Town of Lakeshore
GIS Strategic Plan

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TABLE OF CONTENTS

1. INTRODUCTION 1
1.1. Background 1
1.2. Objectives 1
1.3. Methodology 1

2. CURRENT ENVIRONMENT 3
2.1. Organizational Structure 3
2.2. Existing Partnerships 4
2.3. Business Activities 5
2.3.1. Community & Development Services 5
2.3.2. Corporate Services 9
2.3.3. Economic Development 9
2.3.4. Engineering & Infrastructure Services 10
2.3.5. Finance & Performance Services 11
2.3.6. Strategic Services 11
2.4. Geographic Data 13
2.5. Business Data 27
2.6. Business Applications 29
2.7. Technology Platform 32
2.7.1. Network Configuration 32
2.7.2. Internet Access 34
2.7.3. Connectivity Issues 34
2.7.4. Municipal Website 34
2.7.5. Peripheral Equipment 35
2.7.6. Technology Budget Allocations 35
2.8. County of Essex Relationship with the Town of Lakeshore 36

3. RECOMMENDATIONS 40
3.1. County of Essex (People) 41
3.2. Senior GIS Analyst (People) 42
3.3. Training (People) 43
3.4. GIS Data Warehouse (Technology) 43
3.5. Network Communication (Technology) 43
3.6. Asset Management System (Technology) 44
3.7. Web-Mapping Solution (People) 44
3.8. Web-Based Address Point Management Tool (Technology) 45
3.9. Web-Based Public Access Solution (Technology) 45
3.10. Addressing (Information) 45
3.11. Create/Enhance GIS Datasets (Information) 45
3.12. Job Descriptions (Documentation) 50
3.13. GIS Operations Manual (Documentation) 51
3.14. Standards, Maintenance Procedures and Metadata (Documentation) 52
3.15. Disclaimer (Documentation) 53
3.16. GIS Documentation Library (Documentation) 53
3.17. Strategic Partnerships (People) 53
3.18. Computers (Technology) 54
3.19. Document Management Solution (Technology) 54
3.20. AVL (Technology) 54
3.21. Land Development Tracking System (Technology) 54

4. SUMMARY OF RECOMMENDATIONS 56

5. NEXT STEPS 57
5.1. Approval of Recommendations 57
5.2. GIS Implementation Plan 57

APPENDICES

APPENDIX A: INTERVIEW PARTICIPANTS 59

APPENDIX B: CORPORATE BRAINSTORMING SESSION 61

APPENDIX C: JOB DESCRIPTIONS 63

APPENDIX D: SAMPLE GIS DATA STANDARDS & PROCEDURES 66

APPENDIX E: SAMPLE METADATA 69

LIST OF FIGURES

Figure 1: Organizational Structure 3

LIST OF TABLES

Table 1: Existing Partnerships 4
Table 2: Existing Geographic Data 13
Table 3: Existing Business Data 27
Table 4: Existing Business Applications 30
Table 5: Server and Application Configuration 32
Table 6: Technology at Remote Sites 33
Table 7: Corporate IT Budget (2006) 35
Table 8: In-Progress Datasets 47
Table 9: High Priority Datasets 49

1. INTRODUCTION

1.1. Background

The Town of Lakeshore's introduction to Geographic Information Systems (GIS) was a result of participating with Essex County in the preparation of a GeoSmart application for funding in June 2003. Essex County was successful in securing $500,000 of provincial funding to facilitate the implementation and enhancement of GIS within the area.

The County's GeoSmart project brought together the lower tier municipalities of Essex to determine what GIS tools and services could be provided at the upper tier level, for use by all. The project resulted in the development and implementation of a number of GIS-related applications, including: ESRI GIS software, a web-mapping application, an asset management system, and an online business directory. The project also resulted in the implementation of a shared data warehouse, and the creation of GIS data. As a member municipality of Essex County, the Town of Lakeshore was provided Internet access to these applications and databases via a Citrix login.

In April 2004 the Town of Lakeshore moved forward with their own GIS initiatives by hiring a GIS Technologist. Since that time the Town has invested in the purchase of its own GIS software licenses, some additional GIS-related technology, as well as the creation of a number of Town-specific GIS datasets.

The Town of Lakeshore is growing at a rapid rate, and as such executive management has determined the need to develop a clear strategic path for future GIS initiatives. This GIS Strategic plan lays out that strategic path, and puts forth recommendations on how the Town can best achieve its vision.

1.2. Objectives

The objectives of this GIS Strategic Plan are to:

- Document the Town's current environment (resources, business activities, data, hardware and software) as related to GIS;
- Develop a 5-year vision, detailing the GIS environment the Town would like to achieve within this timeframe; and,
- Develop strategic recommendations that will guide the implementation and achievement of the 5-year vision.

1.3. Methodology

The objectives of the Strategic Plan have been met by:

- *Obtaining and reviewing relevant existing reports and documentation*, such as: the Town's GIS data index, the Essex County GIS Implementation Plan, the Town's budget information as related to GIS, example forms and documents, and Town literature such as the Recreation and Leisure Guide;
- *Holding a project kick-off meeting* to introduce the project to staff and give context to the purpose of the project;

- *Holding a corporate brainstorming session* to generate ideas on possible short and longer-term GIS goals for the Town;
- *Conducting interviews* with business unit and external agencies to define current environment, including: existing resources, business activities, data, hardware and software; and,
- *Developing strategic recommendations* in collaboration with staff and stakeholders to ensure the Town has a solid plan in place to implement their 5-year GIS vision.

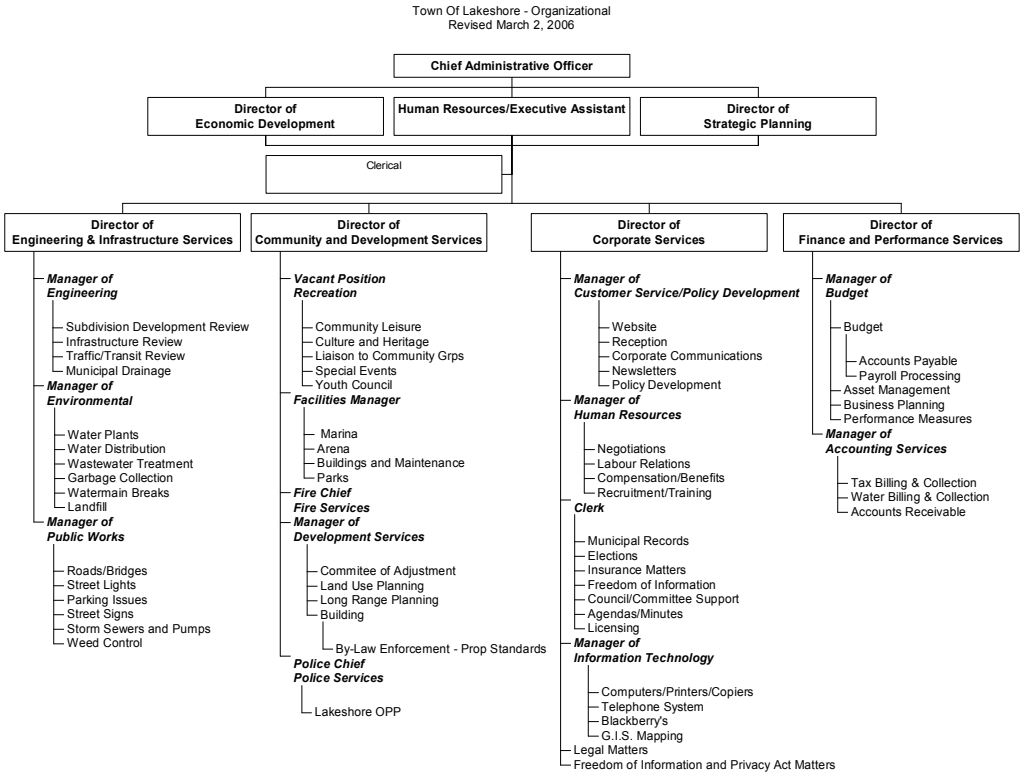
2. CURRENT ENVIRONMENT

In order to gain an in-depth understanding of the current GIS environment at the Town of Lakeshore business unit interviews and a corporate brainstorming session were conducted with stakeholders from each municipal department, in addition to the Ontario Provincial Police and representatives from Essex County's Information Technology Department (see Appendix A – Interview Participants and Appendix B – Corporate Brainstorming Session). *Current environment* is a term used to describe elements of the existing situation that will impact the implementation of GIS technology and services at the Town. Topics that have been specifically explored through stakeholder interviews include: Organizational Structure; Existing Partnerships; Business Activities; Geographic Data; Business Data; Business Applications; and, Technology Platform.

2.1. Organizational Structure

The Town of Lakeshore is administratively organized into six Departments: Community & Development Services; Corporate Services; Economic Development; Engineering & Infrastructure Services; Finance & Performance Services; and Strategic Planning. Each of these Departments is further organized into Divisions as illustrated in Figure 1:

Figure 1: Organizational Structure



The Town currently employs two GIS Technologist resources who work in the IT Division of the Corporate Services Department, providing GIS support to municipal departments in the form of data creation, spatial analysis, cartographic production, and research support for special projects. The GIS Technologists are highly skilled in this specialized field, bringing the necessary background and skills to the position.

Several other members of staff have an understanding of GIS and use a GIS viewing tool to support their business activities. As staff awareness of GIS and its practical applications increases, so too does the demands on the GIS Technologist. Increased staff knowledge of how GIS can help to improve day-to-day business activities means that the GIS Technologist receives an increased volume of requests for data creation, analysis, and cartographic products.

2.2. Existing Partnerships

The Town works with a variety of external businesses and organizations to support and carry out their business activities. Table 1: Existing Partnerships table below summarizes those partners, external organizations and agencies that either supply information/services to the Town, or are supplied information by the Town.

Table 1: Existing Partnerships

Existing Partnerships	
Partner	**Relationship**
Conservation Authorities (ERCA and Lower Thames River)	Conservation authorities provide environmental data and information to various Town departments. Examples of data provided include: flood line, fill line, forest area, and sub-water. The Town has provided an updated Drainage GIS dataset to LTRCA, and could also be shared with ERCA if desired by the CA.
County of Essex	Essex County provides a number of GIS-related solutions to all of the lower tier municipalities in the region (see Section 2.6 – Business Applications). The County also provides a data warehouse in which lower tier GIS data is stored. GIS data stored at the County is accessed by the Town's GIS Technologist through a direct network connection and static IP address. Alternatively the GIS data and business applications can be accessed by authorized staff through a Citrix connection. Staff access to data is limited to reading/viewing, with the exception of the GIS Technologist who has editing privileges. The County's vision of its relationships with the lower tier municipalities is to be the provider of services and high level support. Each municipality is expected to provide their own internal technical support, and this resource should be the point of contact liaison with the County as needed. The County also provides spatial data such as aerial photography, street centreline, and parcels. The street centreline dataset was initially provided by the County, and is now maintained by the Town. The parcel dataset is provided to the County through

Existing Partnerships	
Partner	**Relationship**
	Ontario Parcel, and is sub-licensed to the Town under this agreement. At a departmental level, the Town and County may share additional data (spatial or otherwise), to support specific business activities.
Engineering Consultants (e.g. Dillon, Stantec, IBI, CN Watson, etc.)	The Engineering & Infrastructure Services department has a two way flow of information with its consultants and advisors. Engineering consultants need to know where the Town's infrastructure is located or planned in relation to other infrastructure (such as utilities). Engineering & Infrastructure Services would also benefit from knowing the location and planned timing of other infrastructure within the Town, to help support the planning of capital works projects and public works related activities.
Windsor Essex County Development Commission (WECDC)	WECDC provides modeled and un-modeled demographic, consumer, and lifestyle data, as well as analytical services to support Economic Development Services. Information is obtained from Manifold Data Mining and Statistics Canada. Data is provided at the 6-digit postal code level.
Ministry of Natural Resources	MNR provides the County of Essex with a Lots and Concession GIS dataset which is then made available to the Town.
Ontario Ministry of Agriculture, Food and Rural Affairs	Economic Development Services works with the Ontario Ministry of Agriculture, Food and Rural Affairs
Convention and Visitors Bureau of Windsor, Essex County and Pelee Inland	Economic Development Services works with the Convention and Visitors Bureau of Windsor, Essex County and Pelee Inland.

2.3. Business Activities

This section identifies those business activities carried out by the Town that currently use or would benefit from using GIS related information, technology and services. This section also identifies opportunities to improve GIS related information, technology and services.

Future sections of this document will reference these business activities to ensure that the recommendations contained in the GIS Strategic Plan are based on specific business activities and needs.

2.3.1. Community & Development Services

a) Coordinating Long-Range Development and Planning

Planning Services is responsible for ensuring appropriate growth and development within the Town of Lakeshore in accordance with the Official Plan. In doing so, Planning also produces planning and policy alternatives for Council. Planning staff collect and use a variety of statistics and population projections to help produce plans, reports and studies for presentation to Council, or for use at public meetings.

b) Processing Development Applications

Planning Services is responsible for overseeing the development approvals process as governed by the Planning Act and the Provincial Policy Statement. As part of these processes, Planning administers the application process for: consents and minor variances, zoning by-law amendments, official plan amendments, draft plans of subdivision, site plans and agreements, and subdivision agreements. Although no formal land development tracking system is in place, details from Committee of Adjustment applications are entered into a FroPro database for tracking purposes. The Committee of Adjustment database is currently about 50% complete.

The Planning Act governs that public notice be made by the Town at specific stages of the application process, and to landowners/stakeholders located within a specified distance of the subject lands. Hardcopy assessment maps are used to determine the roll numbers of properties within the specified distance of the subject lands. The roll numbers are then selected in the municipal tax system, to produce mailing labels with the appropriate owner name and address.

In managing the development approvals process, Planning Services also responds to various planning and development related inquiries from the public and the development industry. Information, advice, and assistance are provided as needed to ensure that all development conforms to the Town's Official Plan and Zoning By-laws.

c) Calculating Development Charges

The Town's Development Charges By-Law imposes uniform residential development charges (calculated on the number and type of units) and non-residential development charges (calculated per square metre of total floor area of the building) upon all lands within the boundaries of the Town, payable upon issuance of a building permit. The Development Charges By-Law was last updated in December 2005, and is updated every five years. To update the By-Law, Planning staff must collect and analyze a variety of information, including: official plan mapping; development activity statistics; population projections; servicing and infrastructure information; and, projected development timing. Collecting, verifying, and analyzing this data in preparation of updating the Development Charges By-Law is very time consuming.

d) Performing Building Inspections & Issuing Building Permits

Building Services assists developers, contractors, and the general public complete construction, renovations, and demolition in a safe manner. Prior to granting Building Permit approval, the Building Inspector reviews plans to ensure they are in compliance with the Ontario Building code. Application submissions for Building Permits may include: a plot plan, proof of entrance

approval, conservation authority approval, and septic or water and sewer approvals.

Building permit applications are submitted to the Chief Building Official, who reviews and then approves or denies the application. Building permit information is entered into an MS Access database for tracking; however this database is not up-to-date. Custom maps of building permit activity are produced by the GIS Technologist on a request basis, linking permit information to parcel assessment roll numbers.

Several inspections are carried out during, and upon completion of construction. Hardcopy inspection forms are completed in the field by Inspectors, and are maintained in hardcopy property files.

Development Services is completing a Technology Plan that will examine the benefits of implementing a Building Permit Tracking and Planning Application Tracking solution.

e) Enforcing Municipal By-Laws

The By-Law division is responsible for the administration and enforcement of the Town's by-laws, such as: fencing and pool enclosures, cross connections, development charges, and animal control. By-law enforcement is conducted on a complaint basis; with Officers completing a hardcopy form in the field that is used to follow-up on complaints. Forms are not retained unless legal proceedings are initiated as a result of the complaint.

f) Responding to Letters of Request

Building Services is responsible for responding to inquiries and requests for information related to property and building matters. Requests for building searches are made by lawyers and financial institutions when there is an upcoming change in property ownership or mortgage, to verify there are no outstanding orders on the property.

A review of property history is performed, including building permits, zoning, outstanding work orders, special notation, and any other relevant information. A form letter response is generated, and filed in the hardcopy property file.

g) Assigning Addresses

Municipal addresses are assigned by Building Services based on an existing grid system, and are maintained in the Vailtech system. The Finance Department is informed of address updates via a Fax to the Manager of Accounting Services. Municipal addresses are equivalent to 911 addresses, and are used to support the business activities of internal departments as well as external agencies such as Bell Canada, Canada Post, Hydro One, and by Fire and Police for emergency response purposes. Building Services typical perform a site visit prior to the issuance of an address, to ensure that it is numbered correctly. Green 911 signs are provided for properties where the house is located more than 50 feet from the front property line, ensuring that property can be easily identified by emergency services vehicles from the street.

h) Maintaining Municipal Parks and Facilities

The Facilities Division is responsible for providing clean, safe, and well maintained public buildings, parks, and beaches. Maintenance is provided for all municipally owned and operated facilities, including:

- 20 developed parks;
- 3 community centres;
- 1 arena with twin pads; and,
- 1 marina.

Parks maintenance staff perform regularly scheduled inspections of municipal parks, facilities, and public spaces, to identify broken or vandalized equipment. When staff identify such a problem, a hardcopy work order form is completed and issued to the appropriate Public Works or Facilities staff for action. All inspections are recorded and logged for liability purposes.

i) Operating Municipal Parks and Facilities

The Facilities division is responsible for overseeing the operation of community facilities, including the scheduling of ice rinks and sports fields. Bookings are tracked manually on a hardcopy calendar that is maintained by Facilities staff. Recreation staff are responsible for the development, administration and marketing of community programs and events.

j) Emergency Master Planning and Preparedness

Emergency master planning and preparedness involves the establishment of response and support services that are required during an emergency. It outlines how and where emergency services will be deployed across the Town in a variety of emergency scenarios. Emergency pre-planning involves the identification of potential hazards, formulating an emergency plan, coordinating a training program for emergency response teams, and establishing emergency operations centres and evacuation plans. Information required to support these activities include: dwellings, roads and other transportation corridors, hydrant locations, water bodies and access points, topology, and the locations of hazardous materials and utilities infrastructure. Fire hazard maps (pre-plans) are stored in FirePro, which emergency response plans are MS Word documents that should be available in all emergency command vehicles.

k) Fire Response

The Town of Lakeshore Fire Service operates from 5 fire halls throughout the Town with four full-time staff and approximately 100 volunteers. The Fire Service responded to approximately 500 calls in 2005.

Fire calls are dispatched to the Lakeshore Fire Service through the City of Windsor Fire Department. The Windsor dispatcher handles incoming calls manually, looking up street names and address ranges using an Excel spreadsheet and a hardcopy map, and then pages Lakeshore fire volunteers to respond to the incident. Fire response vehicles are equipped with a hardcopy map book with address ranges added to street segments; however problems have been identified with duplicate street names throughout the Town due to the amalgamation of municipalities in 1999.

The dispatcher faxes forms to the appropriate fire hall to be completed by the response team for reporting purposes.

l) Reporting and Tracking Fire Incidents

Following fire response, a fire report is prepared in FirePro to document the incident. Details including the address, owner, tenants, fire specifics and equipment used are recorded. Fire reports are tracked in FirePro and also forwarded to the Fire Marshal's office.

2.3.2. Corporate Services

m) Providing Customer Service

Administrative staff is responsible for responding to front counter inquiries and responding to telephone requests for customer service. Requests for information may be related to tax billing, waste disposal and collection, municipal by-laws, municipal services, Council meetings and resolutions, or identifying points of interest and providing directions. Access to some Town news and information is provided through the municipal Website, which is hosted and maintained internally by Corporate Services.

n) Filing and Maintaining Municipal By-Laws

The Clerk is responsible for filing and maintaining all municipal by-laws, and is responsible for providing public information, advice, and assistance the by-laws and policies. By-laws are stored in Laserfiche, a document management system that provides extensive text searching functionality. Some by-laws are available in full text via the municipal Website.

While the information in Laserfiche is not currently accessible corporately; the Town intends to implement Laserfiche WebLink™, which will facilitate cost effective corporate access to the information in Laserfiche.

o) Council Services

A primary role of the Corporate Services Department is to administer the Council Meeting process from creation of the agenda through communication of Council decisions to the appropriate persons. The Clerks Department also retains these official meeting agendas and minutes in Laserfiche. Council meeting agendas and minutes are available via the municipal Website.

p) IT Division GIS Services and Support

The IT Division is responsible for providing GIS services and support to other Town departments. The services provided include: data creation; thematic and spatial analysis; cartographic map production; research for special projects; and, GIS-related training and technical support.

2.3.3. Economic Development

q) Promoting the Town

Promoting the Town of Lakeshore as a prosperous place to conduct business is the sole mandate of the Economic Development department. The Economic Development Officer works closely with municipal departments, realtors, property managers, business improvement area groups, chambers of commerce, and other business organizations to market commercial, industrial and institutional land opportunities, and to improve and maintain a healthy business climate within the Town of Lakeshore. The Windsor Essex Community Development Commission has developed a site locator tool that allows users to search for available land and building space within the Region, and searches can be specifically limited to the Town's boundaries.

The Economic Development department is also working to create a Town of Lakeshore Business Directory that will ultimately become integrated with the WEconnect Portal which will also be integrated into the Town's GIS.

2.3.4. Engineering & Infrastructure Services

r) Providing Engineering Services

The Engineering Services division is responsible for the overall planning, design, and installation of the Town's hard services infrastructure such as roads, storm sewers, drainage pumps, municipal drains, sanitary sewers and pumps, watermains, hydrants, meters, etc. Engineering Services is also responsible for the planning and budgeting of capital construction projects. Staff rely on a variety of data and information to help support their planning and decision-making activities, such as: municipal drainage, watershed, storm and sanitary sewers, hydrants, sewer, hydrant, easement and watermain locations; engineers reports; infrastructure history spreadsheets; and development activity reports.

s) Review and Comment on Development Applications

Engineering is required to review and provide comments on development applications initiated through the Development Services division including: draft plans of subdivisions, site plans, and land divisions. The comments relate to specific engineering design components including lot grading, site servicing, storm water management, and traffic management. The Engineering and Infrastructure Services department also reviews and comments on environmental impact assessment reports and other special studies.

t) Providing Environmental Services

The Environmental Services division is responsible for all activities related to the operation, coordination, and maintenance of the Town's environmental infrastructure services such as:

- Sanitary Sewers;
- Manholes and Laterals;
- Water and Wastewater Distribution Systems;
- Water and Wastewater Treatment Facilities;
- Solid Waste and Waste Management; and,
- Land Fill Closure.

u) Municipal Road Infrastructure

Public Works is responsible for the construction and maintenance of Town infrastructure including: roads, curbs, guide rails; street and traffic signs; street, traffic and cross walk lights; storm sewers; catch basins and roadside ditches; snow removal, weed control and street sweeping services.

2.3.5. Finance & Performance Services

v) Coordinating the Budget Process

A budget is prepared annually and presented to Council for approval. The budget takes into consideration the operating and capital needs of the municipality in all areas with the exception of water, sewage, the marina, and the arena, which are all subject to individual budgets. Each Departmental Director is provided with a base budget, to which they must submit supplementary budget requests for one time costs or base budget additions. Supplementary requests are reviewed and ranked in order of corporate importance by the Senior Management Team. For a summary of the 2006 budget items related to IT and GIS, see Section 2.7.7 – Technology Budget Allocations.

w) Processing Tax and Water Billing

A primary role of the Finance Department is to administer the property taxation process. Tax and water billing information is maintained in Vailtech, the municipal finance system; the primary corporate source of address information. Vailtech is used to generate bills and to process and track all payments and a history for each property. Assessment information is imported into Vailtech annually from the MPAC SAS tape; while ownership and address information is updated daily in Vailtech using Laywers Letters and MPAC sales listings. Roll numbers, address, and ownership information can be exported from Vailtech and used in other corporate business applications.

The Vailtech system has label generation functionality, allowing the user to enter the specified roll number (either individually or by range) and generate the corresponding address label(s). Additionally the GeoCortex Web-mapping application allows users to spatially select properties, export roll numbers for use in Vailtech, and then produce mailing labels.

2.3.6. Strategic Services

x) Conducting Special Studies & Projects

Strategic Services is a new department within the Town, with its Manager reporting directly to the CAO. With significant ties to Planning, Recreation, and Economic Development, the Strategic Services department is responsible for the coordination of a variety of special studies and projects, including:

- Facilitating the development of partnerships with external agencies and organizations;

- Coordinating community development and community based projects;
- Formulating sustainable growth strategies;
- Participating in long-term strategic planning;
- Acting as short-term project manager, coordinating consultants and project partners; and,
- Sourcing funding for projects and general operations.

2.4. Geographic Data

Table 2 provides an inventory of the geographic data used to support the business activities of the Town. Existing geographic datasets are identified, as well as the format of the dataset in the first column, The status of the dataset is identified in the second column. The business activities that each dataset supports, which are related to the descriptions provided in Section 2.3 – Business Activities, are listed in the third column,. The last column identifies the owner/provider of the dataset. Those datasets not owned by the Town may be subject to restrictions of use, as determined by the owner/provider.

Table 2: Existing Geographic Data

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
Aerial Photography (2000) 1:15,000 SID Image	Complete	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws j) Emergency master planning and preparedness p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	County of Essex
Aerial Photography (2004) 1:6,250 10cm & 50cm SID Image	Complete	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws j) Emergency master planning and preparedness p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	County of Essex

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		x) Conducting special studies & projects	
Assessment Map Index Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges d) Performing building inspections & issuing building permits f) Responding to letters of request g) Assigning addresses m) Providing customer service p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure w) Processing tax and water billing	Town of Lakeshore
ATV By-Law Shapefile	Complete	a) Coordinating long-range development and planning e) Enforcing municipal by-laws m) Providing customer service n) Filing and maintaining municipal by-laws p) Providing GIS services and support	Town of Lakeshore
Boulevards Shapefile	Maintaining	a) Coordinating long-range development and planning e) Enforcing municipal by-laws h) Maintaining municipal parks and facilities p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Building Outlines Shapefile	Complete	a) Coordinating long-range development and planning d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws h) Maintaining municipal parks and facilities i) Operating municipal parks and facilities j) Emergency master planning and preparedness	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		k) Fire response p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	
Catch Basins Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits j) Emergency master planning and preparedness p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Churches Shapefile	Complete	j) Emergency master planning and preparedness m) Providing customer service p) Providing GIS services and support q) Promoting the Town x) Conducting special studies & projects	Town of Lakeshore
Curb Stop Valves Shapefile	In Progress	p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
D & W Drains Shapefile	Maintaining	p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Drain Breaks Shapefile	Maintaining	p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		t) Providing environmental services u) Municipal road infrastructure	
Drains Shapefile	Maintaining	p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Election Poll Boundaries Shapefile	Updated January 06	m) Providing customer service o) Council services p) Providing GIS services and support q) Promoting the Town x) Conducting special studies & projects	Town of Lakeshore
Engineering Drawings Hardcopy (Some digital)	N/A	a) Coordinating long-range development and planning b) Processing development applications h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness k) Fire response p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Fill Line Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	ERCA (Licensed through Essex County)
Fire Hazard Map (Pre-plans) Hardcopy	N/A	j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents p) Providing GIS services and support	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
Fire Incidents (2003-2005) Shapefile	Maintaining	j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents p) Providing GIS services and support	Town of Lakeshore
Fire Response Areas Shapefile	Complete	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents m) Providing customer service p) Providing GIS services and support	Town of Lakeshore
Flood Line Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	ERCA (Licensed through Essex County)
Forest Area Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness m) Providing customer service p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services	ERCA (Licensed through Essex County)
Hydrants Shapefile	Maintaining	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	
Lots/Con Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges d) Performing building inspections & issuing building permits g) Assigning addresses j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	Ministry of Natural Resources (Licensed through Essex County)
Manholes Shapefile	In Progress	j) Emergency master planning and preparedness m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Map Book Shapefile	Urban Area Complete Rural Area in Progress	j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents p) Providing GIS services and support u) Municipal road infrastructure	Town of Lakeshore
Parcels (Assessment, Ownership) Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges	Teranet MPAC (Sub-Licensed through

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws f) Responding to letters of request g) Assigning addresses j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents m) Providing customer service p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure w) Processing tax and water billing x) Conducting special studies & projects	Essex County)
Park Features Shapefile	Maintaining	a) Coordinating long-range development and planning h) Maintaining municipal parks and facilities i) Operating municipal parks and facilities j) Emergency master planning and preparedness m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	Town of Lakeshore
Parks Shapefile	Maintaining	a) Coordinating long-range development and planning h) Maintaining municipal parks and facilities i) Operating municipal parks and facilities j) Emergency master planning and preparedness m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		x) Conducting special studies & projects	
Pumps Shapefile	Maintaining	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response p) Providing GIS services and support q) Promoting the Town r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	Town of Lakeshore
Railways Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services w) Processing tax and water billing x) Conducting special studies & projects	Town of Lakeshore
Recreation Maps (in Recreation Guide) Shapefile		m) Providing customer service p) Providing GIS services and support q) Promoting the Town x) Conducting special studies & projects	Town of Lakeshore
Remote Locations Shapefile	Complete	p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Road Side Spraying Shapefile	Complete	p) Providing GIS services and support t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Sanitary	Complete	a) Coordinating long-range development and	Town of

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
Lagoons Shapefile		planning b) Processing development applications p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Lakeshore
Sanitary Treatment Plants Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Sanitary Pumps Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Sanitary Sewers Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Schools Shapefile	Complete	a) Coordinating long-range development and planning c) Processing development charges j) Emergency master planning and preparedness	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town w) Processing tax and water billing x) Conducting special studies & projects	
Sidewalks Shapefile	In Progress	a) Coordinating long-range development and planning d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Signs Shapefile	Maintaining	h) Maintaining municipal parks and facilities p) Providing GIS services and support u) Municipal road infrastructure	Town of Lakeshore
Snow Plow Routes Shapefile	Complete	h) Maintaining municipal parks and facilities m) Providing customer service p) Providing GIS services and support u) Municipal road infrastructure	Town of Lakeshore
Standing Water Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits h) Maintaining municipal parks and facilities p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Storm Sewers Shapefile	In Progress	p) Providing GIS services and support r) Providing engineering services t) Providing environmental services	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		u) Municipal road infrastructure	
Storm Water Ponds ESRI Shapefile	In Progress	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Storm Water Pumps Shapefile	In Progress	a) Coordinating long-range development and planning p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Street Centreline Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws g) Assigning addresses j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	County of Essex (Maintained by Town of Lakeshore)
Street Lights Shapefile	Maintaining	h) Maintaining municipal parks and facilities m) Providing customer service p) Providing GIS services and support u) Municipal road infrastructure	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
Subdivisions Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges g) Assigning addresses j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	Town of Lakeshore
Sub-Watershed Shapefile	Complete	a) Coordinating long-range development and planning p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	ERCA (Licensed through Essex County)
Towns Shapefile	Complete	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town x) Conducting special studies & projects	Town of Lakeshore
Trails Shapefile	Maintaining	a) Coordinating long-range development and planning e) Enforcing municipal by-laws h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support q) Promoting the Town	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		u) Municipal road infrastructure x) Conducting special studies & projects	
Valves Shapefile	Maintaining	p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Ward Boundaries Shapefile	Updated Jan 06	a) Coordinating long-range development and planning o) Council services p) Providing GIS services and support x) Conducting special studies & projects	Town of Lakeshore
Water Metre Routes Shapefile	In Progress	p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure w) Processing tax and water billing	Town of Lakeshore
Water Sample Stations Shapefile	Maintaining	p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Water Service Areas Shapefile	Complete	a) Coordinating long-range development and planning b) Processing development applications h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness k) Fire response p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	Town of Lakeshore
Watermains Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications h) Maintaining municipal parks and facilities j) Emergency master planning and preparedness k) Fire response	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure	
Waterways Shapefile	Complete	a) Coordinating long-range development and planning i) Operating municipal parks and facilities j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	Town of Lakeshore
Zoning Shapefile	In Progress	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws m) Providing customer service n) Filing and maintaining municipal by-laws o) Council services p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services x) Conducting special studies & projects	Town of Lakeshore
401 Response Shapefile	Complete	a) Coordinating long-range development and planning j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents	Town of Lakeshore

Geographic Data			
Dataset Format	**Status**	**Business Activities**	**Owner Provider**
		p) Providing GIS services and support	

2.5. Business Data

Table 3: Existing Business Data provides an inventory of the business data used to support the business activities of the Town that have potential linkages to spatial data. Existing business data is listed in the first column, while the business activities support by the data is listed in the second column which relate directly to the descriptions provided in Section 2.3 – Business Activities. The final column identifies the format of the business data.

Table 3: Existing Business Data

Business Data		
Data	**Business Activities**	**Format**
911 Addresses	g) Assigning addresses k) Fire response l) Reporting and tracking fire incidents m) Providing customer service p) Providing GIS services and support	Tabular (Vailtech)
Assessment Information (MPAC)	f) Responding to letters of request p) Providing GIS services and support w) Processing tax and water billing	Tabular (CD-OASYS)
Assessment Information (Municipal)	f) Responding to letters of request p) Providing GIS services and support w) Processing tax and water billing	Tabular (Vailtech)
Building Inspection Forms	d) Performing building inspections & issuing building permits	Hardcopy
Building Permits	d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws p) Providing GIS services and support	Hardcopy
Business Directory (in process)	m) Providing customer service p) Providing GIS services and support q) Promoting the Town	On-line database
Committee of Adjustment Database	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges p) Providing GIS services and support	FoxPro

Business Data		
Data	**Business Activities**	**Format**
	s) Review and comment on development applications x) Conducting special studies & projects	
Development Applications	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges g) Assigning addresses j) Emergency master planning and preparedness k) Fire response m) Providing customer service p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services x) Conducting special studies & projects	Hardcopy
Facilities Scheduling Calendar	i) Operating municipal parks and facilities	Hardcopy
Municipal By-Laws	e) Enforcing municipal by-laws f) Responding to letters of request n) Filing and maintaining municipal by-laws o) Council services p) Providing GIS services and support x) Conducting special studies & projects	FoxPro
Municipal Emergency Response Plans	j) Emergency master planning and preparedness k) Fire response	MS Word
Park Inspection Forms	h) Maintaining municipal parks and facilities	Hardcopy
Permit Database	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits p) Providing GIS services and support	MS Access
Road Studies	a) Coordinating long-range development and planning b) Processing development applications c) Processing development charges p) Providing GIS services and support r) Providing engineering services s) Review and comment on development applications t) Providing environmental services	Tabular

Business Data		
Data	**Business Activities**	**Format**
	u) Municipal road infrastructure x) Conducting special studies & projects	
Sidewalk Inventory (an updated sidewalk inventory and corresponding shapefile will be produced Spring 2006)	a) Coordinating long-range development and planning p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Tabular (MS Access)
Site Photographs	a) Coordinating long-range development and planning d) Performing building inspections & issuing building permits e) Enforcing municipal by-laws h) Maintaining municipal parks and facilities l) Reporting and tracking fire incidents p) Providing GIS services and support q) Promoting the Town u) Municipal road infrastructure x) Conducting special studies & projects	Image file (.jpg or .tif)
Water/Sewer Billings	c) Processing development charges w) Processing tax and water billing	Tabular (Vailtech)
Work Orders	f) Responding to letters of request h) Maintaining municipal parks and facilities p) Providing GIS services and support u) Municipal road infrastructure	Access

2.6. Business Applications

Table 4: Existing Business Applications provides an inventory of the business applications/software used to support the business activities of the Town that fall into one of two categories:

- Business applications used to maintain or display GIS data; or,
- Business applications used to maintain data that could be enhanced if integrated into a GIS environment.

Existing business applications are listed in the first column, while the business activities they support are listed in the second column which relate directly to the descriptions provided in Section 2.3 – Business Activities. The final column identifies the type of business application/software.

Table 4: Existing Business Applications

Business Applications		
Application	**Business Activities**	**Type**
ArcExplorer	a) Coordinating long-range development and planning b) Processing development applications g) Assigning addresses p) Providing GIS services and support r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	GIS Viewer
ArcGIS	p) Providing GIS services and support x) Conducting special studies & projects	GIS
AutoCAD 2007	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits p) Providing GIS services and support x) Conducting special studies & projects	Computer Aided Design
City Works	Not currently used by Town Staff, although some engineering infrastructure data has been entered into the system.	Asset Management
Crystal Reports	v) Coordinating the budget process w) Processing tax and water billing	Customized Reporting Tool
DrainTracker	t) Providing environmental services w) Processing tax and water billing	Track charges for drain maintenance
FirePro	j) Emergency master planning and preparedness k) Fire response l) Reporting and tracking fire incidents	Fire Services Management
Front Page	m) Providing customer service o) Council services	Web Page Design Tool
GeoCortex	a) Coordinating long-range development and planning b) Processing development applications d) Performing building inspections & issuing building permits j) Emergency master planning and preparedness l) Reporting and tracking fire incidents	Web-Mapping Viewer

Business Applications		
Application	**Business Activities**	**Type**
	m) Providing customer service o) Council services p) Providing GIS services and support q) Promoting the Town r) Providing engineering services s) Review and comment on development applications t) Providing environmental services u) Municipal road infrastructure x) Conducting special studies & projects	
Grey Island (in process of implementation)	r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Automated Vehicle Location
Harbour Management System	i) Operating municipal parks and facilities	Harbour Management
Laserfiche	m) Providing customer service n) Filing and maintaining municipal by-laws o) Council services	Document Management System
Oracle Enterprise Manager	v) Coordinating the budget process	RDBMS
Vailtech	f) Responding to letters of request g) Assigning addresses m) Providing customer service v) Coordinating the budget process w) Processing tax and water billing	Financial
VoterView (by DataFix)	o) Council services	Voters List Management
Work Order System	r) Providing engineering services t) Providing environmental services u) Municipal road infrastructure	Custom Work Order Management

2.7. Technology Platform

The Town of Lakeshore utilizes a variety of technology to support its business activities. This section identifies the existing technology components related to GIS.

2.7.1. Network Configuration

The Town of Lakeshore has an extensive network structure which is managed by Information Services. The six servers identified in Table 5: Server and Application Configuration below were installed new in 2006, and are on a four year life cycle (scheduled for replacement in 2010).

Table 5: Server and Application Configuration

Server Specifications	Application Utilization
Server 1 Windows 2003 Std. Ed. Dell PE2850	File & Print Exchange 2003 Microsoft VPN DNS WINS DHCP
Server 2 Windows 2003 Std. Ed. Dell PE1850	Terminal Server (Provides access to financial application and serves MS Office 2003 to 22 thin client terminals)
Server 3 Windows 2003 Std. Ed. Dell PE2850	Oracle 9i (For Vailtech financial system)
Server 4 Windows 2003 Std. Ed. Dell PE2850	LaserFiche 7 MSDE SQL MS Software Update Server (SUS)
Server 5 Windows 2000 Std. Ed. Dell PE1850	Blackberry Enterprise Server 4.0 MSDE SQL
Server 6 Linux RedHat	Web Server (Moving to County Server 3Q06) Firewall Gateway Server

<u>Town Hall Site</u>

The Town Hall network is on a wired 10/100 Base-T (up to 100Mbps) connection. The Internet connection is a 1mbps wireless radio connection to Maxxes Networks (via WedNet – the Windsor Essex Development Network). The network serves a total of 54 clients:

- 22 Thin Clients (Windows 2003 Terminal Server)
- 20 Desktop PCs (Windows XP)
- 20 Laptops (Windows XP)

GIS Workstation

The GIS Technologists perform GIS activities on a workstation with the following specifications:

GIS Workstation
Intel Pentium 4
2.4 Ghz
1GB Ram
NVIDIA GeForce Ti4200 with AGP8x
ATAPI CD-RW 52xMAX
19" Samsung Flat Panel Monitor

Remote Sites

There are seven remote sites that are part of the Town's network. Table 6 summarizes the technology used at each site.

Table 6: Technology at Remote Sites

Remote Site Location	Computer Equipment	Connection Information
Arena	2 x PCs (Windows XP)	Networked & use a shared Bell high-speed DSL & VPN to Town Hall for email & shared files.
Fire Headquarters	6 x PCs (Windows XP)	Networked & use a shared Cogeco high-speed DSL & VPN to Town Hall for email & shared files.
Marina	2 x PCs (Windows XP)	Networked & use a shared Bell high-speed DSL & VPN to Town Hall for email & shared files.
Publics Works Garage (Puce/Maidstone)	1 x PC (Windows XP)	On dial-up Internet for POP access to corporate email.
Public Works Garage (St.Joachim/Rochester)	1 x PC (Windows XP)	On dial-up Internet for POP access to corporate email.
Water Treatment Plant (Belle River)	2 x PCs (Windows XP)	One PC on dial-up Internet for POP access to corporate email.
Water Treatment Plant (Stoney Point)	2 x PCs (Windows XP)	One PC on dial-up Internet for POP access to corporate email.

Data Back-up

The file, print, Exchange and Oracle servers are backed up daily on tape, with monthly tapes being stored offsite.

Business unit interviews identified concerns about data and application backup procedures. For many departments it is critical to have reliable and continuous access to the most up-to-date information available. It was noted that if the Town's network configuration can not ensure constant and uninterrupted access to data, departments may need to employ additional backup measures to ensure they can continue to work efficiently through times when network access is unavailable. Suggested remedies included developing batch processes to copy network data to a designated offline machine within the department, or

implementing departmental mini-hubs that would enable departments to continue working uninterrupted when work is required on other corporate servers.

2.7.2. Internet Access

Most Town staff access the Internet using their own computers equipped with standard Web-browser technology with the exception of staff at outlying Fire Halls, Recreation and Facilities, and Building Inspectors who share access to computers.

2.7.3. Connectivity Issues

Two levels of connectivity issues were identified during the business unit interviews: accessing the Town's servers from remote locations; and, accessing the Essex County servers from the Town office.

Fire Services staff operate out of 5 outlying Fire Halls located throughout the municipality. Staff located in the Belle River Headquarters have access to computers and the Internet via cable modem. Access to the Town's server is provided via Virtual Private Network (VPN). Fire Services regularly encounters connectivity problems and is frequently unable to access MS Outlook (mail system), and FirePro (Fire Services Management).

The Town accesses a wireless network through Windsor Essex Development Network (WEDnet), WEDnet enables the Town to access the County's data warehouse and a variety of ASP solutions.

The Town experiences "failed attempts" when trying to connect to the County servers through WEDnet, ultimately preventing timely access to data and software applications. The Town is working with WEDnet to implement a fibre network to replace the wireless network which will eliminate connectivity issues. Once the fibre network is in place, the Town will be responsible for extending the fibre infrastructure, as required, to remote locations such as the Fire Halls and Public Works Yards.

2.7.4. Municipal Website

The Town's Website provides a forum for sharing Town specific information with the public. Information related to municipal services, the Town's by-laws, and Council agendas and meeting minutes are provided.

The municipal Website is hosted by the County. A Request for Qualifications (RFQ) was published in January 2006 for the redesign and upgrade of the Website, incorporating the following requirements:

- Search and query abilities;
- Easy maintenance of text, graphics and links;
- Ability to publish short movie clips;
- Enhanced security; and,
- Ability to integrate with an enhanced Web-mapping interface.

2.7.5. Peripheral Equipment

In addition to standard computers, the Town also uses the following peripheral equipment:

Large Format Plotter

1 x HP Design Jet 800 24'

GPS Units

3 x Thales Mobile Mapper Pro

32MB SD card w/post processing

Scanners

1 x Canon CanoScan LiDE20

1 x Fujitsu fi-4340C Image Scanner

TIF & PDF scanning up to 11x17 on all photocopiers

Contex hawk-eye CX 36

2.7.6. Technology Budget Allocations

Corporate technology requirements, including GIS technology, are considered part of the Corporate IT Budget. New computers and peripheral equipment required to support departmental business activities are considered under Departmental budgets. Computers are replaced based on a 4 year life cycle. Table 7 provides a summary of the 2006 Corporate IT budget:

Table 7: Corporate IT Budget (2006)

Budget Item	2006 Budget Allocation
Lifecycle Allocation (Annual budget for computer replacements)	$34,267
Annual Operating Budget	$58,140
One Time Items	$7,200
Capital Items (one time) for 2006	$30,000

2.8. County of Essex Relationship with the Town of Lakeshore

Because the recommendations of this plan will be influenced by the Town's current and future relationship with the County of Essex, this section will examine the "pros and cons" of current services and tools provided by the County, which include:

- Citrix access to an Asset Management System (Azteca CityWorks) to record, track and analyze municipal assets and work orders;
- Storage of GIS data in a centralized ArcSDE database;
- Use of a web-mapping application, GeoCortex to view and query GIS data and print maps; and,
- Access to floating ArcView and ArcEditor licenses for data editing and analysis.

The County implemented the GIS environment and the specific tools identified above in partnership with the lower-tier municipalities as part of the GeoSmart funded project completed June 2004. The Town was an active member of that project and participated in determining the scope of the project and selecting the software solutions implemented by the County. In this regard, part of the vision of the GeoSmart funded project was to eliminate the duplication of effort and cost to each partner of purchasing and implementing a shared enterprise GIS solution which included an asset management and web-mapping solution.

Through the workshop and interviews, staff expressed a desire to become more independent from the County. Staff indicated the desire to implement a Town owned and managed enterprise GIS that is specifically tailored to support Lakeshore's internal business needs and day-to-day activities.

Staff drew comparisons to the Town of LaSalle who have successfully implemented an independent enterprise GIS solution, indicating that LaSalle uses GIS to communicate with key stakeholders through an interactive public web-mapping site called infoLaSalle. Staff understand that all departments are able to access spatial and related data, and use it to answer inquiries from the public, ultimately conducting business in a timely and cost-effective manner. Internal resources, residents, businesses, and visitors are able to retrieve, view and print a broad range of property, topographic, public service, and community planning related information and maps.

The following is an assessment of the tools and services provided to the Town by the County related to the information gathered from staff through the brainstorming session and interviews.

a. Of concern to staff is the lack of control the Town has over the administration and functionality of the CityWorks, ArcSDE, and GeoCortex environment provided by the County. For example, data stored in the County's GIS database is modeled to meet the business needs of the County and lower tier municipalities. This means that the Town can not unilaterally modify the data model (e.g. add fields to tables or change field names) to meet their unique business needs. If a change is required, it must be accepted and implemented by the County.

   The County does engage the lower-tier municipalities for input into the data model, such as addressing requests to reduce the number of fields in the data model and to make it less confusing. In this regard the County has demonstrated a willingness to accept input from the lower-tier municipalities.

b. The reliability of the network connection to the County is also a concern. There have been problems with the existing wireless network connection resulting in the

system being unreliable and at times slow, making it time consuming to connect to the database or accessing online tools. Server 'downtime' is also an issue, resulting in interrupted access to the server during work hours.

The Town is working with the County on an ongoing basis to improve the network connections.

c. Currently the Town's geographic data is stored and maintained in personal geodatabase or shapefile file format on the Town's local area network. Specific datasets are copied to the County's GIS database to support the web-mapping and asset management applications provided by the County. Although data can be permanently stored and maintained on the County's data warehouse, it is the Town's preference to store and maintain this information locally and upload data updates as necessary. This preference is due to concerns and questions concerning the flexibility of the ArcSDE and CityWorks data model as well as the impact of connectivity problems which may impact timely access to the applications and information that would reside at the County.

   ArcSDE is a server software solution used to access large multi-user geographic databases stored in relational database management systems (RDBMS). As a core element of any enterprise GIS solution, the primary role of ArcSDE is to act as the GIS gateway between users and spatial data stored in a RDBMS. ArcSDE provides a suite of services that enhance data management performance, and extend the range of data types that can be stored in a RDBMS. ArcSDE enhances the performance and efficiency of storing and accessing orthographic photography and other geospatial datasets via the Internet.

   The Town has access to ArcSDE through the County at no cost.

d. While the Town participated in the selection of the Azteca CityWorks asset management solution implemented by the County as part of the GeoSmart funded project, the Town is not currently using the asset management solution for internal business needs.

   When you purchase Azteca CityWorks licenses you are also required to purchase, at a minimum one ESRI ArcEditor software license. For each additional concurrent user you are required to purchase, at a minimum one additional ArcView license.

   Currently the Town has access to 25 floating Azteca CityWorks and ESRI licenses from the County at no cost. While shared access to 25 floating licensees will exceed the Town's current and future requirements, the County can increase the number of licences as required. The following table identifies the current licensing costs for the software available from the County.

ArcGIS Desktop	
ArcView 9.x Concurrent 1st license	$5,900
ArcView 9.x Concurrent 2-10	$5,300
ArcView 9.x Single Use 1st license	$2,350
ArcView 9.x Single Use 2-10	$2,200
ArcEditor 9x Concurrent 1st license	$12,600
Azteca – Cityworks	
Cityworks - Concurrent 1st license	$22,500
Cityworks - Concurrent 2-5	$11,250
Cityworks - Concurrent 6-10	$10,500
Cityworks - Single 1st license	$13,975
Cityworks - Single 2-5	$7,000
Cityworks - Single 6-10	$6,125
ArcGIS Server-side Technology	
ArcIMS 9x Server/2 CPU - Windows	$18,000
ArcSDE 9x Ser/2 CPUs	$18,000

There are multiple licensing variations the Town would need to consider if purchasing any asset management solution, such as the number and type of users and whether the users would need to use the software concurrently.

If the Town chose to implement Azteca CityWorks locally it may be possible, with agreements from the County, Azteca CityWorks and ESRI Canada to transfer the necessary software licenses to the Town, depending on the number and type of licensees the Town required.

In the current environment the Town has access to the County's ArcSDE at no cost. If the Town chose to install Azteca CityWorks locally, or their web-mapping solution, they would have to install ArcSDE locally.

e. Staff indicated that they have limited ability to modify the way in which information is displayed in the web-mapping application GeoCortex, making on-the-fly custom map production a difficult task for example. As a result, requests for simple cartographic products are directed to the Town's GIS Technologist to produce the desired map.

   The Town can work with the County to implement changes to address the way information is displayed in the GeoCortex application within the technical limitations of the web-mapping application.

   The Enterprise Edition would enable the Town deploy an unlimited number of web mapping sites using ESRI's ArcIMS mapping engine, as opposed to GeoCortex Small Business Edition which restricts the user to one site.

Summary

The information above supports the statement that the Town of Lakeshore realizes specific cost benefits from their existing relationship with the County.

The table below identifies the estimated costs to the Town if they were to choose to purchase their own GIS based web-mapping and GIS based asset management systems using similar applications as currently provided by the County. The costs are based on estimates provided by ESRI Canada and Latitude Geographics (March 2005).

Deliverable	Cost
Server Software	
– ESRI ArcSDE	$18,000
GIS-Based Web-Mapping	
– GeoCortex IMF, Business Edition	$8,000
– ESRI ArcIMS (no training)	$18,000
– Implementation and customizing	$4,975
GIS Asset Management System *	
– 3 concurrent CityWorks and 3 ArcView licenses	$60,900
– Server, installation, customizing (no data creation or training)	$100,000
Total	$209,875

* The number and type of CityWorks and ArcView licenses, as well as server, installation and customization costs are estimated by i*PLAN*corp and are subject to the specific business needs of Engineering & Infrastructure Services. The Town may be able to transfer the concurrent CityWorks and ArcView licenses from the County to the Town, thereby reducing the total estimated cost to $148,975.

The recommendations in this plan will consider these facts in relationship to the short and long term business needs of the Town of Lakeshore while considering the current and future industry trends.

3. RECOMMENDATIONS

The recommendations in this plan are based on the Town of Lakeshore's current environment and needs, as described in Section 2, as well as on current industry standards and future industry vision, while also considering the four primary components to successfully implementing and maintaining an enterprise GIS: People, Technology, Information and Documentation.

People

People are the most critical component of an enterprise GIS and are the primary means by which a successful GIS is implemented and maintained. When we talk about *people*, we are referring to managers, maintainers and users of GIS technology, applications and information.

People form the backbone of relationships with external agencies that provide information and services *to* the Town; require information *from* the Town; and partner *with* the Town in some capacity. Examples of External Agencies include, but are not limited to: Conservation Authorities; Consultants working for the Town; the County of Essex and Lower Tier municipalities; Municipal Property Assessment Corporation (MPAC); the Ministry of Natural Resources (MNR); Teranet; the University of Windsor and/or other academic institutions; and, Utility Providers. External Agencies may access Town data directly or through a web-based mapping interface depending on the nature of their relationship with the Town.

Technology

A robust Technology infrastructure is required in order for an enterprise GIS to function to its optimum performance. *Technology* includes the hardware, software and network infrastructure required to operate and support the enterprise GIS, which includes but not be limited to: network equipment and connections; computer equipment such as GIS workstations and laptops; software applications and tools; and peripheral equipment such as plotters, printers, scanners, GPS units and digital cameras.

Information

Accurate and current Information is at the heart of an enterprise GIS. The Town has a substantial amount of GIS-related data, and will continue to build on its data holdings as the enterprise GIS is implemented and as the system grows and matures.

The true value of a GIS is realized when it is used to access a central data warehouse to support daily business activities and decision-making. Staff must have access to the most current and accurate data, and must have a high degree of confidence in the information they are accessing. When data is outdated and/or incomplete, users lose confidence in the system and revert to manually or in individual databases recording information and performing queries and analysis, thus resulting in an obsolete system with duplicate datasets. It is therefore critical to ensure that:

- One central GIS data warehouse is implemented to support corporate business needs, and that data is not duplicated from department to department;
- Standards and procedures are developed to ensure data is created and maintained to the highest possible standard;
- Metadata is created and maintained for each GIS dataset, defining the data source and date of last update, ultimately promoting user confidence in the data.

Geographic data can be categorized into three groups: Vector, Tabular, and Raster data. Vector Data is spatial data represented in the form of points, lines and polygons having their

geographic size, shape and relative location defined by a set of *x,y* coordinates on a map. Tabular Data consists of attributes associated to the vector features on a map. Attribute data can contain Boolean strings (true/false), date, text or numeric data. An example of vector and tabular data is a parcel dataset displaying the property boundary which is linked to attribute information such as the property roll number and ownership information.

Raster Data is another method of storing, representing and displaying spatial information in a digital form. Raster data consists of using cell data arranged in a regular grid pattern in which each pixel or cell is assigned a value based on its characteristics. An example of raster data is orthographic photography or any other digital image file.

Documentation

The long term success of an enterprise GIS is based on Documentation to support and govern the implementation, maintenance, and growth of the system. *Documentation* includes, but is not limited to Policies, Standards, and Procedures.

Policies are statements on how the Town achieves its goals and objectives with regard to a specific subject area, for example, a policy on how Town-owned data may be sold to or shared with the public. Policies will be established to govern the implementation, maintenance and growth of the enterprise GIS and will outline rules, conventions, and protocols to be adopted by staff relating to GIS data, technology and services.

Standards are defined criteria or specifications that are set as a model to be used consistently to ensure that GIS data and cartographic products are produced and maintained to level of acceptance pre-determined by the Town. For example, standards will be developed to provide detailed guidelines for the creation of all GIS data. A data standards document typically identifies information such as: the GIS dataset name; data type/format; units of measurement; data ownership; attribute information such as field names, domain values, linking and theming fields; associated files; topology rules; and required maintenance frequency.

Procedures are closely related to standards; these two types of documentation are typically published in combination. Procedures provide a series of step-by-step instructions describing the processes to be used when completing a task.

The following recommendations are provided in the order in which the Town of Lakeshore should consider each recommendation. While each recommendation can be considered individually, acceptance of each proceeding recommendation may have an impact on subsequent recommendations.

3.1. County of Essex (People)

It is recommended that the Town continue to utilize and expand on the County's GIS infrastructure and services. While this study identified issues with the current infrastructure, such as instability of the network connections, as well as the need to work with the County to implement changes to the data model and modify the web-mapping solution, these issues are either currently being addresses or can be resolved through continued commitment by both parties.

The benefits of the relationship with the County to the Town's include, but are not limited to cost efficient access to a robust GIS infrastructure, consisting of a GIS data warehouse, web-mapping solution, asset management system, a suite of ESRI software licenses and the skills and expertise to support the technology

infrastructure. The estimated cost to the Town to implement an equivalent infrastructure would be $148,975.

To achieve this objective the Town should work with the County to develop a plan to address the Town's current as well as future needs, as identified in this GIS Strategic Plan. The plan should include a memorandum of understanding and service level agreements that will provide for the long term needs of the Town as identified in this GIS Strategic Plan.

Example requirements of a Memorandum Of Understanding (MOU):

- Application, network file and web servers are maintained and upgraded as required to ensure optimum agreed to system performance;
- All data must be backed-up in accordance with Town's data back-up policies with the ability to restore information if required remotely;
- Network be available 24 hours a day, seven days a week with minimal down-time for maintenance and repairs;
- Applications must support a multi-user environment;
- Ability of the Town to control security and access to applications and data; and,
- Applications must provide a high degree of flexibility, allowing authorized staff to manage and manipulate queries, data, and cartographic outputs.

The recommendations in this plan are based in part on the premise that the Town will accept this recommendation and will successfully establish an agreement with the County that will enable the Town to continue to build on their GIS environment over the long-term.

3.2. Senior GIS Analyst (People)

It is recommended that upon commencement of implementing an asset management and/or development tracking system, as identified in recommendation 3.6 and 3.21 respectively, the Town create a Senior GIS Analyst position to support the ongoing analysis and implementation of the Town's GIS business needs. The Senior GIS Analyst will be an additional position responsible for the day-to-day direction of GIS services. In addition to GIS responsibilities, the position will also be responsible for providing Information Technology support and establishing and maintaining GIS related working relationships with external agencies, such as the County of Essex.

The Senior GIS Analyst will:

- Provide project management;
- Develop and implement data creation and maintenance business processes;
- Liaison with internal and external clients, partners, vendors and consultants;
- Perform advanced analysis;
- Develop and present business cases;
- Manage GIS-related applications and tools;
- Provide guidance and leadership to GIS Technologist;
- Provide IT support; and,
- Develop and deliver training to departmental staff.

3.3. Training (People)

It is recommended that GIS resources receive the following training to support the implementation, use, and management of the enterprise GIS.

While the data warehouse will physically reside at the County, it is critical that the Town possess a strong technical understanding of the network configuration and how the solution can best be configured to meet the Town's business needs.

The Town also needs to continue to enhance their existing GIS skills to support the business needs of the Town.

Training would consist of the following courses:

- Introduction to ArcGIS I & II
- Introduction to ArcSDE;
- ArcSDE Administration.
- Advanced Analysis with ArcGIS; and,
- Azteca CityWorks.

It is also recommended that Town staff be trained on an as-needed bases based on how to carry out basic GIS functions such as using GIS based applications to perform searches and queries, and to produce cartographic outputs for presentations and reports. Training should be provided in the form of practical demonstrations and seminars. Training should be specific to the following applications:

- Web-mapping application (GeoCortex or other); and
- Azteca CityWorks.

3.4. GIS Data Warehouse (Technology)

It is recommended that the Town implement a GIS data warehouse using the County's existing infrastructure to store all GIS and related data. The County's ArcSDE data warehouse environment provide the required system performance required to access large volumes of data, such as orthographic imagery, and maintain an asset management system.

A data warehouse will facilitate:

- Improved storage, retrieval and maintenance of GIS data holdings;
- Increased data sharing among departments;
- Reduced duplication of datasets;
- Greater security and backup measures;
- Improved ability to make maps displaying combinations of data from various departments instantaneously; and,
- Improved ability to share data with external partners using industry standards.

3.5. Network Communication (Technology)

It is recommended that the Town work with the County to continue to improve the performance of the network connection provided by WedNet.

It has been determined that the wireless network connection between the County of Essex and the Town of Lakeshore is unreliable and affects the Town's ability to access information and applications from the County in a dependable manner. The wireless connection was implemented as a temporary solution, until such time that fibre can be installed.

3.6. Asset Management System (Technology)

It is recommended that the Town use the existing Azteca CityWorks software and GIS infrastructure provided through the County to implement a GIS Based Asset Management System.

To achieve this objective the Town should develop a detailed plan identifying the specific required functionality of Asset Management System, the scope of the work to be completed and the proposed methodology to implement the solution.

The specific required functionality of Asset Management System would include, but not be limited to the ability to document inspections, as well as manage inventory, work orders and services requests in relationship to the Town's assets.

Details of the datasets to be created and/or enhanced as part of the implementation of an asset management system are identified in Recommendation 3.12.

While the Town should not incur any additional cost to license the CityWorks software, the implementation of the Asset Management System will require substantial investment of effort. The Town should engage a consultant to assist in the implementation of the Asset Management System.

3.7. Web-Mapping Solution (People)

It is recommended that the Town work with the County to resolve current configuration issues and enhance the GeoCortex web-mapping solution.

Although the existing GeoCortex solution provides the Town access to their GIS data and basic GIS tools, a number of issues have been identified with this solution. Of concern is the lack of flexibility for the Town to manipulate data, perform analysis and control cartographic output. There is also concern over 'down-time' when the application is unavailable due to network connection problems or maintenance performed at the County. Having more control and flexibility with the tool would result in more valuable results supporting the Town's business activities.

The application should be enhanced to provide access to all Town-owned GIS data, with security measures being implemented as necessary to restrict access to sensitive data. Additionally, access to the Town's internal web-mapping application should be made available to the Ontario Provincial Police (OPP), providing restricted access to property ownership information and orthographic photography.

Training should also be provided to Town staff, OPP, and other potential users/stakeholders to ensure all users are familiar and comfortable with the functionality available to them through the selected web-mapping application.

3.8. Web-Based Address Point Management Tool (Technology)

It is recommended that the Town work with the County to implement a web-based Address Point Management tool to facilitate the cost effective maintenance of the Town's corporate address point database.

Address points represent the best means for the Town to create and maintain a unique spatial identifier in a timely manner to support the Town's business needs, such as spatially locating building permits, applications for minor variances and by-laws prior to an assessment roll number being assigned by MPAC or a PIN by Teranet.

The Address Point Management tool would provide front line staff with a cost efficient and easy to use tool that would enable them to create and manage the Town's address point database. Using foundational GIS data such as orthographic photography, parcel fabric and roads, users will be able to create; edit and position address points and associated tabular information. When a new address point has been created the tool should be capable of automatically sending recipients notification of new addresses or modifications to the existing addresses database, such as Bell Canada, Canada Post, Hydro.

3.9. Web-Based Public Access Solution (Technology)

It is recommended that public access to the web-mapping application be enhanced. Whether the Town chooses to continue using the GeoCortex web-mapping application hosted by the County of Essex, or implement an alternative or concurrent solution, a web-mapping application should be configured to provide public access to selected municipal GIS data and related information.

Publishing a web-mapping service will provide members of the public with a new source of municipal information. Questions typically directed to the municipality via phone calls, emails, or front counter visits may ultimately be answered through the information made available in the web-mapping application. For instance, information related to roads, public services, municipal addresses, businesses, and tourism can be made accessible to the public and consultants via a simple GIS interface providing tools for searching, viewing, and printing maps. Security measure can also be implemented to ensure only information approved for public access is published. Providing public access to spatial data and related business information will help the municipality to serve its customers more efficiently, and will act as a new method for providing customer service.

3.10. Addressing (Information)

It is recommended that the Town resolve all duplicate road names (Addressing) created as a result of amalgamation to improve emergency services and GIS analytical functionality.

3.11. Create/Enhance GIS Datasets (Information)

For the purpose of understanding the source, maintenance and use of GIS information each dataset can be categorized into one of four 'geographies' or categories described below:

GIS Dataset Geographies	
Type of Geography	**Description**
Administrative Geography	Datasets defined by administrative policies and documents, which include for example ownership parcels, lot and concessions, zoning, official plan, easements, right-of-ways, voting poll boundaries, address points, points of interest, etc.
Infrastructure Geography	Datasets consisting of physical assets which would include roads, buildings, culverts, pipes, street lights, fire hydrants, etc.
Natural Features Geography	Datasets consisting of environmental features or characteristics which would include rivers, lakes, trees, soil types, wetlands, elevations, etc.
Raster Geography	Consisting of image files which would include orthographic photography, scanned and positioned survey documents, drawings, plans, digital photographs, etc.

The Town is at varying stages of data creation and enhancement. It is recommended that the Town focus on the creation and enhancement of the following datasets in the priority in which they are presented.

Data creation and enhancement efforts have been organized into the following four categories to facilitate prioritizing effort and budgeting.

- Foundational Datasets
- In Progress Datasets
- High Priority Datasets
- Long-Term Datasets

Foundational Datasets

Foundational GIS datasets are those datasets that are critical to providing an accurate geographic base from which other spatial data can be created. Foundational GIS datasets include: Orthographic Photography, Address Points, Parcels and Road Centreline. Accurate foundational GIS datasets are needed to provide cohesiveness between spatial and tabular data and should be considered the highest priority when scheduling data creation efforts.

Orthographic Photography (Raster Geography)

It is recommended that the Town acquire new 2006 Orthographic Photography. The County of Essex has purchased leaf-off colour orthographic photography (10cm ground resolution) flown in the Spring of 2006, which will be available to the Town in the Fall of 2006 at no charge.

Orthographic photography serves as an accurate positional base from which other supporting GIS datasets can be captured, created, positioned, and maintained. Examples of such features include: rivers, lakes, bridges, roads, cemetery plots, rooflines, and utilities. Orthographic photography can also be used to capture and replace outdated features currently contained in the Ontario Base Mapping (OBM) such as shorelines and road edges. Orthographic photography is categorized as Raster Geography.

Digital Elevation Model (Natural Features Geography)

It is recommended that the Town work with the County to acquire Digital Elevation Model (DEM) data. DEM data can be used to produce watersheds which are then used to model storm events, create hydrographs, and route floods; information which can ultimately be used to design culverts, dams, detention basins and other hydraulic structures. DEM data can also be used to create Triangular Irregular Networks (TIN) which can be used to visualize 3D topology.

Address Points (Administrative Geography)

Address points represent the municipal address as assigned by the municipality and are typically positioned at the building entrance or property access point as an *x,y* coordinate location. Any tabular information associated to a municipal address can be tied to an address point, for example: roll number; property identification number; ownership information; land development activity; or, business information such as hours of operation or services provided. Address points are particularly critical in supporting emergency response teams, and providing location information to Town staff and external agencies. Address points can also be used to identify points of interest. Address points are categorized as Administrative Geography.

Parcels (Administrative Geography)

The Town sub-licenses Parcel data from Teranet and MPAC, known as the Ontario Parcel, through Essex County. The parcel dataset identifies property boundaries and provides attributes for both assessment roll number (ARN) and Property Identification Number (PIN). The County receives updates from Teranet quarterly and uploads the data into the appropriate databases for the Lower Tier municipalities. It is recommended that the Town continue to license Ontario Parcel data. Parcels are categorized as Administrative Geography.

Road Centreline (Infrastructure Geography)

The Town maintains a road centreline GIS dataset which it provides to the County, Edits to the road centreline are saved to the Town's network and the updated road centreline dataset is then uploaded to the County's GIS database as needed.

It is recommended that the Town's road centreline be enhanced to support linear referencing. Using this process business data can be linked to either point locations or variable lengths of road. Examples of information typically related to road centreline include: snow removal routes; garbage pick-up routes, bus routes, speed zones, signage, collision statistics, pavement conditions, and capital road work project information. Road centreline is categorized as Infrastructure Geography.

In-Progress Datasets

In-Progress Datasets include efforts related to completing those datasets that the Town is already in the process of creating and/or enhancing, identified in Table 8 below.

Table 8: In-Progress Datasets

In-Progress Datasets		
Dataset	**Source**	**Tabular Attributes**
Administrative Geography		
Plans of Subdivisions (Proposed &	AutoCAD drawings, development applications	Proposed: Open/ Closed/Draft Approved, neighbourhood, Plan # Registered: Year, assumed/un-assumed,

In-Progress Datasets		
Dataset	**Source**	**Tabular Attributes**
Registered)		neighbourhood, name, phase, Plan #
Zoning	Hardcopy maps	Zoning code, description
Infrastructure Geography		
Catch Basins	Ministry of Environment, Pestalto, GPS	Depth, material, cover type
Curb Stop Valves	GPS	Material, size, joint type, corrosion type
Manholes	GPS	Rim elevation, depth, cover type, cover dimensions, material
Sanitary Pumps	AutoCAD drawings	Size, capacity, year installed, type, single phase/3 phase, motor size, commissioner, hydro meter #, account #, discharge data, pipe size, chamber size, gravity outlet, design engineer, supplier.
Sidewalks	Orthographic photography, field visits	Length, material, condition
Storm Sewers	AutoCAD drawings	Engineer reports, bylaws, lengths, watershed area, drainage area, type of pipe material, vintage, size, invert elevations, service connections, manholes, catch basins, size and type, frequency of cleaning
Storm Water Ponds	AutoCAD drawings, orthographic photography	Size, depth, water quality
Storm Water Pumps	AutoCAD drawings, orthographic photography	Size, capacity, year installed, type, single phase/3 phase, motor size, commissioner, hydro meter #, account #, discharge data, pipe size, chamber size, gravity outlet, design engineer, supplier.
Water Meter Routes	Hardcopy maps, internal staff, water system data	Route length, inspector, direction
Watermains	AutoCAD drawings	Material, material class, diameter, joint type, bedding, corrosion type

High Priority Datasets

Based on the information gathered through the workshop and interview process it has been determined that the following datasets identified in Table 9, High Priority Datasets are required to meet the business needs of the Town. Work on High Priority datasets should begin at the earliest time based on available resources and budget while considering the priority of completing Foundational and In Progress Datasets.

Table 9: High Priority Datasets

High Priority Datasets		
Dataset	**Source**	**Tabular Attributes**
Administrative Geography		
Development Agreements	Digital/Scanned development agreements, to be linked to the parcel dataset	Application particulars related to Subdivision Agreements, Development Charges Agreements, Pre-Servicing Agreements)
Easements	Teranet Table, Development applications, hardcopy maps	Type, owner, size, etc.
Minor Variances	Development applications, zoning	Application particulars
Site Plan Agreements	Development applications, AutoCAD drawings	Application particulars
Infrastructure Geography		
Sanitary Sewers	Engineering Drawings	Vintage, type of pipe, repairs/maintenance activity, flows, capacity, service areas, invert elevations, service connections, size and location, design engineer.
Watermains	Engineering Drawings	Vintage, type of pipe, repairs/maintenance activity, flows, capacity, service areas, invert elevations, service connections, size and location, design engineer.
Water Towers	GPS	Location of water tower, age, condition
Points of Interest Geography		
Fire Incident Reports	Points identified from Fire Reports (confidential)	To be determined
Points of Interest	Address Points: Ambulance Stations, Fire Stations, Health Care Facilities, Local Businesses, Parks, Schools, Cemeteries, Tourism Sites	Municipal Address, Name, Type, Hours of Operation
Police Incident Reports	Points identified from Police Reports (confidential)	To be determined

Long Term Datasets

The following GIS datasets were also identified to be prioritized and created after the completion of the high priority GIS datasets identified in Table 10 above. The datasets below were identified by staff in the corporate brainstorming session and business unit interviews. While the Implementation Plan will identify the specific order and date when these datasets should be created, the Town should review, add to,

and reprioritize the list on an ongoing basis to meet the Town's changing business needs.

Long Term Datasets

- Aquifers
- Building Floor Plans
- Building Permits
- By-Law Amendments
- Census Data
- Conservation Authority Boundaries
- Demographic Data
- Development Activity
- Drainage Areas
- Environmental Assessment Processes (Current & Pending)
- Land Use Regulations
- Municipal Facilities
- Parking Lots
- Private Drain Connections
- Recreation
- Railways
- Road Patrol Routes
- Roads Maintenance Activities
- Roadside Drainage
- Soils
- Survey Documents (scanned T-Plans, M-Plans and R-Plans)
- Trails
- Utilities (Hydro, Gas)
- Waterways

Based on the amount of effort to complete the Foundational and In Progress and High Priority datasets, which is identified in the Implementation Plan section of this document, it is recommended that the Town outsource the creation and/or enhancement of those GIS datasets that require 10 or more days effort to complete. Outsourcing will free up the time of the Town's resources to focus their skills and effort on data standards, maintenance, quality assurance, procedures and ensuring that the business needs of the Town are being met.

The GIS Implementation Plan will identify the estimated effort and recommend the logical order in which each dataset should be created and/or enhanced.

3.12. Job Descriptions (Documentation)

It is recommended that a job description(s) be prepared for the GIS positions to ensure that the roles and responsibilities of the positions are clearly defined. The GIS Technologist job description would include, but not be limited to the following duties and requirements:

Duties:

- Manage and administer GIS software and tools;
- Configure and manage GIS-related databases;
- Provide support and mentorship to GIS Technologists;
- Provide GIS training and technical support to municipal staff;

- Act as a lead GIS resource for special projects, as needed; and,
- Liaise with external organizations and members of the public on GIS-related issues.

Requirements:

- Developed understanding and working knowledge of ArcSDE;
- Demonstrated experience, preferably within a municipal environment, in identifying business needs; and proposing and implementing practical solutions; and,
- Ability to lead, mentor, and support staff in a team environment.

An example job description for the Senior GIS Analyst is attached as Appendix C.

3.13. GIS Operations Manual (Documentation)

It is recommended that a GIS Operations Manual be developed to clearly define how GIS services and support will be provided.

The GIS Operations Manual will contain, but not be limited to the following information:

Administration

1. GIS Service Request Policy

   Requests for GIS services and support comes in the form of general GIS questions (e.g. how to perform a spatial query), application specific questions (e.g. how to print a map from the web-mapping application), or to provide detailed training (e.g. how to track assets in CityWorks).

   Protocol for GIS support request:

   - Request for GIS support is e-mailed to the IT Department;
   - Request for GIS support is acknowledged within 48 hours, with the required support being provided (question answered immediately), or with a time estimate of when the response can be answered;
   - If the GIS resource is unable to answer the question or request for support, it is the responsibility of that GIS resource to seek further support from additional resources (IT Manager, Essex County IT Department, ESRI Technical Support, etc.) until the request for support is satisfied.

2. Schedule of Costs

   Define the cost, restrictions and methodology in which the public is able to purchase and/or license hard copy and/or digital data created and owned by the Town of Lakeshore.

3. Services Level Agreements

   Develop services level agreements for internal departmental use.

4. Partners and Stakeholders

5. Data Licensing Agreements

   Terms of use and user agreements to govern the use of all GIS data products (both digital and hardcopy) produced by the Town. Terms of use should be clearly defined and distributed to users and published with the Town's public web-mapping application. User agreements should be negotiated and endorsed by all end-users purchasing digital GIS data from the Town.

6. Data Maintenance Procedures
7. Administrative Procedures
8. Standards
9. Map Layouts

Services

1. GIS Program Coordination
2. Application Services
3. Map Production
4. Web-GIS Management

3.14. Standards, Maintenance Procedures and Metadata (Documentation)

It is recommended that Standards be created for each GIS dataset, defining the specifications and data model which is critical to determining functionality and costs, as well as determining and measuring data quality.

It is also recommended that Procedures be developed to provide step-by-step instructions on how to create and then maintain each GIS dataset. Procedures will identify the frequency in which the dataset should be updated. Standards and Procedures for each GIS dataset can be published in a joint document. See Appendix D for a sample of GIS Standards & Procedures for the creation and maintenance of Address Points.

It is also recommended that metadata be created for each GIS dataset using ESRI's ArcCatalog. Metadata is a summary or description of a dataset or compilation of data that is created, collected, used or distributed by an organization. Metadata catalogues: the contents of a dataset; details about the accuracy, quality, currency, and completeness of the data; spatial information about the data; and, details of how users can gain access to the dataset.

Standards, Maintenance Procedures and Metadata records will:

- Provide a comprehensive inventory of data assets owned and maintained by the Town, as well as information acquired from other sources making it easer for users to locate desired information.
- Increase user confidence in the information;
- Support critical business decisions made using the information and in some instances may be required to support legal evidence; and,
- Help determine budget allocations based on a better understanding of when data assets need to be updated or replaced.

ArcCatalog comes standard with ArcGIS and includes metadata editors that enables the automatic generation and editing of Metadata based on the existing properties of the dataset. When the data changes – for example, when a new attribute is added – ArcCatalog automatically updates the metadata with the new information. Metadata created with ArcCatalog is stored as XML data within the geodatabase, or in an external file that follows the dataset whenever it is copied or moved to a new location. See Appendix E for a sample of metadata created for Address Points.

3.15. Disclaimer (Documentation)

It is recommended that the Town develop a disclaimer to accompany all published digital and hardcopy data products. Although every attempt should be made to maintain the accuracy and currency of all data published internally and externally, a clearly visible disclaimer should be published with all products to ensure that the Town is not held liable for incorrect or outdated information.

The Town's disclaimer should also take into account the identification of datasets which are not owned or maintained by the Town, such as information from Teranet, MPAC, MNR and conservation authorities, for example.

3.16. GIS Documentation Library (Documentation)

It is recommended that a centralized GIS documentation library be implemented that is accessible to all staff. The GIS documentation library will be the single location for maintaining all written materials related to GIS applications, tools and data, and would include but not be limited to information such as:

- GIS Operations Manual
- Hardware product information;
- Software training manuals and other materials;
- Software licensing information;
- Data standards and procedures documents;
- Technical 'white papers' and other research documents;
- Answers to Frequently Asked Questions.

3.17. Strategic Partnerships (People)

Utilities

It is recommended that the Town form strategic partnerships with local utilities to maximize potential data sharing opportunities. Local utility providers such as Union Gas, Hydro One, and E.L.K Energy Inc. should be approached with a data sharing agreement whereby the Town provides the utilities with access (view and query only, no edit privileges) to GIS data such as roads, municipal addresses, and municipal assets and infrastructure in exchange for access to utility servicing information (i.e. location of utilities infrastructure). Secure access to municipal data should be provided to external partners via the web-mapping application, protected by username and password authentication. The provision of utilities data to the Town must be negotiated on a case-by-case basis with each potential partner, but may come in the form of a regularly updated 'snap-shot' of utilities infrastructure. Based on the mutually beneficial nature of this data sharing partnership, it is recommended that no data sharing costs be negotiated.

University of Windsor

It is recommended that the Town form a strategic partnership with the University of Windsor to maximize opportunities to utilize university resources in completing special projects. The University of Windsor offers undergraduate and graduate level courses in GIS, remote sensing, geoinformatics, and environmental modeling. Potential exists to support university curriculum by 'employing' university students to undertake special projects such as data collection or spatial analysis. Employment may be in the form of part-time paid work, or as unpaid practical experience to be

evaluated as an integral part of coursework. The university has developed a tool and methodology for the mobile acquisition of flexible, real-time spatial data for environmental monitoring and the Town should consider this as a viable option for field data collection and analysis for special projects. The university has successfully completed a variety of community projects for the City of Windsor including a library allocation study, an election poll locator, and a fire and rescue allocation study.

3.18. Computers (Technology)

It is recommended that the following computers be installed to support GIS related business needs, which includes an asset management system.

- Desktop computers in Public Works Yards and outlying Fire Halls.
- Laptop computers in Engineering & Infrastructure significant vehicles (repair trucks, road patrol vehicle, and utility locate trucks); Fire Command Vehicles; and in Fire trucks as required.

3.19. Document Management Solution (Technology)

It is recommended that the existing document management software Laserfiche be utilized to store, retrieve, and view digital copies of hardcopy documents. Within the context of GIS, document management systems store scanned images of hardcopy documents (plans, deeds, engineering drawings, application forms, permits, digital photographs, etc.) that are then linked to records in a spatial database. Images are retrieved on demand via selection of the objects with which they are associated or through a database query. Laserfiche allows for text searches of scanned images. The Town may consider implementing a web-based survey document manager tool enables images to be identified and retrieved spatially referenced to a parcel of land or municipal assets, such as piped infrastructure.

3.20. AVL (Technology)

It is recommended that the Town integrate Grey Island Automatic Vehicle Location (AVL) solution being implemented in the Public Works Department with the Town's GIS datasets to improve the analytical and cartographic functionality of the system. Integrating the real-time location of vehicles with the Town's parcel and orthographic photography data for example will provide greater understanding of the location of vehicles related to businesses, residents, and points of interest.

3.21. Land Development Tracking System (Technology)

It is recommended that a Land Development Tracking (LDT) system be implemented to automate the tracking of workflow related to the processing and approval of development applications and permits. A LDT system would make development application and permits accessible through a digital forms interface, allowing data to be captured by staff from hardcopy applications to the database; and ultimately allowing users to apply online. Process tracking and workflow management functionality ensures each step in the process is documented as it is completed, or flagged for future attention. Since the approval of development applications and permits involves input from several departments, it is critical that all departments involved have access to the land development tracking information.

Implementing an LDT system enhances not only the management of processing and approving development applications, but also simplifies the collection of development related information and statistics required for special studies and reports such as those required for the preparation of development charges and growth management studies.

4. SUMMARY OF RECOMMENDATIONS

The following Recommendation Summary table identifies each recommendation and the estimated amount of "Days of Effort" and "Cost" to implementing each recommendation. The number of Days of Effort can be performed by Town staff, contracted out, or a combination of the both. Costs are based on an estimated purchase or licensing cost to implement the recommendation.

The estimated days of effort and costs are provided as a guide for prioritizing and scheduling the implementation of recommendations over a five year period. The Implementation Plan will provide detailed days of effort and cost associated with specific deliverables, which will result in more accurate estimates.

		Days of Effort	Cost
3.1.	County of Essex (People)		
3.2.	Senior GIS Analyst (People)		
3.3.	Training (People)		
3.4.	GIS Data Warehouse (Technology)		
3.5.	Network Communication (Technology)		
3.6.	Asset Management System (Technology)		
3.7.	Web-Mapping Solution (People)		
3.8.	Web-Based Address Point Management Tool (Technology)		
3.9.	Web-Based Public Access Solution (Technology)		
3.10.	Addressing (Information)		
3.11.	Create/Enhance GIS Datasets (Information)		
	▪ Foundational Datasets		
	▪ In-Progress Datasets		
	▪ High Priority Datasets		
	▪ Long Term Datasets		
3.12.	Job Descriptions (Documentation)		
3.13.	GIS Operations Manual (Documentation)		
3.14.	Standards, Maintenance Procedures and Metadata (Documentation)		
3.15.	Disclaimer (Documentation)		
3.16.	GIS Documentation Library (Documentation)		
3.17.	Strategic Partnerships (People)		
3.18.	Computers (Technology)		
3.19.	Document Management Solution (Technology)		
3.20.	AVL (Technology)		
3.21.	Land Development Tracking System (Technology)		

5. NEXT STEPS

5.1. Approval of Recommendations

Upon final submission of this GIS Strategic Plan the Town will:

- i*PLAN*corp will circulate the GIS Strategic Plan to Department Heads and key staff for review, comment and acceptance;
- i*PLAN*corp will make final revisions to recommendations as required;
- i*PLAN*corp and the Town will review estimated days of effort and cost to implement each recommendation and prioritize the implementation of recommendations over the next five years based on business needs and forecasted budget;
- i*PLAN*corp will conduct an on-site meeting to present recommendations to staff, council, and other interested stakeholders; and,
- The Town will sign-off on Phase 1: GIS Strategic Plan; and,
- i*PLAN*corp will proceed to complete Phase 2: GIS Implementation Plan.

5.2. GIS Implementation Plan

Once the recommendations have been signed-off, i*PLAN*corp will proceed with the preparation of the GIS Implementation Plan. The Implementation Plan will provide a detailed action plan for the implementation of those recommendations to be implemented over a period of the first 2 years, describing the tasks, resources, timelines and estimated costs. The Implementation Plan will also identify those recommendations to be implemented between years 3 – 5 at a high level, as they are dependent upon the successful completion of preceding tasks, and should be revisited prior to implementation.

The GIS Implementation Plan will be comprised of:

- A Microsoft Word document providing specific detailed descriptions of each deliverable, implementation task, and related supporting documents; and,
- A Microsoft Project Gantt chart that identifies required resources, timelines, and estimated costs. This project plan will be delivered in both hardcopy and digital format so that it can be updated as needed and used as a project management tool throughout the implementation.

APPENDICES

APPENDIX A:
INTERVIEW PARTICIPANTS

Interview #1 – Tuesday January 24, 2006 (8:30am – 10:00am)
Community & Development Services, Building and Planning Division

Name	Title
Alex Shinas	Manager Development Services
Bruce McAllister	Senior Planner (Consultant)
Maureen Lesperance	Planning Co-ordinator
Sue Mailloux	Office Clerical
Mirella Allison	Building Inspector
Barbara Rusan-Cronmiller	Plans Examiner

Interview #2 – Tuesday January 24, 2006 (10:15am – 11:45am)
Engineering & Infrastructure Services

Name	Title
Dan Piescic	Director Engineering & Infrastructure Services
Chris Masterson	Advisor Engineering & Infrastructure Services
Tony DiCiocco	Manager Engineering Services
Tony Francisco	Manager Environmental Services
Chuck Chevalier	Manager Public Works

Interview #3 – Tuesday January 24, 2006 (12:30pm – 1:15pm)
Economic Development

Name	Title
Dave Genik	Economic Development Officer

Interview #4 – Wednesday January 25, 2006 (8:30am – 9:30am)
Community & Development Services, Fire Services Division

Name	Title
Don Williamson	Fire Chief

Interview #5 – Wednesday January 25, 2006 (9:45am – 11:15am)
County of Essex, Information Technology

Name	Title
Wendy St. Amour	Manager of IT
Jim Giniac	Network Administrator
Michael Sherwood	GIS Technician

Interview #6 – Wednesday January 25, 2006 (1:30pm – 3:00pm)
Finance & Performance Services

Name	Title
Sylvia Rammelaere	Director Finance & Performance Services
Wendy Poole	Manager
Patti Atkinson	Manager of Accounting Services

Interview #7 – Wednesday January 25, 2006 (3:15pm – 4:15pm)
Community & Development Services, Recreation and Facilities

Name	Title
Mariette Kazlauskas	Recreation Coordinator
Romeo Beaulieu	Facilities Supervisor

Interview #8 – Thursday January 26, 2006 (8:30am – 10:00am)
Corporate Services

Name	Title
Kirk Foran	Director Corporate Services
Rita Arsenault	Manager Customer Service & Policy Development
Mary Masse	Clerk

Interview #9 – Thursday January 26, 2006 (10:15am – 10:45am)
Ontario Provincial Police

Name	Title
Steve Johnston	Constable

Interview #10 – Thursday January 26, 2006 (10:45am – 11:30am)
Strategic Services

Name	Title
James Snyder	Manager Strategic Services

Interview #11 – Thursday January 26, 2006 (11:30am – 12:30pm)
Corporate Services, Information Technology

Name	Title
Brian Lucier	Manager Information Technology
Sue Johnston	GIS Technologist

APPENDIX B:
CORPORATE BRAINSTORMING SESSION

Monday, January 23, 2006 (2:00pm – 3:00pm)

Attendees:
Building & Planning
Community & Development Services
Corporate Services
Economic Development
Engineering & Infrastructure Services
Finance & Performance Services
Fire Services
IT & GIS
Ontario Provincial Police
Recreation & Facilities
Strategic Services

The objective of the corporate brainstorming session was to generate ideas about the potential short and longer term uses of GIS at the Town of Lakeshore. The ideas generated are summarized below and have been used to help shape the Town's 5-year vision. It should be noted that in the development of recommendations, the classification of short and longer-terms goals may have been altered from the brainstormed time classifications, to better suit the implementation of the Town's overall vision.

Short-Term Goals (Years 1 & 2)	Longer-Term Goals (Years 3 – 5)
Desired Data	
▪ Infrastructure services ▪ Zoning consolidation ▪ Minor variances ▪ Accurate base map ▪ Fire and police incident reports ▪ Development agreement ▪ Site plan agreement ▪ Easements ▪ Comprehensive property data ▪ Property database of record	▪ Infrastructure - Watermains - Sanitary sewers - Storm sewers - Drains ▪ Digital aerial photography ▪ Parcel ▪ Parcel linked with property ▪ Property lined with engineering studies - Drainage areas - Capacity of sewers and treatment facilities ▪ Property linked to billing ▪ Zoning ▪ Current and pending EA processes ▪ Fire and police data ▪ Crime statistics ▪ Census data ▪ Aquifer ▪ Soils ▪ WSWA

Short-Term Goals (Years 1 & 2)	Longer-Term Goals (Years 3 – 5)
	▪ Waterways ▪ Hydro layer ▪ Demographics - Statistics, population ▪ 911 addressing ▪ Building floor plans to identify hazardous materials ▪ Roads maintenance ▪ Trails ▪ Voters list ▪ Minor variance ▪ Building permits ▪ Service layers (gas, hydro) to determine growth ▪ Development ▪ Census data ▪ Recreation
Practical Applications	
▪ Notification, print labels and lists ▪ Document management - Attach files and integrate with Laserfiche ▪ Print reports based on selected property - Include ortho and property information ▪ Customer service - Track calls, integrate with analysis mapping ▪ Sales model for selling data	▪ Easier, faster access to maps ▪ Simple user interface → "GIS for Dummies" ▪ Analysis tools ▪ Queries ▪ Public access (internet, front counter) ▪ Work order system ▪ Automated bylaw enforcement ▪ Boil water advisories ▪ Flood plain limits ▪ User agreements for aerial maps ▪ Maintain own parcel map system ▪ Spatial analysis ▪ Booking for recreational services ▪ Update DC background report ▪ Converge services ▪ Automate letters and mailouts for zoning ▪ Social planning
Resource Implications/Opportunities	
▪ Training on existing GIS ▪ Identify data entry staff	▪ Partner with other agencies and utilities ▪ Continued training with software changes ▪ Work with or isolate self from County ▪ ConnectOntario

APPENDIX C:
JOB DESCRIPTIONS

Corporation of the Town of Lakeshore

JOB DESCRIPTION

POSITION TITLE: Senior Geographic Information System (GIS) Analyst

PURPOSE OF POSITION:

Reporting to the IT Manager, the Senior GIS Analyst is responsible for the design, development, implementation, maintenance and documentation of geospatial information technology solutions for the Town of Lakeshore.

MAJOR RESPONSIBILITIES

- Maintain a GIS Operational Manual consisting of, but not limited to standards, procedures and Services Agreements.
- Assist business units in selecting and implementing appropriate geo-spatial technology and procedures to best serve their needs by researching and recommending viable options.
- Analyze, design, and implement spatial data structures and spatially enabled applications with objectives to promote integration with existing geo-spatial information assets and tools.
- Ensure the cost effective creation and maintenance of corporate GIS databases and/or applications.
- Design, develop, implement and support geo-spatial technologies using ESRI and AutoDesk software products, more specifically using ArcGIS, ArcMAP, ArcEDITOR, ArcObjects, ArcInfo, ArcIMS, ArcSDE and AutoCAD.
- Continually research applications and best practices and make recommendations to ensure the Town of Lakeshore is utilizing the most current industry standard solutions.
- Develop and implement quality control/quality assurance procedures and activities using manual and automated tools and methods to ensure the quality of the corporate GIS database.
- Using a variety of hardware and software tools, including hand held GPS units, capture and/or create information to support corporate business needs.
- Implement and maintain standard workflows, procedures and standards to ensure the corporate GIS databases is complete and current.
- Provide analysis and cartographic services as requested to various departments to assist in decision-making, public awareness, program implementation, and policy development.
- Create digital files, standard and special purpose maps, plans, sketches, and reports, of various requested geographic data.

- Ensure that data access and updates are conducted according to Town, license and partner policies and that data integrity and security is preserved.
- Export and distribute GIS data in a variety of standard data and media formats, maintaining a detailed data service request log, ensuring data distribution contracts, copyright and statements of liability are complete and properly authorized.
- Receive data from external agencies by verifying and documenting the content and quality of the data, importing the data into the corporate GIS environment.
- Perform general technical support functions in support of the Information Technology division.
- Develop and maintain detailed data models in an ESRI Geodatabase environment.
- Research problems and deal with highly complex issues.
- Provide instruction to GIS Technologist and Department staff in the use of business and administrative software, including word processing, spreadsheets and database management; as well as business processes and procedures.

HUMAN RESOURCES

This individual is not required to supervise any staff.

DECISION MAKING AND JUDGEMENT

Work is performed under the general direction of the Manager of Information Technology, with access to the municipal policies, procedures, bylaws and regulations as well as other department heads. Make recommendations to the Manager of Information Technology in regard to the day-to-day GIS business activities. Troubleshooting skills are required when determining IT malfunctions.

INTERPERSONAL SKILLS

Internal:

- Provide leadership to the GIS Technologists'
- Communicate effectively in person, writing (or email) and over the phone to resolve technical and business issues
- Self-motivated with the ability to work independently and to learn quickly
- With all office administration to requisition supplies and services
- With other staff to obtain and provide information as necessary

External:

- Work with contractors / professionals / suppliers to implement projects, and to obtain and exchange information

WORKING CONDITIONS

35 hours per week, Monday to Friday 8:30 a.m. to 4:30 p.m. with 1 hour for lunch. Occasional over-time required for information technology related tasks and emergency situations.

PREFERRED QUALIFICATIONS

- Require community college diploma in Geographic Information Systems, Engineering, Land Surveying, Geography, Urban Planning or a related discipline or an equivalent combination of education and relevant business experience.
- Demonstrated experience and proven knowledge spatial database application including practical experience working with GIS technology, and internet-based mapping, preferably in a municipal environment for a minimum of 5 years.
- Demonstrated leadership experience working with management and staff to implement and maintain a Corporate GIS environment.
- Experience working with ESRI, AutoDesk suite of software and corporate operating and server systems.
- Excellent cartographic, presentation and graphic design skills for the creation of professional quality maps and related products.
- Strong understanding of computer software, hardware and related operations.
- Excellent analytical, problem solving and time management skills.
- Good interpersonal, oral and written communication skills.
- Ability to troubleshoot computer hardware and software issues.

APPENDIX D:
SAMPLE GIS DATA STANDARDS & PROCEDURES

Address Points

1 Description

Filename: Address_Points
Geography: Administrative
Database: sde_data
Abstract: Addresses within the City of Pickering.
Format: ESRI Feature Class
Type: Spatial – Point
Grid Co-ordinate System: Universal Transverse Mercator (UTM)
Zone: 17
Units: Metres
Geodetic Datum: North American Datum (NAD) of 1983
Ellipsoid: Geodetic Reference System (GRS) 8

2 Attribute Information

Field Name	Domain Values	Key Linking Field	Key Theming Field
ARN	15 or 20 digit roll number (as ONTARIO PARCEL)	*	
PROPERTYROLL	15 digit roll number from PROPERTYOWNERS	*	
HOUSENUMBER	from PROPERTYOWNERS		
HOUSENUMBER_INT	from PROPERTYOWNERS (text convert to integer)		
STREET	from PROPERTYOWNERS		
STREETTYPE	from PROPERTYOWNERS		
STREETDIRECTION	from PROPERTYOWNERS		
UNITTYPE	from PROPERTYOWNERS		
UNITNUMBER	from PROPERTYOWNERS		
CITY	from PROPERTYOWNERS		

3 Associated Files

Layer File(s): Address_Points.lyr
Supporting Datasets: TBL_INTERMEDIATE_ARN
Dependant Datasets: Breken Points
Source File(s): Assessment Parcels, AMANDA.PROPERTY

4 Ownership & Maintenance

Data Ownership: The City of Pickering
Maintained by: Information and Support Services
Date of Latest Update: March 31, 2006
Update frequency: Monthly or as required.
Maintenance Procedure:

An *unmatched query* between Address_Points.PropertyRoll and PROPERTYOWNERS.ROLLNO will need to be executed to determine if any news addresses have been added to the AMANDA database.

Open and execute *unmatched_addresses.sql* in SQL Server > SQL Query Analyzer to return these records.

Use standard editing procedures to add points to the feature class at the appropriate location.

To insert a new address point:

1. Start Editing. Set Task to “Create New Feature.”
2. Set Target Address Points to which you wish to add a point.
3. Select the Sketch Tool from the editing toolbar.
4. Click on the map where the new point will be placed.
5. Open attributes and populate the ARN field according to Ontario Parcel conventions, PROPERTYROLL field according to AMANDA conventions, and HOUSENUMBER_INT field with an integer value (for Geocoding purposes).

An *update query* based on PROPERTYROLL will need to be executed to add the new attributes from the AMANDA database.

Open and execute *update_addresses.sql* in SQL Server > SQL Query Analyzer add attributes from the AMANDA database.

5 Specifications

Topology Rules:
None

6 Initial Creation

Address Points were created by joining Assessment Parcel to AMANDA.PROPERTY via the Intermediate Assessment Roll Number table (TBL_INTERMEDIATE_ARN) in an SDE View where:

(ASSESSMET_PARCELS.ARN = TBL_INTERMEDIATE_ARN.PCL_ARN)
AND
(TBL_INTERMEDIATE_ARN.AMANDA_ARN =
AMANDA.PROPERTY.PROPERTYROLL)

This table allows the spatial features to join to records in AMANDA and allows AMANDA records to be mapped. This table provides three additional important functions:

1. The table includes a link to all spatial features even if there is no matching record in AMANDA.
2. The table includes a link to all records in AMANDA even if there is no matching spatial feature.
3. The table links a single spatial feature having a 20 digit roll number to multiple AMANDA records having 15 digit roll numbers that correspond to the 20 digit range.

This ability joins a single address point for each parcel having 15 digit roll number and single address point for each 15 digit roll number corresponding to a single parcel having a 20 digit roll number.

The SDE View was exported to a polygon feature class. The polygon feature class was converted to a point feature class using ArcToolbox.

Address Points were created at, and remained at, the parcel centroid. Townhouses were an exception. These points were position to the location of each unit as displayed in the aerial photography.

APPENDIX E:
SAMPLE METADATA

Metadata: Address_Points

Identification_Information
Data_Quality_Information
Spatial_Data_Organization_Information
Spatial_Reference_Information
Entity_and_Attribute_Information
Distribution_Information
Metadata_Reference_Information

Identification_Information:

Citation:
Citation_Information:
Originator: City of Pickering
Publication_Date: August 2005
Title: sde_data.SDE_OWNER.Address_Points
Geospatial_Data_Presentation_Form: vector digital data
Online_Linkage:
Server=FRSBS; Service=5161; Database=sde_data; User=sde_owner; Version=sde.DEFAULT
Description:
Supplemental_Information: SOURCE:
Time_Period_of_Content:
Time_Period_Information:
Multiple_Dates/Times:
Single_Date/Time:
Calendar_Date: unknown
Time_of_Day: unknown
Currentness_Reference: ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: Monthly
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: 280.778338
East_Bounding_Coordinate: 280.991129
North_Bounding_Coordinate: 44.009203
South_Bounding_Coordinate: 43.793331
Keywords:
Theme:
Access_Constraints: Contact the City of Pickering for access constraints.
Use_Constraints: Contact the City of Pickering for use constraints.
Native_Data_Set_Environment:
Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.1.0.722

Data_Quality_Information:

Lineage:
Process_Step:
Process_Description: Dataset copied.
Source_Used_Citation_Abbreviation:
\\frsbs\Pickering\Data_For_Conversion\Infrastructure_Geograhy\InfrastructureGeography.mdb
Process_Step:
Process_Description: Metadata imported.
Source_Used_Citation_Abbreviation: C:\DOCUME~1\ARMSTR~1\LOCALS~1\Temp\xmlF6.tmp
Process_Step:
Process_Description: Metadata imported.
Source_Used_Citation_Abbreviation: C:\DOCUME~1\pereiran\LOCALS~1\Temp\xmlD.tmp
Process_Step:
Process_Description: Metadata imported.
Source_Used_Citation_Abbreviation: C:\DOCUME~1\pereiran\LOCALS~1\Temp\xml5D.tmp

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:
SDTS_Point_and_Vector_Object_Type: Entity point
Point_and_Vector_Object_Count: 31416

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:
Planar:
Grid_Coordinate_System:
Grid_Coordinate_System_Name: Universal Transverse Mercator
Universal_Transverse_Mercator:
UTM_Zone_Number: 17
Transverse_Mercator:
Scale_Factor_at_Central_Meridian: 0.999600
Longitude_of_Central_Meridian: -81.000000
Latitude_of_Projection_Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.001000
Ordinate_Resolution: 0.001000
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Resolution: 1.000000
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:
Entity_Type:
Entity_Type_Label: sde_data.SDE_OWNER.Address_Points
Attribute:
Attribute_Label: OBJECTID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain:
Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: ARN
Attribute:
Attribute_Label: PROPERTYROLL
Attribute:
Attribute_Label: HOUSENUMBER
Attribute:
Attribute_Label: HOUSENUMBER_INT
Attribute:
Attribute_Label: STREET
Attribute:
Attribute_Label: STREETTYPE
Attribute:
Attribute_Label: SHAPE
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: STREETDIRECTION
Attribute:
Attribute_Label: UNITTYPE
Attribute:
Attribute_Label: UNITNUMBER
Attribute:

Attribute_Label: CITY
Detailed_Description:
Entity_Type:
Entity_Type_Label: sde_data.SDE_OWNER.clip_GTA_ANSI
Attribute:
Attribute_Label: SIG_DES
Attribute:
Attribute_Label: OBJECTID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain:
Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: HECTARES
Attribute:
Attribute_Label: SHAPE.area

Distribution_Information:

Resource_Description:
Not downloadable data. Contact the City of Pickering for distribution information.

Metadata_Reference_Information:

Metadata_Date: 20060412
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: iPLANcorp
Contact_Address:
Address_Type: mailing address
Address: 211 Main Street South
City: Newmarket
State_or_Province: Ontario
Postal_Code: L3Y 3Y9
Contact_Voice_Telephone: 905 895 0011
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Extensions:
Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>
Profile_Name: ESRI Metadata Profile
Metadata_Extensions:
Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>
Profile_Name: ESRI Metadata Profile
Metadata_Extensions:
Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>
Profile_Name: ESRI Metadata Profile