as well as information about the new, proposed parcels. This will include information from the OASYS and POLARIS databases, it will include zoning and other restrictions that affect the existing parcel, and it will likely include environmental and infrastructure information.

The application may involve amendments to zoning, OP, etc. The amendments will likely proceed concurrently with the application for subdivision.

All the information about the application and the proposed parcels has to be recorded.

4.2.2 Time 2

In the second phase, the municipality agrees to some variation of the application and proceeds with its other processes to support the new parcel definitions. These may include the design of servicing, amendments to zoning, capital budgeting for service capacity improvements, etc.

The municipal perspective is now that the old, existing parcel is retired and the new proposed parcels are “granted consent”. (This view is necessary from an information system perspective, since most Municipal systems need to work with “granted consent” parcels in order to design, budget, etc. for services). The new parcels have to be assigned unique identifying numbers in order to be tracked by municipal systems.

However, an issue at this stage is that the provincial databases still only know about the old parcel. This means that the information on taxation and ownership are lagging the municipal information. The new parcels **have not** been assigned unique taxation or ownership identifiers (AROLL or PIN).

The municipality must keep two concurrent views of the same physical piece of land. This is necessary, in order to properly manage the data from all sources about that piece of land.

4.2.3 Time 3

Once the municipality has approved some variation of the application, the developer proceeds to register the new parcels with Land Registry. This is a process independent of the Municipal process. However the municipality is required to clear all conditions of subdivision, severance or condominium approval, in order to allow the land registration process to proceed.

At some point in time, the POLARIS databases are updated to reflect the retiring of the old parcel and the creation of the new proposed parcels. At this point, the Provincial ownership information is in sync with the Municipal information. The new parcels are assigned unique POLARIS identifying numbers (PINs) and the PINs of the old parcels are retired.

A major issue that arises is to ensure that the newly assigned PINs are properly referenced to the unique identifiers that were previously assigned by the Municipality for the new parcels.

On the taxation side, however, the old parcel is still the only parcel known to the OASYS database. So the Provincial taxation information is still out of sync.

4.2.4 Time 4

Once the taxation status of the new parcels is known (e.g. they are purchased or registered), the OASYS database is updated. The new parcel records are created and old ones are retired. This involves the assignment of new AROLL numbers to the new parcels and the retiring of the AROLLs of the old parcels.

It is only at this stage that all Municipal and the Provincial views of the parcel are in sync.

Again, a critical issue that arises is to ensure that the newly assigned AROLLs are properly referenced to the unique identifiers that were previously assigned by the Municipality for new parcels as well as PINs that were assigned by registration.

4.2.5 Discussion

This analysis of the subdivision process points out that municipalities cannot rely solely on the Provincial database definitions of parcel to support the municipal processes. The updating of the Provincial databases lag the actual process of parcel creation and deletion.

The primary dilemma is that the Municipality has to work with a parcel before OASYS or POLARIS recognizes its existence.

In fact, most municipalities address this problem by ‘pretending’ to use the assessment definition, but in fact creating parcels with ‘temporary’ roll numbers that then have to be updated at some later time. This usually turns out to be error prone in practice.

The assertion of the Property Model is that, in fact, the Municipality has to define and manage its own view of parcel. This view assigns municipally managed unique identification to parcels. These id's are assigned according to the Municipal processes rather than the Provincial processes. The Provincial views are then linked to the Municipal Parcels when appropriate.

The major impact (and one of the key recommendation of the project) is that the keepers of the Provincial databases (Teranet and OPAC) have to somehow incorporate the relationship of Units of Ownership and Units of Taxation to the Municipal Parcel Id into their databases. This can be accomplished in a number of ways, including the establishment of an "Identifier Service" to record as early as possible the correspondence of PIN to AROLL to Municipal Parcel Identifier. One other suggestion is to also investigate the use of the Legal Description as a way of uniquely identifying parcels and reconciling the correspondence of the various identifiers.

4.3 Property Model

The following diagram represents the detail property model

The notation legend is as follows:

- >- many to
- >o- zero or more to....
- o- zero or one to....
- |< one or more to....

4.4 Property Model Details

This section explains some aspects of the model that may not be immediately obvious from the diagram.

4.4.1 Municipal Parcel

The key conceptual assertion of the model is the way that “parcel” is defined (Municipal Defined Parcels).

The model defines parcels by means of a partitioning (in two dimensions) of the surface of the land. This partitioning is driven primarily by ownership boundaries. It adds further boundaries in instances where one ownership defined parcel is divided into different taxation classes. The ownership boundaries are based on legal descriptions.

This definition is in fact used by most municipalities. It is also conceptually similar to the way POLARIS and OASYS define parcels.

However, the two provincially defined views of parcel *as they are implemented currently* are not sufficient for the Municipal purposes.

This is because of some key characteristics:

1. The timing of the subdivision (split or merge) process that creates and retires parcels is such that the provincially defined processes lag in the creation and deletion of their versions of parcel.
2. The provincial definitions are not individually inclusive of all the parcels of Municipal interest: assessment partitioning is only on the basis of taxation; POLARIS is only on the basis of ownership and land interests.
3. The provincial definitions are not necessarily tied to a two dimensional partition of land. e.g. POLARIS actually creates Units of Ownership, as exemplified by the fact that condominiums are assigned their own PIN's. This in fact results in POLARIS defining parcels by a three dimensional partition of space.

Therefore, the model defines the Municipal Parcel as an entity that relates to the provincial definitions, but because of the way parcels are created and retired as described in section 2, the Municipal Parcel entity is maintained by municipal processes.

The Municipal Parcel entity reflects the current existing “official” partitioning of land. It also contains a history of superceded and retired “official” partitionings.

The primary process that creates and retires instances of this entity is the municipal land division processes.

4.4.2 POLARIS

The POLARIS Ownership Units entity holds the information about parcel ownership that is obtained from Provincial databases.

The POLARIS data represents ownership units, which may or may not coincide with a two dimensional partition of land surface.

The relationship of POLARIS Ownership Units to Municipal Parcel is *many to many* for two reasons:

- One ownership unit may be viewed as more than one parcel for taxation reasons.
- There may be several ownership units that are located on one parcel. (e.g. condos)

The model defines only one entity for the POLARIS data, however, in an actual implementation, there may be a more complex structure of entities to hold all the information that is available from POLARIS (e.g. instruments, history, etc.). The main invariant, however, is that POLARIS Ownership Units are related many to many to Municipal Parcels, and that parcels cannot be exclusively represented by the POLARIS entity.

4.4.3 Assessment

The OASYS database available from OPAC contains many types of information that can be used to populate a municipal database.

The Assessment Taxation Unit entity represents the units of taxation that are contained in the OASYS data.

These units are related many to many to the Municipal Parcel because:

- One taxation unit may be composed of several ownership units or parcels.
- There may be several taxation units that are located on one parcel (e.g. condos).

The model defines only one entity to represent assessment data. In an actual implementation, there may be a more complex design that holds all the other information available from OASYS. Some of these are already represented in the model (Occupancy Units, Buildings, etc.). Others may be added as well.

The main invariant is that Assessment Taxation Units map to Municipal Parcels in a potentially many to many relationship.

4.4.4 Easement

The model treats Easements as an entity that relates to Municipal Parcels.

This means that Easements are not represented as a two dimensional partition of land and that Easement Boundaries are not used in the definition of Municipal Parcels. (e.g. Easements are not parcels).

Easements may have a spatial representation, but this representation “overlays” the parcel fabric.

A parcel may contain more than one easement, and an easement may span several parcels.

Each Easement may contain one or more utility services.

4.4.5 Addressing

The model represents Address as an identifiable entity that is associated with a Municipal Parcel.

There may be more than one address in a parcel, but there is only one parcel that an address identifies. The address does not identify down to the occupancy unit level. In that sense, Address is a two dimensional feature.

It is assumed that an address instance may have a number of units, buildings etc. associated with it.

The whole municipal address (e.g. 123 Junes St. Unit 23) may be represented as a join between Occupancy Units, Address, Street Names.

4.4.6 Building/Occupancy

Occupancy Units and Buildings are located on Municipal Parcels. These entities are populated partly from the Assessment data, but also from municipal processes (e.g. permits). Hence, there is not necessarily a one-to-one correspondence between these entity instances and the various "cards" that are found in the Assessment data.

4.4.7 Blockface / Street Segmentation

The model has a very primitive representation of street segments (Streets) and block faces.

Block Faces is represented primarily because some data sources are only available tied to block face.

The Streets entity allows the keeping of the history of segmentation, but more sophisticated dynamic segmentation would necessitate the addition of more entities to support the applications that require it.

4.4.8 Condominiums

This model represents condominium units as Occupancy Units.

Occupancy units that are condominium units have a direct relationship with the POLARIS ownership unit that represents them. Non-condominium Occupancy units have a null relationship with the POLARIS Ownership Entity.

Each condominium complex is assumed to be represented as one Municipal Parcel, hence each individual unit does not have its own Municipal Parcel.

4.4.9 Facilities, Administrative Areas

There are a large number of data sources that are used in the planning process that provides information about Municipal Parcels.

The vast majority of these have a very simple relationship to Municipal Parcel. This relationship simply attributes the parcel with certain characteristics. (e.g. it lies in a flood zone; it contains wood lots; it is serviced by a particular utility).

The model represents these as classes of entities that have a very simple, spatial relationship to Municipal Parcel. This implies that the relationship can be dynamically calculated using GIS; and there are minimal referential constraints; and the technical process of parcel instance creating and deletion does not have to consider these relationships.

The entities that fall into this category are polygonal (“wetlands”), linear (“streams”) and point (“water service point”) features.

An example for illustration of these concepts is the case of Archaeological Sites. These sites are represented by attributed polygons (e.g. type of site, contents type, etc.). Any impact of a site on a particular Municipal Parcel can be calculated when required by means of a GIS operation (polygon overlay).

4.5 Property Model Details Planning Process Support

The model has a number of entities that are there to support the planning process as it concerns the subdivision or merging of properties. The underlying process assumption is that the proposal process has two phases: proposal and application. Proposals are 'unofficial' documents that require tracking, but do not need to be recorded as structured data. Proposals may at some time acquire "official" status, at which time they are viewed as an Application.

An Application has to be tracked, and its impact on zoning, OP, and Restrictions has to be detailed and recorded.

The entities Zones, OP, and Restrictions contain information about the municipality's zoning, official plan and development restrictions. The model represents these as entities, but there is no further detail of attributes. This is because instances of these entities, is usually represented in unstructured form in most municipalities, or there is no common accepted way of representing them at this time.

The entities of Pending Zones, Pending OP, Pending Restrictions represent the various proposed changes that are a consequence of the Applications. These entities are therefore related to the Application instances that generated them and to the relevant Zones, OP, or Restrictions instances.

The Application instance may have an impact on parcel definition (e.g. subdivide or merge). This impact is recorded as Proposed Parcels or Proposed Building.

Proposed Buildings are related to the existing Municipal Parcel and Buildings and Structures.

Proposed Parcels are related to the Municipal Parcels, and the Zones on which the application will have an impact.

This model will support information storage about a number of alternate application scenarios; it will track over time the impact of applications on the existing parcel fabric.

4.6 Attributes

The entities of the Detail Property Model are defined with various attributes. A full description of these attributes is found in Appendix 2.

The source of the definition of these attributes, are from the various models that were used in the creation of the model, and from the various existing databases (e.g. POLARIS, Assessment).

The attribute definitions are not intended to define the standard or to be an exhaustive list that is required for all municipal applications. Rather, they should be viewed as guidance for implementation and an illustration of current practices.

The general rule for including attributes was based on whether they appeared in multiple sources. For instance “Number of Bedrooms” is a very detailed attribute (there is an argument for not including it in a higher level model), however, it appears in most Municipal systems, as well as the OASYS database.

There is also redundancy between some of the Address related entities and the POLARIS and Assessment entities. In particular this relates to addressing. Again, the intent was to illustrate that the entities that support external data sources may contain alternate values or forms of common attributes. In this regard, the address attributes in Assessment may have been better labeled, such as “OASYS_VERSION_OF_STREET_NUMBER”.

This illustrates an important issue that emerged from the project; namely the need for more formal standards for key attributes, such as those related to addressing. This is an issue that has to be resolved with the participation of the municipalities, Canada Post, key utility companies such as Bell, and the Province wide agencies such as OPAC and Teranet.

4.7 Spatial Issues

By the very nature of “property”, one has to deal with spatial nature of the data related to property and the use of GIS tools to manage and use this data. Most Municipalities do in fact, have some sort of CAD or GIS to deal with property mapping.

The model assumes some fairly accepted conventions from the GIS technology. One of these is the concept of “feature”. A feature may be a real world object (such as a house) or it may be an abstract area with determinable boundaries (such as a Ward). Features in a spatial database will have a “type” (e.g. river) and a unique identification of the feature instances.

This Detail Property Model defines the relationships between real and abstract features in order to support the information requirements of the planning process. The Entities of the model are used to represent features. These will have an attribute called Feature Id. (e.g. Buildings and Structures).

Entities that do not have a Feature Id attribute are deemed to be non-spatial. (e.g. Street Names; while street segments are spatial, the street name authority list is not).

Using a Feature Id is a minimal spatial mechanism. The model does not contain any other references to co-ordinates or geometry. This leaves the actual implementation of the spatial entities open ended. Those entities can be represented in many different ways depending on the requirement and available technologies; e.g. geometric information can be stored in RDBMS tables or stored in GIS software data sets.

The defined relationships between entities represent complex relationships between features. For example, the relationship between Occupancy Unit and a Parcel is a legal relationship (e.g. ownership), as well as a two dimensional spatial relationship (the unit is contained within the polygon representing parcel), as well as a three dimensional relationship (an apartment unit "hovering" above the parcel in a multi storey apartment building).

The relationships defined do not necessitate one type of implementation over another. Some relationships can be represented purely by spatial relationships (e.g. address points contained in parcel polygons). Other relationships are not easily represented by spatial relationships alone (e.g. occupancy unit and parcel). The determination of a relationship between instances of some entities may only be established using spatial operations, while others have to be recorded as explicit foreign key relationships in a database environment.

The model simplifies these issues by denoting all relationships as “set theoretic” relationships. In an actual implementation, it is up to the implementer as to whether a relationship stays as a RDBMs link, or is represented in a GIS, or in a combination.

This style of modeling circumvents the problems of what spatial representations are available to the implementer. For instance, if the only digital mapping available represents parcels as points, then it may be impossible to represent some relationships using spatial operators alone.

The prototype that illustrates the model represents all relationships as foreign keys in a RDBMS, and the GIS component is used to give entity instances a spatial representation (i.e. to store geometric information and to enable graphical visualizations).

4.8 Prototype

4.8.1 General Description

The purpose of the prototype is to illustrate a potential implementation of the Detail Property Model concepts. This section gives an overview of some of the concepts in the prototype. More detailed user documentation can be found with the CD that contains the prototype.

The primary concept that is illustrated is the way data can be navigated to support planning related questions. This navigation means that the prototype can be used to look at an instance of an entity (e.g. Municipal Parcel), and then the various relationships that are defined in the Detail Property Model can be used to find related instances in other entities.

This is implemented using “lookup forms”. A lookup form will contain information about an instance, and also a number of buttons that allow “jumping” to other forms.

It is with these buttons that the user can call up related information.

An example of this is when a particular Municipal Parcel is being viewed, it is a simple operation to use one of the buttons to view all Proposed Parcels that are part of pending applications; or to use another button to view the POLARIS information that pertains to the Municipal Parcel, etc.

The prototype and the sample data illustrate the relationships that may exist between the different views of parcel: the Municipal Defined, POLARIS, Assessment and Proposed. The many –to-many nature of these relationships can be seen at both the spatial level and at the tabular relationship level.

The prototype also illustrates one particular way that the model can be implemented in a GIS environment.

The central concept is that the various spatial entities are implemented both as tables within the RDBMS and as “features” within the GIS. The instances of the entities in the tables are linked to instances within the GIS.

The GIS can be used as a navigation tool to select particular features from the digital map, and using the links to the tables, find the relevant entity instances. Finally, the lookup forms can be further used to navigate the relationships between the selected feature and the other features.

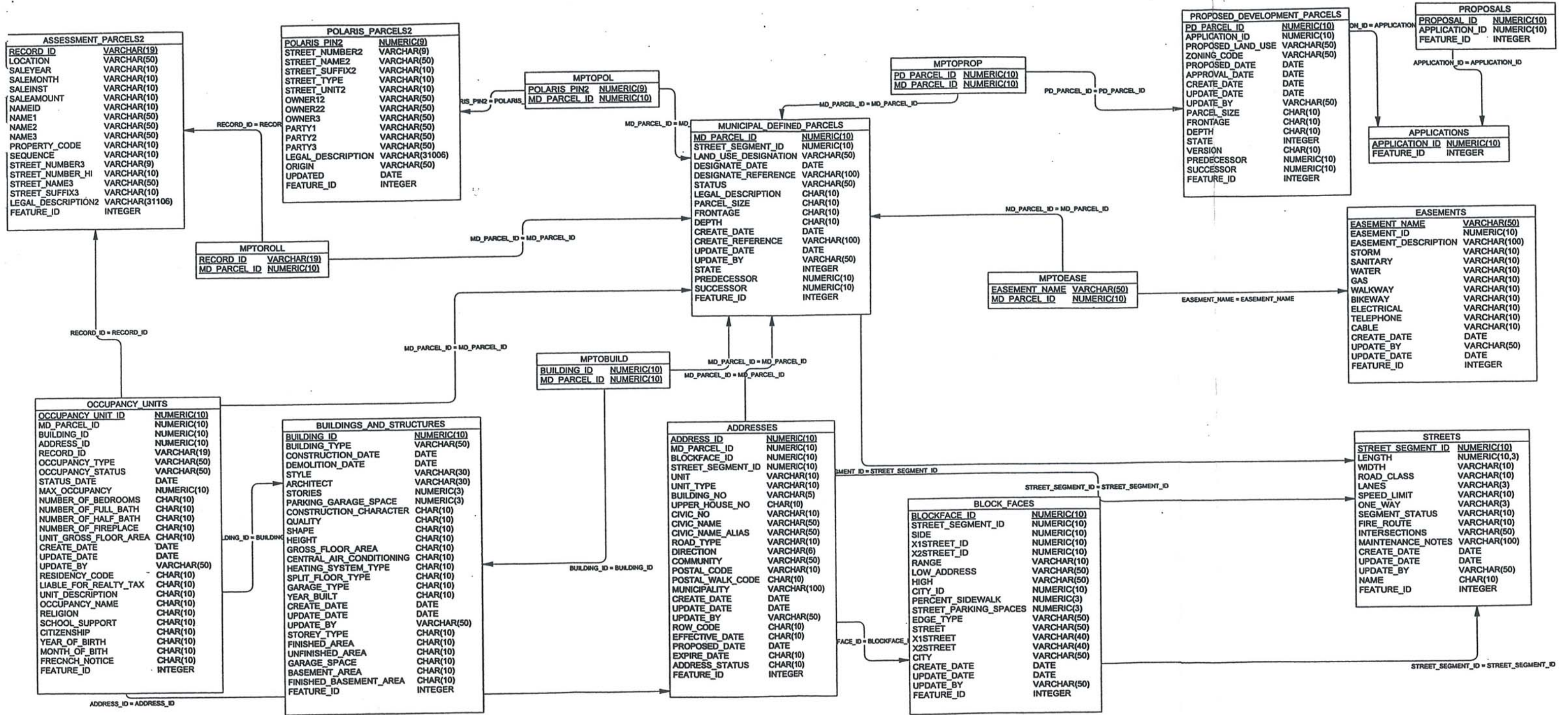
In the prototype, all spatial relations are dynamically determined as needed. (there is no storage of topology etc.)

The prototype also illustrates a mechanism that allows unstructured data (e.g. images, documents) to be linked to particular features. This type of capability is necessary in the planning process when unstructured images (e.g. scanned plan of subdivision) have a close relationship to entities within the database (e.g. Municipal Defined Parcel).

4.8.2 Technical Description

The prototype is implemented using PowerBuilder and MapObjects.

The following data structures are used to link the Physical version of the Property Model to the GIS. These structures implement the “feature concept” and the linking of unstructured data to features.



5.0 RECOMMENDATIONS

5.1 Introduction

This section of the report outlines the major recommendations of the study. The recommendations are intended to address particular issues that have emerged from the analysis, as well as issues that were discussed in the various interviews during the course of the project.

Due to the nature of the subject matter, it is rarely possible to give a simple recommendation that will immediately solve an issue. In most instances, an issue occurs due to the way different organizations conduct their individual affairs. This is not to say that either organization's business practices are "wrong", rather the issue is a result of the mismatch of their respective processes. The particular organizations that are involved include Teranet, OPAC, the Province (through MNR, LIO, and other agencies), and Municipalities (For purposes of these discussions, we will group regions and their local municipalities under the label "Municipalities")

In these "cross organizational" issues, it is usually not possible for one or the other organization to unilaterally act on the recommendation to resolve the issue. In these instances, the parties involved will need to co-operate to solve the issue, with the full understanding that there will be a "cost" to both parties. This cost will usually be the cost of modifying current workflows, databases, or systems.

The recommendations are presented in a particular form: the issue is outlined; the desired outcome of the recommendation is presented; various options as to how to achieve that outcome are given; and finally there is a suggestion as to which of the options should be pursued.

5.2 View of Parcel Creation

5.2.1 Issue

The various organizations that are concerned with the definition and maintenance of parcel information in Ontario have inconsistent business processes as they relate to their views of parcel creation and change. This leads to multiple

identifiers for any one particular parcel. There is currently no satisfactory process to match these different identifiers, and hence “gather” all the information available about a parcel.

The primary downside of this situation is that it is inefficient and very costly to correlate all the information about a particular parcel. This has cost impacts on Municipal and provincial activities, on the development industry, and ultimately, on the public.

5.2.2 Desired Outcome

While the attribute information about parcels (e.g. ownership, encumbrances, taxation rates, etc.) may be updated by processes within and outside of Municipalities, generally the *existence* of parcels begins and ends with processes at the Municipal level. There are some key exceptions to this:

1. Some Provincial, Federal and outside agencies (Ontario Hydro) are exempt from the requirements of the Planning Act with respect to severance of land or creation of easements.
2. The process of land consolidation (particularly in rural areas) is not required to go through any municipal process.

So while municipal processes create approximately 90% of the new parcels, there are parcels created or merged outside the municipal processes. This fact has to be considered in the analysis of appropriate options and generally means that municipalities can not function on their own to create new parcel fabric and achieve 100% of the changes to parcel fabric.

The most desirable situation is to have one unique identifier for parcels that is used by all the organizations that collect or create data concerning that parcel. This would mean, for instance, that OPAC and Teranet would use the same primary identifier for parcels. One could walk into an Assessment office and access taxation information using a parcel identifier, and then walk into a Registry office and get ownership information about the same parcel using the same parcel identifier. The most current and correct addresses associated with that parcel could then be obtained from the Municipality by referencing the identifier.

A different but acceptable situation is to continue to use different parcel identifiers, but to have commonly available (*from the time of creation of the*

parcel) a cross reference between the different identifiers. This would achieve the same objective, but it would be somewhat more cumbersome to administer. (This discussion assumes that there will be a continuing differentiation between tax and ownership parcels...see Recommendation 6).

5.2.3 Options

The current situation is that Municipalities deal with this issue in different ways: some reconcile their internal parcel id to AROLL; some reconcile their internal parcel id to PIN; some don't use an internal parcel id. This situation has proven to create a lot of problems.

Neither Teranet or OPAC currently reconcile back to the Municipal id, and it's safe to assume neither organization will give up their mandate to assign their respective identifiers.

The first workable option is for Teranet and OPAC to provide an "identifier" service to Municipalities. The way this would work is as follows: when a Municipality creates new parcel, the Municipality would ask OPAC and Teranet for an AROLL and PIN respectively. They would insure that these identifiers would be reserved. The Municipality would use these identifiers for its processes, and would make sure that when OPAC or Teranet would normally see these new parcels (at registration or assessment); the pre-assigned numbers were passed along with the transactions.

A second option is for Municipalities to assign their own identifiers for new parcels. This identifier would be passed along with the transactions that inform OPAC or Teranet of the existence of a new parcel. Teranet and OPAC would then immediately send back their corresponding identifier to the Municipality

Both options require changes to the business processes *and the databases* of OPAC, Teranet and the Municipalities. The obvious change is to ensure that the identifier correspondences are tracked in all the organizations. The not so obvious change is that much better flow of information would have to develop between the concerned parties. Namely, transaction based notifications would have to be used to ensure that the references to changed or deleted identifiers were made known to all concerned.

A third option that should be investigated is the use of Legal Descriptions to automatically establish correspondences. This, of course, implies that the language used in Legal Descriptions would have to adhere to strict syntactic and semantic rules.

5.2.4 Recommendation

The recommendation is to adopt the first option (“identifier” service). This is preferable, since it limits the number of identifiers to only two, thereby reducing potential errors.

The real problem is not what needs to be implemented, but rather how to convince the various parties (OPAC, Teranet, and 500 Municipal Governments) that this option needs to be implemented.

Given that both Teranet and OPAC are now working in a private sector commercial model, the viable approach is to address this in a commercial manner. This implies in its simplest form, that Teranet and OPAC provide the “identifier” service to Municipalities.

(Some Municipalities have different opinions about the desirability of entering into such relationships. These opinions are usually motivated by historical issues of obtaining parcel mapping from Teranet. Note that the notion of “identifier” service is relatively independent of mapping. The service could be offered either independent or combined with mapping)

So, the recommendation to the Regional Planning Commissioners is to promote this strategy. This implies an initial study and negotiation with Teranet and OPAC to determine the possible arrangements for such a service. Secondly, RISWG, through its members, should promote the concept to their respective organizations.

5.3 Use of Draft Plan Definitions

5.3.1 Issues

The current problem of parcel identifier creation is due in large part to the *time lag* from when the Municipality is working with a new parcel definition, to when Teranet or OPAC sees the new parcel definition. Teranet currently doesn't see a new parcel until it is submitted for registration. By this time, the parcel may have existed for a long time in Draft Plan form.

5.3.2 Desired Outcomes

The scenario for Teranet and OPAC assigning tentative identifiers would be greatly facilitated if the Draft Plans (which contain the preliminary parcel definition) were available to Teranet and OPAC as early as possible.

Early processing of Draft Plans by Teranet and OPAC would also allow early provision of information back to the Municipalities.

5.3.3 Options

Early availability of Draft Plans implies a municipally initiated flow of information about approved draft plans, severances, merges, etc. to Teranet and OPAC as soon as they occur. This also implies that Teranet and OPAC have to institute procedures to process this information into their databases.

The options for instituting this situation involve different levels of technology.

The "low-tech" option implies that the Municipalities send Draft Plans in paper form or on physical media containing digital forms.

The "high-tech" option requires municipalities to post electronic copies of Draft Plans on publication servers. These posted files could then be accessed by Teranet or OPAC over a network, (e.g. this could be implemented as an Internet WEB site). This option implies standard formats for GIS data and an investment in this

type of technology by the Municipalities. Note that the Draft Plan line work can exist independently of the parcel fabric.

5.3.4 Recommendation

It is recommended that Municipalities initiate a transition to the “High-tech” option.

The Planning Commissioners’ roles in this would be to initiate pilot projects for proof of concept and to endorse such an initiative.

5.4 Parcel Custodian

5.4.1 Issues

Aside from the problems of parcel identification, there is a related *data quality* issue concerning parcels. Because the various data stores containing parcel information are not easily cross-referenced, common parcel attributes (such as address, or spatial representation) are duplicated. The values for these attributes for any given parcel in these different databases are not consistent. Of greater concern is that there is no easy way currently to bring the data in these various databases to a higher level of consistency.

For example, a lot of parcels in the OPAC databases are missing a digital spatial representation. Such a representation for a given parcel may exist in the Teranet databases, but there is currently no easy way to correlate the two databases. Another example, the Municipal Address for parcels in the POLARIS and Assessment databases are known to be less than 100% correct, yet correct Addresses exist for parcels within most Municipalities.

This situation would be aided by adoption of Recommendation 1, but as long as different authorities exist for key attributes, there are bound to be errors and mismatches.

5.4.2 Desired Outcomes

While more timely flow of information about parcel creation and modification would help the current situation, the ideal scenario is that in any particular municipality (or Region), there exist one authority database of existing parcels that is used by both the municipality and Teranet and OPAC.

This could be achieved by a number of means, but the base concept is that there is one *steward* of this database that manages the incorporation and authentication of parcel information. The primary benefit of this arrangement is that the issue of parcel identifier reconciliation would be solved.

This common database of parcel information would contain some key attributes, such as address, spatial representation, legal description, etc. Each of the players (Municipality, Teranet, and OPAC) would still keep their own, organization specific attribute sets about the parcels. For instance, instruments and document history for a parcel would still be with Teranet. Assessed value and market history would still be with OPAC.

5.4.3 Options

The options for implementing such a stewardship concept involve selecting who acts as the Steward for the common data within any particular Municipality, and also selecting the technology to be used to ensure that the database is available to all and is properly maintained.

There are two major issues that have made such an arrangement impractical in the past.

The easier issue is the question of technology. The available technology for networking, security, and data management are now available and cost effective to allow such an arrangement to be implemented. There are several examples of such systems that have been implemented.

The nastier issue concerns questions of data ownership and cost. The centre of this issue in the past has been the digital mapping of parcels. Municipalities who

have created and are maintaining their own parcel mapping are reluctant to enter into arrangements whereby they have to rely on external organizations for their parcel mapping.

It is important to note that there are options to deal with this issue.

The most important point to note is that the benefits of parcel data stewardship are there even if mapping is not part of the common data. Just keeping a common database containing parcel id, address, and legal description is cost effective. The inclusion of digital mapping or other data can be decided on a Municipal case by case basis. In other words, municipalities can separate the issue of mapping from the issue of relying on an externally managed database of parcel ids and address.

5.4.4 Recommendation

The recommendation is for RISWG to act as the agent to convince Municipalities, OPAC and Teranet to adopt a stewardship concept. This would involve a project to refine the concept, to negotiate with Teranet and OPAC to endorse the concept, and then to work with Municipalities to implement the concept.

It is envisioned that a pilot project at a Municipality would be required to prove and refine the actual operation.

Teranet is currently promoting a service to Municipalities that could be used to implement stewardship (the GeoServer). The recommendation to Teranet is to investigate how this service could be unbundled, namely, allowing a municipality the option of using Teranet's mapping or using their own. This provides municipalities the choice on mapping systems for property databases.

5.5 Work Towards Adopting an Addressing Standard

5.5.1 Issues

The problem associated with municipal addresses is a long standing issue with Municipalities as well as with OPAC, Teranet, and the Province.

One problem is that any particular address point (i.e. entranceway to a house) may have several different address values in different databases. In fact, all of these may be valid (e.g. the Canada Post version gets the mail delivered; the 911 version gets the Ambulance to the door; the Municipality's version was assigned by the legal address authority).

Another problem is that the "language" used to express addresses varies by database. Each organization has their own rules for short forms, valid street names, and unit numbering (e.g. short forms such as CR, CRES, etc.).

Still another major issue is that the definitions of what constitute an address vary by database. Some applications represent address as an offset along a street centreline, while others allow multiple address points on parcel polygons.

The issue of addressing is very much intertwined with the Property database, and it's a concern for the Planning process. Hence it is an issue that needs to be tackled.

5.5.2 Desired Outcomes

The ideal situation is that for any point in space, there is only one valid address for that point *and that all users and keepers of addresses use that one valid address.*

An *acceptable* situation is that there is an authority list of valid addresses in any Municipality, and that most databases use the values on that list. Any databases that don't use this authority list should at least have a cross- reference to this list.

5.5.3 Options

There are two initiatives needed, one to define a data standard for address, the other to create a mechanism for creating and maintaining a province wide authority list of addresses.

The first initiative would create a formal data definition for addresses that could be used in database design. This definition would define what constitutes an

address instance; it would define the type and form of attributes, including street name, suffixes etc.

The second initiative would create an operational system in the province that maintains one *authority* list of valid addresses. This database would be available province wide, but it would of necessity take its transactional updates from Municipalities. An ideal approach would be a scheme of distributed databases, where each Municipality (or Region) maintains the list locally but make it available on a network for other users.

5.5.4 Recommendation

This is a recommendation that will have to be championed at the Provincial level.

The address data definition project should be undertaken jointly by OPAC, Teranet, RISWG, MISA and LIO. For the standard to be successful, it needs to be formally endorsed by these organizations. This implies direct funding by these groups, as well, a commitment by them that they will adopt the standard in their respective databases.

An important role that LIO, as the Provincial government representative would undertake, is to coordinate this effort with Federal departments and Agencies (such as Canada Post, StatsCan, etc.).

The second initiative of coordination of the building of the actual address databases should be undertaken by LIO. This initiative requires ongoing business and funding relationships to be established with individual Municipalities. It also requires the institution of province wide network technology. LIO has experience in both of these areas.

5.6 Data Model Stewardship

5.6.1 Issues

The PDS Base Property Model as presented in this project is only a start at reconciling the issues of parcel definition. It is a model that needs to be further refined and promoted.

The process of stewarding the model (and possibly other future subject models) needs an ongoing commitment by the various stakeholders, including the Municipalities, OPAC, LIO, and Teranet.

5.6.2 Recommendation

The recommendation is to set up two long range organizational instruments.

Firstly, there needs to be a Steering Committee, populated by representatives from the stakeholders, whose role is to oversee and steer the evolution of the model. This committee would need to meet often to assess and approve all technical changes and additions to the model. The group would also be responsible for setting strategy for further research and for approving the various uses that the model could be put to. For instance, the issues of commercial adoption of the model, the issues of licensing and the issues of endorsement need to be addressed.

Secondly, a Steward has to be appointed to deal with the operational aspects of the model, including ongoing design, production of relevant documentation, support of organizations that adopt and implement the model, and promotion of the model and its concepts.

The Steward could be selected to be one of the Stakeholders or a firm could be hired to carry out these tasks.

5.7 To Teranet and OPAC

5.7.1 Issues

A historical anomaly that needs to be addressed is the distinction that is made between the mapping of Ownership parcels and Taxation parcels. This distinction is based largely on the history of the different Provincial departments that used to manage these issues. Also, the past manual processes involved made it very difficult to reconcile the distinction.

With the automation of the management of these processes, it is increasingly clear that both views of “parcel” are largely based on the same physical realities. While there are a small percentage of cases where, in fact, the parcels represented are different (the many to many relationship), the potential benefits of merging the definitions far outweigh the overheads of dealing with the exceptions.

The costs of carrying this artificial distinction are high. It results in data errors, duplication of effort, etc.

5.7.2 Desired Outcomes

The ideal situation would be the existence of a single digital parcel fabric for the Province.

5.7.3 Options

Addressing this issue requires co-operation between Teranet and OPAC. The actual details that would have to be put in place include the creation of a maintained PIN - AROLL cross-reference, and the creation of a single digital parcel map for the province.

5.7.4 Recommendation

While the Planning Commissioners can't directly implement this recommendation, there are a number of ways that they could encourage this situation to come about:

The mandate and the activities of OPAC will be driven, in large part, by the Municipalities who now have a direct stake in OPAC. Municipalities also have direct representation on the board of OPAC. The Planning Commissioners could encourage their respective organizations to support OPAC in moving in the direction of amalgamating parcel fabrics.

5.8 Digital Submission Standards

5.8.1 Issues

Most Municipalities have adopted technological improvements to the way they manage mapping and infrastructure design data. However, even though the Municipality's own data is kept to a consistent standard, the various sources of outside data, notably Applications and As-Built drawings, are of various format and quality.

This situation is a major impediment towards implementing a better parcel data management process. It is unreasonable to require the Municipality to bear the total cost of creating the properly formatted digital versions of submitted plans.

Various attempts at imposing digital data standards on the development community have met with varying degrees of success. This is in large part due to the lag in adoption of digital techniques within the development community.

5.8.2 Desired Outcomes

The ideal situation is that submitted plans could be easily incorporated into the Municipalities' databases. This implies that the data is submitted in a form that conforms to data standards for attributes and to digital mapping standards.

In order to realize this, it is necessary for Municipalities to broaden the criteria of application compliance to include proper digital formats. It is also necessary to have in place appropriately costed services to allow all submitters to convert to the required format.

The rules and formats should be standardized throughout the Province.

5.8.3 Options

The first option is for a Municipality to pass a bylaw requiring submissions to be in a digital form. This requires that a clear digital standard be prepared and that Council approve the policy. This option can be exercised unilaterally by any Municipality.

Another option is for a Provincial wide regulation to be enacted, requiring digital submissions to a Provincial standard.

5.8.4 Recommendation

The second option is not seen as practical, since such a regulation would cross several jurisdictions.

The “bylaw” option is seen as the most workable, and in fact, several Municipalities are going this route.

The recommendation to the Planning Commissioners is to give support to this effort. This can be done through a number of channels.

One action is to initiate a project to create a RISWG endorsed standard for digital submission. This should involve those Municipalities who have experience in this area, plus UDI, who represents the development community, that must live with the standards.

Another action is for the Planning Commissioners, as a body, to raise this issue in the Municipal political agenda, through AMO. This would address one of the historical problems with such efforts, namely, the lack of enthusiasm by some Municipal politicians towards imposing constraints on developers.